B.Tech. (Fashion Technology)

2015 Regulations, Curriculum & Syllabi

BANNARI AMMAN INSTITUTE OF TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University, Chennai
Approved by AICTE - Accredited by NBA New Delhi, NAAC with 'A' Grade and ISO 9001:2008 Certified)
SATHYAMANGALAM – 638 401 Erode District Tamil Nadu
Phone : 04295 226000 Fax : 04295 226666
Web:www.bitsathy.ac.in E-mail : stayahead@bitsathy.ac.in

CONTENTS

REGULATIONS 2015

(CHOICE BASED CREDIT SYSTEM)

(Common to all B.E./B.Tech. Degree Programmes)

Regulation 2015 has been prepared in accordance with the guidelines given by the University Grants Commission, All India Council for Technical Education and affiliating University incorporating the features of the Choice Based Credit System (CBCS). The Regulation 2015 is applicable to the candidates admitted to the Bachelor of Engineering (B.E.) / Bachelor of Technology (B.Tech.) Degree Programmes of the Institution in the academic year 2015-2016 for Regular admission (Academic year 2016-2017 for Lateral Entry) and subsequently.

The regulations hereunder are subjected to amendments as may be decided by the Academic Council of the Institution from time to time. Any or all such amendments will be effective from such date and to such batches of students (including those already in the middle of the programme) as may be decided by the Academic Council.

1. ADMISSION

Candidate, seeking admission to the B.E./B.Tech. Programme, shall satisfy the conditions of admission prescribed by the Directorate of Technical Education and Anna University, Chennai as given below.

1.1 Regular Admission

Candidates, for admission to the first semester of the eight semesters B.E./B.Tech. Degree Programmes, shall be required to have passed:

- Higher Secondary Examination (10 +2) of Curriculum (Regular Academic Stream) prescribed by the Government of Tamil Nadu with Mathematics, Physics, and Chemistry as three of the four subjects of the study prescribed under Part-III or any other examinations of any Board or University or authority accepted by the Syndicate of the University / Directorate of Technical Education (DoTE), Chennai as equivalent thereto.

(or)

- Should have passed Higher Secondary Examination of Vocational Stream (Engineering/Technology), prescribed by the Government of Tamil Nadu.

1.2 Lateral Entry Admission

1.2.1 The candidates who possess Diploma in Engineering / Technology awarded by the State Board of Technical Education and Training, Tamil Nadu or its equivalent are eligible to apply for Lateral Entry admission to the third semester of B.E. / B.Tech. Programmes in the branch of study as per the eligibility criteria prescribed by the Directorate of Technical Education from time to time.

(or)

1.2.2 The candidates who possess the Bachelor Degree in Science (B.Sc.) (10+2+3 stream) with Mathematics as a subject in B.Sc. is eligible to apply for Lateral Entry admission to the third semester of B.E./B.Tech. Programmes, as per the eligibility criteria prescribed by the Directorate of Technical Education from time to time. Such candidates shall undergo two additional Engineering subject(s) one each in third and fourth semesters, as bridge courses.

2. PROGRAMMES OFFERED

A candidate may be offered admission to any one of the programmes offered by the Institution for the candidates specified in Clause 1.1 and as per the eligibility criteria of DoTE for the candidates under Clause 1.2 from the list given below:

B. E. Programmes

i. Aeronautical Engineering
ii. Agricultural Engineering
iii. Automobile Engineering
iv. Civil Engineering
v. Computer Science and Engineering
vi. Electrical and Electronics Engineering
vii. Electronics and Communication Engineering
viii. Electronics and Instrumentation Engineering
ix. Mechanical Engineering
x. Mechatronics

B. Tech. Programmes

i. Biotechnology
ii. Fashion Technology
iii. Information Technology
iv. Textile Technology
v. Food Technology

3. STRUCTURE OF THE PROGRAMME

3.1 Every programme shall have a distinct curriculum with syllabi consisting of theory, laboratory, mini-project, life-skills and personality development courses, as prescribed by the respective Boards of Studies, broadly categorized under:

(i) **Basic Science** courses including Mathematics, Physics, Chemistry and further specialization in these subjects

(ii) **Basic Engineering c**ourses including Engineering Graphics, Workshop Practices, Basics of Electrical, Electronics, Civil, Mechanical Engineering, Engineering Mechanics and Computer Programming.

(iii) **Humanities and Social Science c**ourses including Language Courses, Management Courses, Life Skills and Professional Ethics.

(iv) **Professional Courses** include Discipline Core Courses, Professional Electives, Core Electives and Open Electives.

(v) **Employability Enhancement Courses (EEC)** include Project Work and /or Internship, Seminar, Industrial /Practical Training, Value Added and Certificate Courses.

The assortment of different courses shall be designed that the student, at the end of the programme, would be able to be trained not only in his / her relevant professional field but also as a socially mindful human being.

The medium of instruction is English for all the Courses, Examinations, Seminar Presentation, Projects and any other courses that a student registers for.

3.2 Each course is normally assigned a certain number of credits, with 1 credit per lecture period per week, 1 credit for 2 periods of tutorial, 1 credit for 2 periods of laboratory courses, and 1 credit for 2 periods of seminar/project work per week.

3.3 A Diagnostic Test will be administered to all the B.E. / B.Tech. students after the admission to assess the proficiency in English and based on the score they will be brought under two streams namely, Stream A and Stream B. Students under Stream A will study **Communicative English I** and Stream B will study **Basic English I** under Language Elective I in the First Semester. In the Second Semester, Stream A will be further divided into two categories based on their English language proficiency assessed in the Continuous Assessment, while the upper segment can

enroll and study **German / Japanese / French / Chinese / Hindi** and the remaining students of that Stream will study **Communicative English II**. The students under Stream B will study **Basic English II** or may opt for **Communicative English II** based on the assessment carried out at the end of the semester I.

3.4 Every student shall be required to opt for **Nine** electives from the list of electives. Students can opt for the electives (Core / Professional / Open Elective) from any branch of B.E/B.Tech. Programmes, besides his / her own discipline courses, during V to VIII Semesters, if he/she satisfies the prerequisite for that particular course.

3.5 However, out of nine electives, every student shall be required to opt for, a minimum of three electives as open electives from the list of open electives of the branch / branches other than his / her branch of specialisation. There shall be no pre-requisite course(s) for such open electives.

3.6 Students can also opt for **one-credit courses** of 15 to 20 hour duration, which will be offered by the experts from the industry on specialised topics. Students can opt for such **one-credit courses** during the semesters I to VII as and when these courses are offered. A student will also be permitted to register the **one-credit courses** offered by other Departments, provided the student has fulfilled the necessary pre-requisites or the courses that may not require any pre-requisites. Under no circumstances, the same one credit course shall be repeated in subsequent semesters in any Department / Centre and a maximum batch size for a given course shall not exceed 40. In the case of disciplines with multiple divisions (intake more than 60) different course(s) shall be offered to other batch(es) of students.

On successful completion of one credit courses, Credits will be indicated in the Grade Sheet, but will not be considered for computing the Cumulative Grade Point Average (CGPA). However, if a student wishes to avail the exemption from any one of the Electives (other than open elective) of the Semester VIII, he / she can do so by exercising his / her option in writing to the respective Head of the Department during the beginning of the VIII Semester, following the equivalence norm, that **one regular elective (**in the **VIII Semester)** is equivalent to **three one-credit courses** completed by the student during the previous semesters, IV to VII. Details of the one credit courses offered by the department shall be forwarded to the Office

of the Controller of Examinations. However one credit courses completed during I to III semesters shall be maintained in the Grade sheet as "Additional credits earned" (not considered for the computation of GPA/CGPA).

3.7 Fast Track System shall enable students to undergo a semester-long Internship or Special Training during Semester VIII. A student who secures a minimum CGPA of 8.50 in Semester IV with no current arrears, as on that date and maintains the CGPA of 8.50 till VI Semester without any arrears shall be eligible to opt for Fast Track System and such student is required to complete three elective courses satisfactorily, while completion of Semester VII, as additional Credits during the semesters V to VII.

3.8 Every student shall be required to carry out a Project Work in the Department / Industry or by exercising Fast track during VIII Semester in consultation with the Faculty Guide and submit the project report, in the prescribed format, at the end of the VIII Semester for the valuation.

3.9 A student can register for Self-Study Elective(s) over and above the electives from any branch of Engineering / Technology at the rate of one per semester starting from V semester onwards provided he/she maintains a Cumulative Grade Point Average (CGPA) of 8.50 or above till the previous semesters with no current arrears. Credits will be indicated for such courses in the grade sheets (additional credits) but will not be considered for computing the CGPA.

3.10 A Student may be permitted to credit online courses with the approval of the Departmental Consultative Committee constituted by the Head of the Department, subject to a maximum of three credits. Such students may be exempted from attending the classes, if such course(s) are offered in the semester. Summary of such on-line courses, taken by the students, along with the offering agency shall be presented to the Academic Council for information and further suggestions. However, those students need to obtain certification from the agency / agencies offering the course, to become eligible for writing or seeking exemption (core elective course) from the End Semester Examination. In case of credits earned through online mode, from the other Institute / University, the credits may also be transferred directly after due approval from the Departmental Consultative

Committee and the Office of the Controller of Examinations. A student can get exemption for a maximum of 3 credits during the entire programme (in lieu of Discipline elective or Open elective).

4. VALUE ADDED COURSES / ADD-ON COURSES

A Student can opt for the Value Added Courses / Add-on Courses offered by the various Department / Centres for which the batch size will not exceed 40 per course from Semester II to VII. Head of the Department / Centre shall submit the list of such courses, duly approved / ratified by the Academic Council, to the Controller of Examinations to administer the examination process. A separate Certificate will be issued on successful completion of the course by the Office of the Controller of Examinations.

5. DURATION OF THE PROGRAMME

5.1 A regular student (admitted after 10+2) or equivalent is normally expected to satisfactorily fulfil the requirements for award of the degree B.E. / B.Tech. within four academic years (8 semesters) from the date of admission but in any case not more than 7 years (14 Semesters); lateral entry students shall fulfil such requirements within three academic years (6 semesters) from the date of admission but in any case not more than six years (12 Semesters) leading to the award of Degree of Bachelor of Engineering (B.E.) / Bachelor of Technology (B.Tech.) of Anna University, Chennai.

5.2 The total period for completion of the programme from the commencement of the semester, to which the student was admitted, shall not exceed the maximum period (Clause 5.1), regardless to the break-of-study (vide Clause 15) or period of prevention in order.

5.3 Each semester shall consist of minimum 90 working days or 450 periods of 60 minutes each or equivalent. Head of the Department shall ensure that every faculty member teaches the subject / course as prescribed in the approved curriculum and syllabi.

5.4 Special Theory / Practical Sessions may be conducted for students who require additional inputs over and above the number of periods normally specified

(Remedial Classes), as decided by the Head of the Department, within the specified duration of the Semester / Programme.

6. COURSE ENROLLMENT AND REGISTRATION

6.1 Each student, on admission shall be assigned to a Faculty Advisor (vide Clause 8) who shall advise / counsel the student about the details of the academic programme and the choice of course(s) considering the student's academic background and career objectives.

6.2 Every student shall enroll for the courses of the succeeding semester, in the current semester. However, the student shall confirm the enrollment by registering for the courses within the first five working days after the commencement of the semester concerned.

6.3 After registering for a course, a student shall attend the classes, satisfy the attendance requirements, earn Continuous Assessment marks and appear for the End Semester Examinations.

6.3.1 Each student, on admission to the programme, shall register for **all the courses prescribed in the curriculum in** the **first Semester of study (III Semester** for students admitted under **lateral entry stream).**

6.3.2 The enrollment for all the courses of the Semester II will commence 10 working days prior to the last working day of Semester I. The student shall confirm the enrollment by registering for the courses within the first five working days after the commencement of the Semester II. In the case, if a student fails to register in the course(s), he/ she may be permitted to register the same, as specified in the Clause 6.5, in the subsequent semesters or when it is offered.

6.3.3 The enrollment for the courses of the Semesters III to VIII will commence 10 working days prior to the last working day of the preceding semester. The student shall enroll for the courses with the guidance of the student's Faculty Advisor. If a student wishes, the student may drop or add courses (vide Clause 6.4) within **five** working days after the commencement of the semester concerned and complete the registration process duly authorized by the Faculty Advisor.

6.4 Flexibility to Add or Drop courses

6.4.1 A student has to earn the total number of credits specified in the Curriculum of the respective Programme of study in order to be eligible to obtain the degree. However, if a student wishes, the student is permitted to earn more than the total number of credits prescribed in the curriculum by opting for one- credit courses, self study electives or additional courses.

6.4.2 From the III to VIII semesters (from IV to VIII Semesters in case of lateral entry students), the student has the option of registering for additional courses or dropping existing courses. Total number of credits of such courses cannot exceed 6 in a given Semester. However the maximum number of credits that a student can register in a particular semester shall not exceed 30 credits (regardless to the reappearance credits). In such cases, the attendance requirement as stated Clause 7 is mandatory.

6.4.3 The minimum number of credits that a student can register in a particular semester shall not be less than 18 credits (except VII / VIII semester).

6.4.4 The student shall register for the project work in the VIII semester only.

6.5 Reappearance Registration

6.5.1 If a student fails in a theory course, the student shall do reappearance registration (Examination) for that course in the subsequent semesters or when it is offered next.

6.5.2 On registration, a student may attend the classes for the reappearance registration courses, if the student wishes, and the attendance requirement (vide Clause 7) is not compulsory for such courses.

6.5.3 However, if a student wishes to improve his/ her continuous assessment, in the second attempt during reappearance, shall satisfy the Clause 6.5.5 and appear for continuous assessment as given for that particular course.

6.5.4 If the theory course, in which the student has failed, is either a professional elective or an open elective, the student may register for the same or any other professional elective or open elective course, respectively in the subsequent semesters. However, the change of elective courses is permitted only once.

6.5.5 In this case (Clause 6.5.4), the student shall attend the classes, satisfy the attendance requirements (vide Clause 7), earn Continuous Assessment marks and appear for the End Semester Examination.

6.5.6 The student who fails in any Laboratory Course/ Project work / Seminar or any other EEC courses (Specified in Clause 3.1) shall register for the same in the subsequent semesters or when offered next, and **repeat** the course as per Clause 6.5.5.

6.5.7 If a student is prevented from writing the end semester examination of a course or several courses due to lack of attendance, the student has to register for that / those course(s) again, when offered next, attend the classes and fulfill the requirements as per Clause 6.5.5 & 6.5.6. If the course, in which the student has 'lack of attendance', is a Core Elective or an Open Elective, the student may register for the same or any other Core Elective or Open Elective course(s) respectively in the subsequent semesters and appear in the examination as per Clause 6.5.5.

7. REQUIREMENTS FOR APPEARING FOR THE END SEMESTER EXAMINATION OF A COURSE

A student who has fulfilled the following conditions (vide Clause 7.1 and 7.2) shall be deemed to have satisfied the attendance requirements for appearing for End Semester Examination of a particular course.

7.1 Every student is expected to attend all the periods and earn 100% attendance. However, a student shall secure not less than 80% attendance (Physical presence) course wise taking into account the number of periods required for that course as specified in the curriculum.

7.2 If a student, secures attendance between 70% and 79% in any course(s) in the current semester due to medical reasons (prolonged hospitalization / accident / specific illness) or participation in Institution/ University/ State/ National/ International level extra and co-curricular activities, with prior permission from the Head of the Department, shall be permitted to appear for the current semester examinations subject to the condition that the student shall submit the medical certificate / participation certificate attested by the Head of the Department (along

with Condonation form). Such certificates along with the condonation forms shall be forwarded to the Controller of Examinations for verification and permission to attend the examinations. However during the entire programme of study, a student can avail such Condonation in any two semesters only (regardless the number of courses).

7.3 A student shall normally be permitted to appear for End Semester Examination of the course(s) if the student has satisfied the attendance requirements (vide Clause 7.1 – 7.2) and has registered for examination in those courses of that semester by paying the prescribed fee.

7.4 Students who do not satisfy Clause 7.1 and 7.2 and who secure less than 70% attendance in a course will not be permitted to write the End-Semester Examination of that course. The student has to register and repeat this course in the subsequent semesters or when it is offered next (vide Clause 6.5).

7.5 In the case of reappearance registration for a course (vide Clause 6.5), the student has to register for examination in that course by paying the prescribed fee.

7.6 A student who has already appeared for a course in a semester and passed the examination is not entitled to reappear in the same course for improvement of grades.

8. FACULTY ADVISOR

To help the students in planning their courses of study and for general advice on the academic programme, the Head of the Department will attach a certain number of students to a Faculty member of the Department who shall function as Faculty Advisor for those students. The Faculty Advisor shall advise and guide the students in registering of courses, reappearance of courses, monitor their attendance and progress and counsel them periodically. If necessary, the Faculty Advisor may also discuss with or inform the parents about the progress / performance of the students concerned.

9. COMMITTEES

9.1 Common Course Committee

9.1.1 A theory course handled by more than one faculty including the discipline with multiple divisions (greater than or equal to 2) shall have a “Common Course Committee” comprising of all members of faculty teaching that course with one

of the members as the Course Coordinator, nominated by the Head of the Institution (Head of the Department in the case of multiple divisions of a discipline) and student representatives (one per specialization or division) registered for that course in the current semester.

First meeting of the Common Course Committee shall be held within fifteen days from the date of commencement of the semester. Two subsequent meetings in a semester may be held at suitable intervals. During these meetings, the student members shall meaningfully interact and express their opinions and suggestions of all the students to improve the effectiveness of the teaching-learning process. It is the responsibility of the student representatives to convey the proceedings of these meetings to all the students.

9.1.2 In addition, Common Course Committee (without the student representatives) shall meet to ensure uniform evaluation through the common question papers during Continuous Assessment and End Semester Examinations.

9.2 Class Committee Meeting

For all the courses taught, prescribed in the curriculum, Class Committee meeting shall be convened thrice in a semester (first meeting within 15 days from the commencement of the semester and other two meetings at equal interval after the first meeting) comprising members of the faculty handling all the courses and two student representatives from the class.

One of the members of the faculty (preferably not handling any courses to that class), nominated by the Head of the Department, shall coordinate the activities of the Committee. During these meetings, the student members shall meaningfully interact and express their opinions and suggestions of all the students to improve the effectiveness of the teaching-learning process. It is the responsibility of the student representatives to convey the proceedings of these meetings to all other students.

10. SYSTEM OF EXAMINATION

10.1 Performance in each course of study shall be evaluated based on (i) Continuous Assessment throughout the semester and (ii) End Semester examination at the end of the semester for the regular courses or as given in the Clause 16. However, the

final examination in the case of one credit courses / certificate / value added courses may be conducted, as and when the course is completed, through the office of the Controller of Examinations.

10.2 Each course, both theory and practical including project work, shall be evaluated as per the Scheme of Assessment given in Clause 16.

10.3 The End Semester Examinations shall normally be conducted after satisfying the Clause 5.2. Supplementary Examinations may also be conducted, at such times, for the benefit of the students as decided by the Controller of Examinations.

10.4 For the End Semester examinations, both theory and practical courses including project work, the internal and external examiners (from Academia or Industry) shall be appointed by the Controller of Examinations as per the guidelines given by the Examination and Evaluation Board of the Institute.

11. PASSING REQUIREMENTS AND PROVISIONS

11.1 A student who secures not less than 50% of total marks prescribed for a course, vide Clause 16, comprising a minimum of 50% of the marks prescribed for the End Semester Examination, shall be declared to have passed the course successfully and earned the prescribed credits for that course, applicable for all registered courses.

11.1.1 If a student fails to secure a pass in a particular course, i.e., failing to obtain minimum marks, as stated above, it is mandatory that he/she shall register and reappear for the examination in that course in the subsequent semester(s) whenever the examinations are conducted for that course, till he / she secures a 'Pass'.

11.1.2 Continuous Assessment (CA) marks obtained by the student in the first appearance shall be retained and considered valid for one subsequent attempt, except Clause 6.5.4, 6.5.5, 6.5.6 and 6.5.7. However, from the third attempt onwards, the student shall be declared to have passed the course if he/she secures a minimum of 6 Grade Points (B Grade) in the course prescribed during the End Semester Examinations.

11.2 The minimum number of total credits to be earned by a student to qualify for the award of Degree in the various branches of study as prescribed by the respective Boards of Studies is given below:

Branch of Study	Minimum Credits	
	Regular Admission	Lateral Entry
B.E. Programmes		
Aeronautical Engineering	178	134
Agricultural Engineering	177	133
Automobile Engineering	179	134
Civil Engineering	176	131
Computer Science and Engineering	176	131
Electrical and Electronics Engineering	176	132
Electronics and Communication Engineering	177	132
Electronics and Instrumentation Engineering	177	133
Mechanical Engineering	179	135
Mechatronics	177	133
B.Tech. Programmes		
Biotechnology	175	131
Fashion Technology	176	132
Information Technology	176	131
Textile Technology	175	131
Food Technology	175	131

11.2.1 Student Migration and Credit Transfer: Normalization of the Credits will be carried out in consultation with the Board of Studies of the programme concerned and approved by the Head of Institution, if a student migrates from other institutions to Bannari Amman Institution of Technology or rejoins from previous regulation to this regulation.

11.3 A student shall be declared to have qualified for award of B.E/B.Tech. Degree if he/she successfully completes the course requirements (vide Clause 7, 10 and 11) and passed all the prescribed courses of study of the respective programme (listed in Clause 2), within the duration specified in Clause 5.1.

12. ASSESSMENT AND AWARD OF LETTER GRADES

12.1 The assessment shall be based on the performance in the End Semester Examinations and / or Continuous Assessment, carrying marks as specified in Clause 16. Letter Grades (based on Credit Point and Grade Point) are awarded to the students based on the performance in the evaluation process.

12.2 Credit Point is the product of Grade Point and number credits for a course and Grade Point is a numerical weight allotted to each letter grade on a 10-point scale (as specified in the Clause 12.3), while the Letter Grade is an index of the performance of a student in a said course.

12.3 The performance of a student will be reported using Letter Grades, each carrying certain points as detailed below:

Range of Total Marks (as specified in Clause 16) / Specific Reason	Grade Points	Letter Grade
91 to 100	10	O (Outstanding)
81 to 90	9	A + (Excellent)
71 to 80	8	A (Very Good)
61 to 70	7	B + (Good)
50 to 60	6	B (Above average)
0 to 49	0	RA (Reappearance Registration)
Incomplete	0	I
Withdrawal	0	W
Absent	0	AB
Shortage of Attendance	0	SA

'RA' ---Reappearance registration is required for that particular course

'I' --- Continuous evaluation is required for that particular course in the subsequent examinations.

'SA' --- shortage of attendance (Clause 7) and hence prevented from writing end semester examination.

12.4 After completion of the evaluation process, Grade Point Average (GPA), and the Cumulative Grade Point Average (CGPA) is calculated using the formula:

$$GPA/CGPA = \frac{\sum_1^n C_i * g_i}{\sum_1^n C_i}$$

where

C_i : Credit allotted to the course.

g_i : Grade Point secured corresponding to the course.

n : number of courses successfully cleared during the particular semester in the case of GPA and all the semesters, under consideration, in the case CGPA.

12.5 A student who does not appear for the End Semester Examinations in a course, after registering for the same, shall be deemed to have appeared for that examination for the purpose of classification (Subject to Clause 14 and 15).

12.6 For the non credit courses Grades shall be indicated as given in the Clause 16 and shall not be counted for the computation of GPA/CGPA.

12.7 **Photocopy / Revaluation:** A student, who seeks the re-valuation of the answer script is directed to apply for the photocopy of his/her semester examination answer paper(s) in the theory course(s), within 2 working days from the declaration of results in the prescribed format to the Controller of Examinations through the Head of the Department. On receiving the photocopy, the student can consult with a competent member of faculty and seek the opinion for revaluation. Based on the recommendations, the student can register for the revaluation through proper application to the Controller of Examinations. The Controller of Examinations shall arrange for the revaluation and declare the results. Revaluation is not permitted to the courses other than theory courses. In the case of theory courses with laboratory component, a student can seek revaluation for the theory component only, following the procedure stated above.

13. CLASSIFICATION OF THE DEGREE AWARDED

For the purpose of the 'Award of Degree', the duration of completion of the programme shall be the total duration taken by a student for completing first time registration of all the required courses and satisfying Clause 11, regardless to the period of Break-of-study as per Clause 15 and satisfy any one of the conditions required as given below.

13.1 **First Class with Distinction**: A student who qualifies for the award of the Degree having passed all the courses of study of all the Eight Semesters (six semesters for lateral entry students) at the first opportunity, after the commencement of his / her study and securing a CGPA not less than 8.50 (vide clause 12.3) shall be declared to have passed with **First Class with Distinction**.

13.2 **First Class**: A student who qualifies for the award of the Degree having passed all the courses of study of all the eight semesters (six semesters for lateral entry students) after the commencement of his / her study and securing a CGPA not less than 6.50 shall be declared to have passed with **First Class** (not exceeded the total duration as specified in the Clause 5).

13.3 **Second Class**: All other students who qualify for the award of the Degree shall be declared to have passed in **Second Class.**

13.4 Course Completion Certificate shall be given to a student, provided he / she should have registered all the courses and also registered for the examinations in those courses (subject to Clause 6.0 and 7.0).

14. WITHDRAWAL FROM THE EXAMINATION

14.1 A student may, for valid reasons, be granted permission by the Head of the Department to withdraw from appearing in the examination in any course(s) only once during the entire duration of the degree programme.

14.2 Withdrawal application shall be valid only, if the student is eligible to write the examination as per Clause 7 and, if such request for withdrawal is made prior to the submission of the Continuous Assessment marks of the course(s) with the recommendations from the Head of the Department.

14.3 Withdrawal shall not be considered as an appearance in the examination for the eligibility of a student for First Class with Distinction or First Class.

15. AUTHORIZED BREAK OF STUDY FROM A PROGRAMME

15.1 A student is permitted to go on break of study for a maximum period of one year either as two breaks of one semester each or a single break of one year.

15.2 A student is normally not permitted to break the period of study temporarily. However, if a student happens to discontinue the programme temporarily during the

middle of programme of study, for reasons such as personal accident or hospitalization due to ill health or in need of health care, he/she shall apply to the Head of the Institution in advance, in any case, not later than the last date for registering for the semester examination, through the Head of the Department stating the reasons for the break-of-study (for one academic semester or 6 months, whichever is earlier). However, a student detained for want of minimum attendance requirement as per Clause 7 shall not be considered as permitted 'Break of Study' and Clause 15.3 is not applicable for such case.

15.3 The student is permitted to rejoin the programme after the break shall be governed by the rules and regulations of DoTE and the Curriculum and Regulations in force at the time of rejoining, subject to the Clause 11.2.1.

15.4 Authorized break of study will be counted towards the duration specified for passing all the courses (vide Clause 5.1 and 5.2) and for the purpose of classification of Degree (vide Clause 13).

15.5 The total period for completion of the programme reckoned from the commencement of the first semester to which the student is admitted shall not exceed the maximum period specified in Clause 5.1, irrespective of the period of break of study in order that he / she may be eligible, for the award of the degree (vide Clause 13).

15.6 In case of valid reasons (as stated in Clause 15.2) extended break-of-study may be granted by the Head of the Institution for a period not more than one year (total duration or two semesters whichever is earlier) in addition to the earlier authorized break of study.

15.7 If a student does not report back to the Institute, even after the extended Break of Study, the name of the student shall be deleted permanently from the college enrollment. Such students are not entitled to seek readmission under any circumstances.

16. SCHEME OF ASSESSMENT

Courses offered under B.E. / B.Tech. Programmes are assessed as given below:

I	**THEORY COURSES**	**Marks**
	Continuous Assessment	**50**
	Distribution of marks for Continuous Assessment:	
	Test I (15)	
	Test II (15)	
	Open book test (10)	
	Library - Seminars / Assignments (Two) (10)	
	End Semester Examination	**50**
	Total Marks	**100**

II	**THEORY COURSES WITH LAB COMPONENT**	**Marks**
	Continuous Assessment	**50**
	Distribution of marks for Continuous Assessment:	
	Test I (10)	
	Test II (10)	
	Conduct of Experiment	
	Preparation(5)	
	Experiment and Results (5)	
	Record Note[#]	
	Final Lab Examination (20)	
	End Semester Examination (QP pattern as per (I))	**50**
	Total Marks	**100**

III	**LABORATORY COURSES**	**Marks**
	Continuous Assessment	**50**
	Distribution of marks for Continuous Assessment:	
	Conduct of Experiment	
	i. Preparation (5)	
	ii. Experiment and Results (10)	
	iii. Record / Observation[#] *(5)*	
	Test – Cycle I (15)	
	Test – Cycle II (15)	
	End Semester Examination	
	Experiments & Results (40)	**50**
	Viva Voce – (10)	
	Total Marks	**100**

[#] *Reports / Record Note / Integrated Lab Manual to be retained for 1 year for Academic Audit, by respective Department*

IV	**TECHNICAL SEMINAR**	**Marks**
	Continuous Assessment	**50**
	Distribution of marks for Continuous Assessment:	
	Presentation I (25)	
	Presentation II (25)	
	End Semester Examination	
	Report[#] (20)	**50**
	Presentation (20)	
	Viva voce (10)	
	Total Marks	**100**

V	**PROJECT**	**Marks**
	Continuous Assessment	**50**
	Distribution of marks for Continuous Assessment:	
	Review I	
	Literature survey (10)	
	Problem Identification (5)	
	Methodology (10)	
	Review II	
	Continuation in Methodology (10)	
	Results / Progress (15)	
	End Semester Examination	
	Report[#] (20)	**50**
	Presentation (20)	
	Viva voce (10)	
	Total Marks	**100**

VI	**LANGUAGE ELECTIVE**	**Marks**
	(CONTINUOUS ASSESSMENT ONLY)	
	Test 1	
	Listening (10)	
	Speaking (5)	**25**
	Reading (5)	
	Writing (5)	
	Test 2	
	Listening (10)	
	Speaking (5)	**25**
	Reading (5)	
	Writing (5)	
	Oral Exam	**50**
	Total Marks	**100**

[#] *Reports / Record Note / Integrated Lab Manual to be retained for 1 year for Academic Audit, by respective Department*

VII	ONE-CREDIT COURSE	Marks
	Test	**30**
	Quiz	**20**
	Final Examination	**50**
	Total Marks	**100**

VIII	MINI-PROJECT	Marks
	(CONTINUOUS ASSESSMENT ONLY)	
	Review I	**25**
	Review II	**25**
	Project Evaluation	
	Report (25)[#]	**50**
	Presentation&Viva Voce (25)	
	Total Marks	**100**

IX	LIFE SKILLS	Marks
	(CONTINUOUS ASSESSMENT ONLY)	
	Test I	**25**
	Test II	**25**
	Final Examination	**50**
	Total Marks	**100**
	Grades (Excellent / Good / Satisfactory/Not Satisfactory)	

X	VALUE ADDED / CERTIFICATE COURSES	Marks
	(CONTINUOUS ASSESSMENT ONLY)	
	Test I	**25**
	Test II	**25**
	Final Evaluation / Test	**50**
	Total Marks	**100**
	Grades (Excellent / Good / Satisfactory / Not Satisfactory)	

XI	ENGINEERING GRAPHICS	Marks
	Continuous Assessment	**50**
	Distribution of marks for Continuous Assessment:	
	Class work (based on attendance) (5)	
	Assignments (Minimum 8 Assignments) (20)	
	Model Examination (25)	
	End Semester Examination	**50**
	Total Marks	**100**

[#] *Reports / Record Note / Integrated Lab Manual to be retained for 1 year for Academic Audit, by respective Department*

Optional Test: *A student becomes eligible to appear for the one optional test conducted after the Periodical Test II, only under the following circumstances: (i) absent for Test I or Test II or both on account of medical reasons (hospitalization / accident / specific illness), or (ii) participation in the College / University / State / National / International level Sports events with prior permission from the Head of the Institution and (iii) on satisfying the conditions (i) or (ii), the student should have registered for the Optional Test, through the concerned member of faculty who handles the course or through the respective Head of the Department, submitted to the Controller of Examinations. Such Optional Tests are not conducted for the courses under the categories III, IV, V, VI, VII, VIII, IX, X and XI listed above.*

17. FIELD / INDUSTRIAL VISIT / INTERNSHIP

Heads of Departments, in order to provide the experiential learning to the students, shall take efforts to arrange at least two industrial visits / field visits in a semester. The students may also undergo in-plant training / internship during summer / winter vacation between III and VII semesters.

18. PERSONALITY AND CHARACTER DEVELOPMENT

Every student shall be required to undergo a minimum of 40 hours of Personality Development Programmes viz, NSS / NCC / YRC / YOGA / Sports and Games / Technical and Non-technical Club activities during the first year, failing which he/she shall not be permitted to appear for the End Semester examinations of semester II and there onwards. Such students are permitted to appear for the End Semester examinations of semester II and there onwards only after completing satisfactorily the requirements.

The attendance of the personality and character development courses / events shall be maintained on the regular basis by the concerned First Year Co-ordinators and made available in the Office of the Controller of Examinations before the commencement of Semester examinations of Semester I or Semester II.

19. DISCIPLINE

A student is expected to follow the rules and regulations laid down by the Institute and the affiliating University, as published from time to time. Any violations, if any, shall be treated as per the procedures stated thereof.

If a student indulges in malpractice in any of the End Semester / Continuous Assessments, he / she shall be liable for punitive action as prescribed by the Institution / University from time to time.

20. REVISION OF REGULATIONS, CURRICULUM AND SYLLABI

The Institution reserves the right to revise/amend/change the Regulations, Curriculum, Syllabi, Scheme of Examinations and date of implementation and to introduce Additional Electives, Open Electives, One Credit Courses and Value Added Courses through the Academic Council.

The Question Paper pattern (Theory Examination) for UG Programme is given below:

PART A

Objective Type Questions: 20	**(20X1 = 20 Marks)**	**20**

PART B

Short Answer Questions: 10	**(10X2 = 20 Marks)**	**20**

PART C

Long Answer Questions: 5	**(5X12 = 60 Marks)**	**60**

	Total	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

On successful completion of four year B.Tech. degree programme quite a few years after graduation our graduates will

PEO1 : Graduates will be having successful careers in industry, academic, research in the fields of apparel and fashion technology with a fundamental knowledge and skill in basics of science, technology, engineering, arts, mathematics, computers and industry related textile, apparel and fashion processes.

PEO2 : Graduates will be globally competent in apparel and fashion industry, entrepreneurship through effective communication, soft skills and also be able to relate apparel and fashion industry to address social issues.

PEO3 : Graduates will be professional, ethical and will demonstrate spirit of excellence and leadership in their successful professional career.

PROGRAMME OUTCOMES

a. **Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b. **Problem Analysis**: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. **Design/ Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. **Conduct Investigations of Complex Problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

e. **Modern Tool Usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

f. **The Engineer and Society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. **Environment and Sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

h. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i. **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend

and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

k. **Project Management and Finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

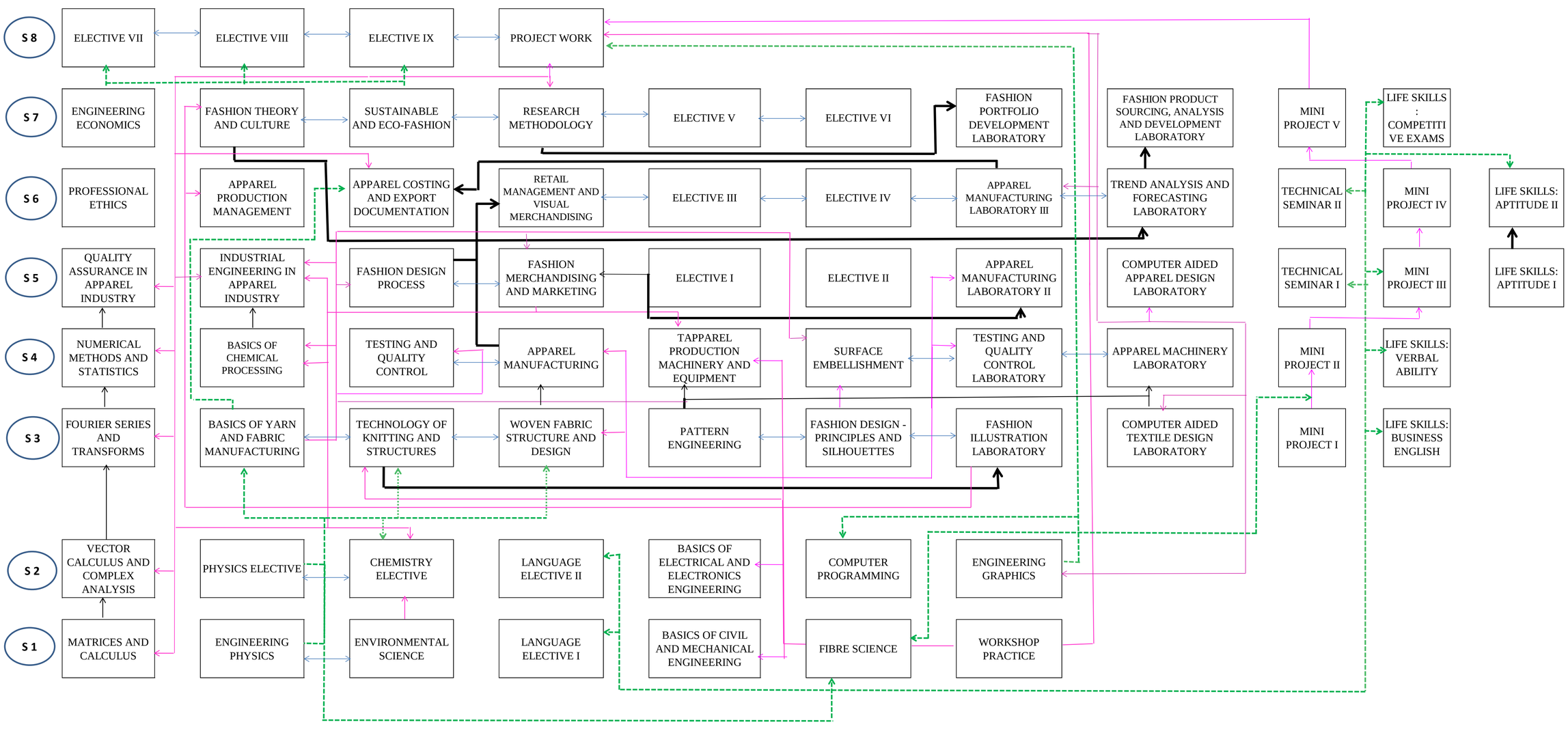
l. **Life-long Learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF PEOs AND POs

POs	a	b	c	d	e	f	g	h	i	j	k	l
PEO-1	X	X	X	X	X		X				X	X
PEO-2			X			X	X	X	X	X		X
PEO-3			X	X		X	X	X	X	X	X	X

DEPARTMENT OF FASHION TECHNOLOGY
CURRICULAM DESIGN & INTERLINKING OF COURSES

360 ° FLEXIBLE LEARNING FRAME WORK



B. Tech. FASHION TECHNOLOGY
Minimum Credits to be Earned :176

FIRST SEMESTER

Code No.	Course	Objectives & Outcomes		L	T	P	C	Maximum Marks			Category
		PEOs	POs					CA	ES	Total	
15MA101	MATRICES AND CALCULUS*	II	a,b	3	2	0	4	50	50	100	BS
15PH102	ENGINEERING PHYSICS*	II	a	2	0	2	3	50	50	100	BS
15CH103	ENVIRONMENTAL SCIENCE*	II	g	2	0	2	3	50	50	100	HSS
	LANGUAGE ELECTIVE I#	-	-	-	-	-	3	100	-	100	HSS
15GE205	BASICS OF CIVIL AND MECHANICAL ENGINEERING⊕	II	a	3	0	0	3	50	50	100	ES
15FT106	FIBRE SCIENCE	I,II	a,b,c,e	3	0	0	3	50	50	100	ES
15GE107	WORKSHOP PRACTICEΩ	II	a,e	0	0	2	1	50	50	100	ES
Total				13	2	6	20	**400**	**300**	**700**	-

SECOND SEMESTER

Code No.	Course	Objectives & Outcomes		L	T	P	C	Maximum Marks			Category
		PEOs	POs					CA	ES	Total	
15MA201	VECTOR CALCULUS AND COMPLEX ANALYSIS*	II	a,b	3	2	0	4	50	50	100	BS
	PHYSICS ELECTIVE*	-	-	-	-	-	4	50	50	100	BS
	CHEMISTRY ELECTIVE*	-	-	-	-	-	4	50	50	100	BS
	LANGUAGE ELECTIVE II#	-	-	-	-	-	3	100	-	100	HSS
15GE105	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERINGΔ	I	a	2	0	2	3	50	50	100	ES
15GE206	COMPUTER PROGRAMMINGΨ	I	a	3	0	2	4	50	50	100	ES
15GE207	ENGINEERING GRAPHICSλ	I,II,III	a, b, d, e	0	0	4	2	50	50	100	ES
Total				8	2	8	24	**400**	**300**	**700**	-

* Common to all branches of B.E./B.Tech
# Common to all branches of B.E./B.Tech (Continuous Assessment)
⊕ Common to CSE,ECE,EEE,EIE,FT,IT (I Semester) and to MTRS, BT,TT, FD (II Semester)
Ω Common to AE, AG,AU,ME,MTRS, BT,FT,TT ,FD (I Semester) and to CE,CSE,ECE,EEE,EIE,IT (II Semester)
Δ Common to AE,AG,AU,CE,ME,MTRS, BT,TT,FD (I Semester) and to CSE,FT,IT (II Semester)
Ψ Common to CE (I Semester) and to AE,AG,AU, ME,MTRS, BT,FT,TT,FD (II Semester)
λ Common to CE,CSE,ECE,EEE,EIE,IT (I Semester) and to AE, AG,AU,ME,MTRS, BT,FT,TT, FD (II Semester)

THIRD SEMESTER											
Code No.	**Course**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**	**Maximum Marks**			**Category**
		PEOs	**POs**					**CA**	**ES**	**Total**	
15MA301	FOURIER SERIES AND TRANSFORMS$^{\alpha}$	II	a, b	3	2	0	4	50	50	100	BS
15FT302	BASICS OF YARN AND FABRIC MANUFACTURING	I,II	a, b	3	0	0	3	50	50	100	ES
15FT303	TECHNOLOGY OF KNITTING AND STRUCTURES	I,II	a, b	3	0	0	3	50	50	100	PC
15FT304	WOVEN FABRIC STRUCTURE AND DESIGN	I,II	a, b	2	0	2	3	50	50	100	PC
15FT305	PATTERN ENGINEERING	I,II	a, b, c	3	0	2	4	50	50	100	ES
15FT306	FASHION DESIGN - PRINCIPLES AND SILHOUETTES	I,II	a, b, c, e	3	0	2	4	50	50	100	PC
15FT307	FASHION ILLUSTRATION LABORATORY	I,II	a, b, c	0	0	2	1	50	50	100	PC
15FT308	COMPUTER AIDED TEXTILE DESIGN LABORATORY	I,II	a, b, c	0	0	2	1	50	50	100	PC
15FT309	MINI PROJECT I	III	a,b,c,d,e,i	0	0	2	1	100	-	100	EEC
15GE310	LIFE SKILLS: BUSINESS ENGLISH$^{\Phi}$	III	j	0	0	2	-	100	-	100	EEC
Total				17	2	14	24	**600**	**400**	**1000**	-
FOURTH SEMESTER											
Code No.	**Course**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**	**Maximum Marks**			**Category**
		PEOs	**POs**					**CA**	**ES**	**Total**	
15MA401	NUMERICAL METHODS AND STATISTICS$^{\beta}$	I,II,III	a	2	2	0	3	50	50	100	BS
15FT402	BASICS OF CHEMICAL PROCESSING	I,II	a, b	3	0	2	4	50	50	100	ES
15FT403	TESTING AND QUALITY CONTROL	I,II	a, b, c	3	0	0	3	50	50	100	PC
15FT404	APPAREL MANUFACTURING	I,II	a, b, c, e	3	0	2	4	50	50	100	PC
15FT405	APPAREL PRODUCTION MACHINERY AND EQUIPMENT	I,II	a, b, c	3	0	0	3	50	50	100	PC
15FT406	SURFACE EMBELLISHMENT	I,II	a, b, c, e	2	0	2	3	50	50	100	PC
15FT407	TESTING AND QUALITY CONTROL LABORATORY	I,II	a, b	0	0	2	1	50	50	100	PC
15FT408	APPAREL MACHINERY LABORATORY	I,II	a, b	0	0	2	1	50	50	100	PC
15FT409	MINI PROJECT II	II, III	a,b,c,d,e,i	0	0	2	1	100	-	100	EEC
15GE410	LIFE SKILLS: VERBAL ABILITY$^{\Phi}$	III	J	0	0	2	-	100	-	100	EEC
Total				16	2	14	23	**600**	**400**	**1000**	-

$^{\alpha}$ Common to all branches of B.E./B.Tech. except CSE

$^{\Phi}$ Common to all branches of B.E./B.Tech (Non-Credit Course)

$^{\beta}$ Common to AG,AU,ME,MTRS,EEE,EIE,BT,TT,FT,FD

FIFTH SEMESTER											
Code No.	**Course**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**	**Maximum Marks**			**Category**
		PEOs	**POs**					**CA**	**ES**	**Total**	
15FT501	QUALITY ASSURANCE IN APPAREL INDUSTRY	I,II,III	a, b, c, e, h, f	3	0	0	3	50	50	100	PC
15FT502	INDUSTRIAL ENGINEERING IN APPAREL INDUSTRY	I,II,III	a, b, c, e, f	3	0	2	4	50	50	100	PC
15FT503	FASHION DESIGN PROCESS	I,II,III	a, b, c, h	3	0	2	4	50	50	100	PC
15FT504	FASHION MERCHANDISING AND MARKETING	I,II,III	a, b, c, e	3	0	0	3	50	50	100	PC
	ELECTIVE I	-	-	-	-	-	3	50	50	100	PE
	ELECTIVE II	-	-	-	-	-	3	50	50	100	PE
15FT507	APPAREL MANUFACTURING LABORATORY II	I,II	a, b	0	0	2	1	50	50	100	PC
15FT508	COMPUTER AIDED APPAREL DESIGN LABORATORY	I,II	a, b	0	0	2	1	50	50	100	PC
15FT509	TECHNICAL SEMINAR I	II, III	i, j	0	0	2	1	50	50	100	EEC
15FT510	MINI PROJECT III	II, III	a, b, c, d, e, i	0	0	2	1	100	-	100	EEC
15GE511	LIFE SKILLS: APTITUDE I$^{\Phi}$	III	a, b	0	0	2	-	100	-	100	EEC
Total				12	0	14	24	**650**	**450**	**1100**	
SIXTH SEMESTER											
Code No.	**Course**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**	Maximum Marks			
		PEOs	**POs**					**CA**	**ES**	**Total**	**Category**
15GE601	PROFESSIONAL ETHICS^{+}	II	f, g, h	2	0	0	2	50	50	100	HSS
15FT602	APPAREL PRODUCTION MANAGEMENT	I,II,III	a, b, c, e, f	3	0	0	3	50	50	100	PC
15FT603	APPAREL COSTING AND EXPORT DOCUMENTATION	I,II,III	a, b, c, e, f	3	0	0	3	50	50	100	PC
15FT604	RETAIL MANAGEMENT AND VISUAL MERCHANDISING	I,II,III	a, b, c, e, f	3	0	0	3	50	50	100	PC
	ELECTIVE III	-	-	-	-	-	3	50	50	100	PE
	ELECTIVE IV	-	-	-	-	-	3	50	50	100	PE
15FT607	APPAREL MANUFACTURING LABORATORY III	I,II	a, b, c	0	0	2	1	50	50	100	PC
15FT608	TREND ANALYSIS AND FORECASTING LABORATORY	I,II	a, b, c	0	0	2	1	50	50	100	PC
15FT609	TECHNICAL SEMINAR II	II,III	J	0	0	2	1	50	50	100	EEC
15FT610	MINI PROJECT IV	II,III	a,b,c,d,e,i	0	0	2	1	100	-	100	EEC
15GE611	LIFE SKILLS: APTITUDE II$^{\Phi}$	III	a,b	0	0	2	-	100	-	100	EEC
Total				11	0	10	21	**650**	**450**	**1100**	**-**

$^{\Phi}$ Common to all branches of B.E./B.Tech (Non-Credit Course)

$^{+}$ Common to AE, AU, CE, ME,MTRS, BT,FT,TT, FD (VI Semester) and to CSE,ECE,EEE,EIE,IT (VII Semester)

SEVENTH SEMESTER											
Code No.	**Course**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**	Maximum Marks			
		PEOs	**POs**					**CA**	**ES**	**Total**	**Category**
15GE701	ENGINEERING ECONOMICS[$]	II	a,f,g,k,l	3	0	0	3	50	50	100	HSS
15FT702	FASHION THEORY AND CULTURE	I,II	a	4	0	0	4	50	50	100	PC
15FT703	SUSTAINABLE AND ECO-FASHION	I,II,III	a,b,c,e	3	0	0	3	50	50	100	PC
15FT704	RESEARCH METHODOLOGY	-	-	3	0	0	3	50	50	100	ES
	ELECTIVE V	-	-	-	-	-	3	50	50	100	PE
	ELECTIVE VI	-	-	-	-	-	3	50	50	100	PE
15FT707	FASHION COLLECTION AND PORTFOLIO LABORATORY	I,II,III	a, b, c, d, e	0	0	2	1	50	50	100	PC
15FT708	FASHION PRODUCT SOURCING, ANALYSIS AND DEVELOPMENT LABORATORY	I,II,III	a, b, c, e, i, j	0	0	2	1	50	50	100	PC
15FT709	MINI PROJECT V	II,III	a,b,c,d,e,i	0	0	2	1	100	-	100	EEC
15GE710	LIFE SKILLS : COMPETITIVE EXAMS[Φ]	III	a,b,l	0	0	2	-	100	-	100	EEC
Total				13	0	8	22	**600**	**400**	**1000**	-
EIGHT SEMESTER											
Code No.	**Course**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**	Maximum Marks			
		PEOs	**POs**					**CA**	**ES**	**Total**	**Category**
	ELECTIVE VII	-	-	-	-	-	3	50	50	100	PE
	ELECTIVE VIII	-	-	-	-	-	3	50	50	100	PE
	ELECTIVE IX	-	-	-	-	-	3	50	50	100	PE
15FT804	PROJECT WORK	I,II,III	a-l	-	-	-	9	50	50	100	EEC
Total				-	-	-	**18**	**200**	**200**	**400**	-

[$] Common to CSE,ECE,EEE,EIE,IT (VI Semester) and to AE, AG,AU,CE,ME,MTRS,BT,FT,TT, FD (VII Semester)

[Φ] Common to all branches of B.E./B.Tech (Non-Credit Course)

Electives							
Code No.	**Course**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**
		PEOs	**POs**				
LANGUAGE ELECTIVES							
15LE101	BASIC ENGLISH I	II	j	3	0	0	3
15LE102	COMMUNICATIVE ENGLISH I	II	j	3	0	0	3
15LE201	BASIC ENGLISH II	II	j	3	0	0	3
15LE202	COMMUNICATIVE ENGLISH II	II	j	3	0	0	3
15LC203	CHINESE	II	j	3	0	0	3
15LF203	FRENCH	II	j	3	0	0	3
15LG203	GERMAN	II	j	3	0	0	3
15LH203	HINDI	II	j	3	0	0	3
15LJ203	JAPANESE	II	j	3	0	0	3
PHYSICS ELECTIVES							
15PH201	PHYSICS OF MATERIALS	I	a	3	0	2	4
15PH202	APPLIED PHYSICS	I	a	3	0	2	4
15PH203	MATERIALS SCIENCE	I	a	3	0	2	4
15PH204	PHYSICS OF ENGINEERING MATERIALS	I	a	3	0	2	4
15PH205	SOLID STATE PHYSICS	I	a	3	0	2	4
CHEMISTRY ELECTIVES							
15CH201	ENGINEERING CHEMISTRY	I	a	3	0	2	4
15CH202	APPLIED CHEMISTRY	I	a	3	0	2	4
15CH203	APPLIED ELECTROCHEMISTRY	I	a	3	0	2	4
15CH204	INDUSTRIAL CHEMISTRY	I	a	3	0	2	4
15CH205	WATER TECHNOLOGY AND GREEN CHEMISTRY	I	a	3	0	2	4
DISCIPLINE ELECTIVES							
15FT001	PROTECTIVE CLOTHING	I	a, b	3	0	0	3
15FT002	INTELLIGENT TEXTILES	I	a, b	3	0	0	3
15FT003	HOME FURNISHINGS	I	a, b	3	0	0	3
15FT004	CLOTHING COMFORT	I	a, b	3	0	0	3
15FT005	FASHION COMMUNICATION	I,II	a, b, c	3	0	0	3
15FT006	FASHION STYLING AND MODELING	I,II	a, b, c	3	0	0	3
15FT007	INTIMATE FASHION	I,II	a, b, c	3	0	0	3
15FT008	FASHION ACCESSORIES	I,II	a, b, c	3	0	0	3
15FT009	TREND ANALYSIS AND FORECASTING	I,II	a, b, c	3	0	0	3

15FT010	FASHION PHOTOGRAPHY	I	a, b	3	0	0	3
15FT011	PSYCHOLOGY OF COLOR	I	a, b	3	0	0	3
15FT012	INTERIOR DESIGN	I	a, b	3	0	0	3
15FT013	FASHION CRAFTS	I,II	a, b, c	3	0	0	3
15FT014	ADVANCED PATTERN ENGINEERING	I,II	a, b, c	3	0	0	3
15FT015	PLANT LAYOUT AND FACILITIES DESIGN	I,II	a, b, c	3	0	0	3
15FT016	QUALITY CONTROL OF GARMENTS AND ACCESSORIES	I,II	a, b, c	3	0	0	3
15FT017	FASHION BRAND MANAGEMENT	I,II	a, b, c	3	0	0	3
15FT018	INTERNATIONAL BUSINESS IN APPAREL INDUSTRY	I	a, b	3	0	0	3
15FT019	SUPPLY CHAIN MANAGEMENT	I	a, b	3	0	0	3
15FT020	HUMAN RESOURCE MANAGEMENT	I	a, b	3	0	0	3
15FT021	FINANCIAL MANAGEMENT	I	a, b	3	0	0	3
15FT022	TOTAL QUALITY MANAGEMENT	I,II	a, b, c	3	0	0	3
15FT023	PROJECT MANAGEMENT	I,II	a, b, c	3	0	0	3
15FT024	FASHION ENTREPRENEURSHIP	I	a, b	3	0	0	3
15FT025	INTERNATIONAL SOCIAL COMPLIANCE	I	a, b	3	0	0	3
15FT026	ERP AND MIS IN APPAREL INDUSTRY	I	a, b	3	0	0	3
15FT027	GRAPHIC DESIGNING FOR LAYOUTS	I,II	a, b, c	3	0	0	3
ENTREPRENEURSHIP ELECTIVES							
15GE001	ENTREPRENEURSHIP DEVELOPMENT I	II	b,c,d,e,f & k	3	0	0	3
15GE002	ENTREPRENEURSHIP DEVELOPMENT II	II	b,e,h,i,j & k	3	0	0	3
PHYSICAL SCIENCE ELECTIVES							
15GE0P1	NANOMATERIALS SCIENCE	I,II	a	3	0	0	3
15GE0P2	SEMICONDUCTOR PHYSICS AND DEVICES	I,II	a	3	0	0	3
15GE0P3	APPLIED LASER SCIENCE	I,II	a	3	0	0	3
15GE0C1	CORROSION SCIENCE	I,II	a	3	0	0	3
15GE0C2	ENERGY STORING DEVICES AND FUEL CELLS	I,II	a	3	0	0	3
15GE0C3	POLYMER CHEMISTRY AND PROCESSING	I,II	a	3	0	0	3
OPEN ELECTIVES							
15FT0YA	FASHION CRAFTS	I	a, b	3	0	0	3
15FT0YB	FASHION ACCESSORIES	I	a, b	3	0	0	3
15FT0YC	FASHION VISUAL MERCHANDISING	I	a, b	3	0	0	3
15FT0YD	INTERIOR DESIGN	I	a, b	3	0	0	3
15FT0YE	SURFACE EMBELLISHMENT	I	a, b	3	0	0	3

ONE CREDIT COURSES							
15FT0XA	LEAN MANUFACTURING	I	a, b	0	0	0	1
15FT0XB	INTELLECTUAL PROPERTY RIGHTS	I	a, b	0	0	0	1
15FT0XC	BUYERS MANUAL	I, II	a, b, c	0	0	0	1
15FT0XD	BIO-MIMICRY IN FASHION	I	a, b	0	0	0	1
15FT0XE	DRAPING AND FITTING	I, II	a, b, c	0	0	0	1
15FT0XF	KNOWLEDGE OF EMERGING MARKETS	I	a, b	0	0	0	1
15FT0XG	PRODUCT CERTIFICATION IN GARMENT INDUSTRY	I	a, b	0	0	0	1
15FT0XH	DENIM FABRICS AND GARMENTS	I	a, b	0	0	0	1
15FT0XI	3-D FASHION	I	a, b	0	0	0	1
15FT0XJ	FABRIC DEVELOPMENT AND SOURCING	I, II	a, b, c	0	0	0	1
15FT0XK	SKILL DEVELOPMENT ON APPAREL PRODUCTION PLANNING PACKAGE	I	a, b	0	0	0	1
15FT0XL	SKILL DEVELOPMENT ON ERP PACKAGE	I	a, b	0	0	0	1
ADDITIONAL ONE CREDIT COURSES (I to III Semesters)							
15GE0XA	HEALTH AND FITNESS	-	-	-	-	-	1
15GE0XB	FOUNDATION COURSE IN COMMUNITY RADIO TECHNOLOGY	-	-	-	-	-	1
15GE0XC	VEDIC MATHEMATICS	-	-	-	-	-	1
15GE0XD	INTRODUCTION TO ALGORITHMS	-	-	-	-	-	1
15GE0XE	ETYMOLOGY	-	-	-	-	-	1
15GE0XF	HINDUSTANI MUSIC	-	-	-	-	-	1
15GE0XG	CONCEPT, METHODOLOGY AND APPLICATIONS OF VERMICOMPOSTING	-	-	-	-	-	1
15GE0XH	AGRICULTURE FOR ENGINEERS	-	-	-	-	-	1
15GE0XI	INTRODUCTION TO DATA ANALYSIS USING SOFTWARE	-	-	-	-	-	1
15GE0XJ	ANALYSIS USING PIVOT TABLE	-	-	-	-	-	1
BRIDGE COURSES							
15FTB01	FIBRE SCIENCE						
15FTB02	ENGINEERING PHYSICS						

SUMMARY OF CREDIT DISTRIBUTION

S.No	CATEGORY	CREDITS PER SEMESTER								TOTAL CREDIT	CREDITS in %	Range of Total Credits	
		I	II	III	IV	V	VI	VII	VIII			Min	Max
1	BS	7	12	4	3					26	15%	15%	20%
2	ES	7	9	6	3			3		28	16%	15%	20%
3	HSS	6	3				2	3		14	8%	5%	10%
4	PC			13	16	16	11	9		65	37%	30%	40%
5	PE					6	6	6	9	27	15%	10%	15%
6	EEC			1	1	2	2	1	9	16	9%	10%	15%
Total		20	24	24	23	24	21	22	18	176	100%	-	-

BS - Basic Sciences
ES - Engineering Sciences
HSS - Humanities and Social Sciences
PC - Professional Core
PE - Professional Elective
EEC - Employability Enhancement Course

CA - Continuous Assessment
ES - End Semester Examination

15MA101 MATRICES AND CALCULUS 3 2 0 4

(Common to all Branches)

Course Objectives

- Interpret the introductory concepts of Matrices and Calculus, which will enable them to model and analyze physical phenomena involving continuous changes of variables
- Summarize and apply the methodologies involved in solving problems related to fundamental principles of Matrices and Calculus.
- Develop enough confidence to identify and model mathematical patterns in real world and offer appropriate solutions, using the skills learned in their interactive and supporting environment.

Course Outcomes (COs)

1. Analyze the characteristics of a linear system with eigen values and vectors.
2. Identify and model the real time problem using first order linear differential equations.
3. Recognize and solve the higher order ordinary differential equations.
4. Characterize the functions and get the solutions of the same.
5. Integrate the functions for evaluating the surface area and volume.

UNIT I **9 Hours**

MATRICES

Eigen Values and Eigen Vectors of a real matrix - Properties of Eigen Values-Stretching of elastic membranes. Cayley - Hamilton Theorem - Quadratic form: Reduction of a quadratic form to a canonical form.

UNIT II **8 Hours**

ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER

Leibnitz's Equations - Modelling and solutions using Newtons law of cooling of bodies - solutions to R-L and R-C electric circuits.

UNIT III **11 Hours**

ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER

Linear differential equations of second and higher order with constant coefficients. Linear differential equations of higher order with variable coefficients: Cauchys linear differential equation - Method of variation of parameters for second order differential equations.

UNIT IV **9 Hours**

MULTIVARIABLE CALCULUS

Functions of Two Variables and their solutions- Total Differential - Derivative of implicit functions- Jacobians Unconstrained maxima and minima.

UNIT V **8 Hours**

MULTIPLE INTEGRALS

Double integration with constant and variable limits-Region of integration -Change the order of integration -Area as double integral in cartesian coordinates. Triple integral in Cartesian coordinates.

FOR FURTHER READING

Applications of mass spring system in ordinary differential equations of higher order

Total: 45+30=75 Hours

Reference(s)

1. C. Ray Wylie and C Louis Barrett, Advanced Engineering Mathematics, Sixth Edition, Tata McGraw-Hill Publishing Company Ltd, 2003.
2. Erwin Kreyszig, Advanced Engineering Mathematics, Tenth Edition, Wiley India Private Limited,New Delhi 2015.
3. Peter V. O Neil, Advanced Engineering Mathematics, Seventh Edition, Cengage Learning India Private Limited, 2012.
4. B.S. Grewal, Higher Engineering Mathematics, Forty Third Edition, Khanna Publications, New Delhi 2014.
5. Glyn James, Advanced Engineering Mathematics, Third Edition, Wiley India, 2014.
6. T.Veerarajan, Engineering mathematics for First Year, Tata McGraw-Hill Publishing company Limited, New Delhi, 2014.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					6					6			6											20
2	2					2				4					4				6						18
3		2			2						6			6					6						22
4		2					6				8				6										22
5	2						4			6									6						18
																								Total	100

Assessment Questions

Remember

1. Define spectral values of a matrix.
2. State Cayley - Hamilton theorem.
3. List out five natures of a quadratic form.
4. Reproduce the solution for the first order linear differential equation $\frac{dy}{dx} + Py = Q$
5. State Newton's Law of cooling in ordinary differential equation.
6. Define Jacobian in three dimensions
7. State Wronskian determinant.
8. List two sufficient conditions for extermum of a function

   $z = f(x, y)$ *at* (a, b) .
9. Define Jacobian of u *and* v with respect to x *and* y.
10. Recall any two properties of Jacobians.

Understand:

1. Identify whether there exist a square matrix without eigenvalues? Give reason
2. Indicate the matrix which has real eigenvalues and real eigenvectors?
3. Identify in which cases can we expect orthogonal eigenvectors?.

4. Compare second and higher order ordinary differential equation
5. A condenser of capacity C discharged through an inductance L and resistance R in series and the charge q at the time t satisfies the equation $L\frac{d^2q}{dt^2}+R\frac{dq}{dt}+\frac{q}{c}=0$.given that L=0.25 henries,R=250 ohms,C=2×10^{-6} farads,and that when t=0,charge q is 0.002 coulombs and the current $\frac{dq}{dt}=0$,obtain the value of q in terms of t.
6. Represent the area bounded by the parabolas $y^2=4-x$ and $y^2=4-4x$ as a double integral.
7. Formulate Leibnitz's equation where R=100 ohms L=0.05 henry E=100 Cos300t volts
8. A condenser of capacity C discharged through an inductance L and resistance R in series and the charge q at the time t satisfies the equation $L\frac{d^2q}{dt^2}+R\frac{dq}{dt}+\frac{q}{c}=0$.the circuit consists of an inductor of 1H,a resistor of 12Ω,capacitor of 0.01 F,and a generator having voltage given by E(t)=24 sin10t.find the charge q and the current I at time t,if q=0 and i=0 at t=0 where $i=\frac{dq}{dt}$.
9. Formulate the area between the curves $y^2=4x$ and $x^2=4y$.
10. Indicate and change the order of integration for $\int_0^1\int_{x^2}^{2-x} xydydx$

Apply:

1. Carry-out the three engineering applications of eigen value of a matrix.
2. Find the eigen values and eigen vectors of the matrix A = $\begin{pmatrix}11 & -4 & -7\\ 7 & -2 & -5\\ 10 & -4 & -6\end{pmatrix}$ and hence find the eigen values of A^2, 5A and A^{-1} using properties.
3. Use Cayley Hamilton theorem to find inverse of A = $\begin{pmatrix}1 & 3 & 7\\ 4 & 2 & 3\\ 1 & 2 & 1\end{pmatrix}$.
4. Find the points of the function $f(x,y)=x^2y+xy^2-axy$ where f is a maximum or minimum.
5. A body originally at 80^0C cools down to 60^0C in 20 minutes, the temperature of the air being 40^0C. What will be the temperature of the body after 40 minutes from the original?
6. If the temperature of a cake is 300^0F when it leaves the oven and is 200^0F 10 minutes later, when will it be practically equal to the room temperature of 60^0F, say, when will it be 61^0F? Use Newton's law of cooling.
7. In an L-C-R circuit, the change q on a plate of a condenser is given by $L\frac{d^2q}{dt^2}+R\frac{dq}{dt}\frac{q}{c}=$Esinpt,where $i=\frac{dq}{dt}$.the circuit is tuned to resonance so that $p^2=1/LC$. If

initially the current I and the charge q be zero.show that ,for small values of R/L, the current in the circuit at time t is given by (Et/2L)sinpt.

8. Construct the solution for the equation $(D^3 - D)y = xe^x$
9. Use the method of variation of parameters to solve $(D^2 + 4)y = \cot 2x$.
10. Construct the equation $x^2y'' + xy' = x$ into a linear differential equation with constant coefficients.

Analyze:

1. Justify whether the matrix B = $\begin{pmatrix} \cos & \sin & 0 \\ -\sin & \cos & 0 \\ 0 & 0 & 1 \end{pmatrix}$ is orthogonal or not? .
2. Suppose that in Winter the day time temperature in a certain office building is maintained at 70°F, The heating is shut off at 10 P.M. and turned on again at 6 A.M. On a certain day the temperature inside the building at 2 A.M. was found to be 65°F. The outside temperature was 50°F at 10 P.M. and had dropped to 40°F by 6 A.M. Find the temperature inside the building when the heat was turned on at 6 A.M.? .
3. Experiment show that the radio active substance decomposes at a rate proportional to the amount present. Starting with 2grms at time t=0 find the amount available at a later time.
4. Differentiate RL and RC electric circuit.
5. Transform the equation $x^2y'' + xy' = x$ into a linear differential equation with constant coefficients.
6. If the voltage in the RC circuit is E = E_0 cos ωt, find the charge and the current at time t.
7. Solve $(x^2D^2-2xD+2)y = (3x^2-6x+6)e^x$, $y(1) = 2 + 3e$, $y'(1) = 3e$
8. In a circuit the resistance is 12Ω and the inductance is 4 H. The battery gives a constant voltage of 60 V and the switch is closed when t = 0, so the current starts with I(0) = 0. (a) Find I(t) (b) Find what happens to the current after a long time(c) justify the current after 1 s.
9. If $g(x,y) = \cdot(u,v)$ where $u = x^2 - y^2$, $v = 2xy$ prove that

$$\frac{\partial^2 g}{\partial x^2} + \frac{\partial^2 g}{\partial y^2} = 4(x^2 + y^2)\left(\frac{\partial^2 \cdot}{\partial u^2} + \frac{\partial^2 \cdot}{\partial v^2}\right).$$

10. Solve the triple integral $\int_0^a \int_0^{\sqrt{a^2-x^2}} \int_0^{\sqrt{a^2-x^2-y^2}} xdxdydz$

Evaluate:

1. Use Cayley-Hamilton theorem to find the value of

$A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$ if the matrix A = $\begin{pmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{pmatrix}$

2. Determine the nature, index, rank and signature by reducing the quadratic form $2x^2+2y^2+2z^2+2yz$ to canonical form by an orthogonal transformation.

3. Determine the value of y from the equation $\frac{dy}{dx} = \frac{x^2+y^2+1}{2xy}$
4. Determine the solution of y of the equation $\sqrt{1-y^2}\,dx = (sin^{-1}x - x)dy$.
5. Determine the value of y from the equation $\frac{dy}{dx} - \frac{tan\,y}{1+x} = (1+x)\,e^x\,sec\,y$.
6. Determine the complete solution for y from the equation $\frac{d^2y}{dx^2} + \frac{1}{x}\frac{dy}{dx} = \frac{12log\,x}{x^2}$.
7. Determine the complete solution for y of $(x^2D^2 - xD + 4)y = x^2\sin(\log x)$.
8. Determine the solution of the initial value problem $y'' + y' - 6y = 0$ with the initial conditions y(0)=10 and $y'(0) = 0$.
9. Evaluate $\iiint (x^2 + y^2 + z^2)\,dxdydz$ taken over the region of space defined by $x^2 + y^2 \le 1$ and $0 \le x \le 1$.
10. Evaluate $\int_0^a \int_y^a \frac{x}{x^2+y^2} dxdy$ by changing into polar coordinates

15PH102 ENGINEERING PHYSICS **2 0 2 3**

(Common to all Branches)

Course Objectives

- To impart knowledge in properties of matter, crystallography and ultrasonics
- To understand the applications of lasers and fiber optics
- To implement the principles of quantum physics in the respective engineering fields

Course Outcomes (COs)

1. Realize the concept of properties of matter and apply the same for practical applications
2. Identify the suitable laser source for fiber optic communication applications
3. Determine the velocity of ultrasonic waves and apply the same for day today applications
4. Classify the different types of crystal structures and analyze their properties
5. Comprehend the efficacy of quantum equations in modern areas

UNIT I **8 Hours**

PROPERTIES OF MATTER

Elasticity: elastic and plastic materials - Hooke's law - elastic behavior of a material -stress -strain diagram- factors affecting elasticity. Three moduli of elasticity- Poisson's ratio-torsional pendulum-twisting couple on a cylinder. Young's modulus- uniform bending -non- uniform bending. Viscosity: coefficient of viscosity -streamline and turbulent flow -experimental determination of viscosity of a liquid -Poiseuille's method.

UNIT II **6 Hours**

APPLIED OPTICS

Interference: air wedge- theory- uses- testing of flat surfaces- thickness of a thin wire. Laser: introduction- principle of laser- characteristics of laser- types: CO2 laser -semiconductor laser (homo junction). Fiber optics: principle of light transmission through fiber- expression for acceptance angle and numerical aperture- types of optical fibers (refractive index profile and mode)- fiber optic communication system (block diagram only).

UNIT III **5 Hours**

ULTRASONICS

Ultrasonics: introduction- properties of ultrasonic waves-generation of ultrasonic waves-magnetostriction- piezo electric methods- detection of ultrasonic waves. Determination of velocity of ultrasonic waves (acoustic grating). Applications of ultrasonic waves: SONAR- measurement of velocity of blood flow -study of movement of internal organs.

UNIT IV **5 Hours**

SOLID STATE PHYSICS

Crystal Physics: lattice -unit cell -crystal systems- Bravais lattices- Miller indices- 'd' spacing in cubic lattice- calculation of number of atoms per unit cell, atomic radius, coordination number and packing density for SC, BCC, FCC and HCP structures- X-ray diffraction: Laue's method - powder crystal method.

UNIT V **6 Hours**

QUANTUM MECHANICS

Quantum Physics: development of quantum theory- de Broglie wavelength -Schrodinger's wave equation- time dependent and time independent wave equations- physical significance. Application: particle in a box (1d)- degenerate and non-degenerate states. Photoelectric effect: quantum theory of light work function- problems.

FOR FURTHER READING

Neutrions - expanding universe

2 Hours

INTRODUCTION

Exposure to Engineering Physics Laboratory and precautionary measures

4 Hours

EXPERIMENT 1

Determine the moment of inertia of the disc and calculate the rigidity modulus of a given wire using torsion pendulum (symmetrical masses method).

4 Hours

EXPERIMENT 2

Find the elevation of the given wooden beam at the midpoint by loading at the ends and hence calculate the Youngs modulus of the material.

4 Hours

EXPERIMENT 3

Find the depression at the midpoint of the given wooden beam for 50g, 100 g, 150 g, 200 g and 250 g subjected to non-uniform bending and determine the Youngs modulus of the material of the beam.

4 Hours

EXPERIMENT 4

Determine the coefficient of viscosity of the given liquid by Poiseulles method.

4 Hours

EXPERIMENT 5

Form the interference fringes from the air wedge setup and calculate the thickness of the given wire.

4 Hours

EXPERIMENT 6

By applying the principle of diffraction, determine the wavelength of given laser and the average particle size of lycopodium powder using laser source.

4 Hours

EXPERIMENT 7

Determine the
(i) wavelength of ultrasonics in a liquid medium,
(ii) velocity of ultrasonic waves in the given liquid
(iii) compressibility of the given liquid using ultrasonic interferometer.

Total: 60 Hours

Reference(s)

1. D. S. Mathur, Elements of Properties of Matter, 5th edition, S Chand & Company Ltd., New Delhi, 2012.
2. Charles Kittel, Introduction to Solid State Physics, 8th edition, Wiley India Pvt. Ltd., New Delhi, 2012.
3. Arthur Beiser, Shobhit Mahajan and S Rai Choudhury, Concepts of Modern Physics, 6th Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2010.
4. B. K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning India Pvt. Ltd., New Delhi, 2012.
5. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011.
6. Ian Morison, Introduction to Astronomy and Cosmology, John Wiley and Sons, Ltd., 2013.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	2			4	5				1			1	3				1							20
2	4	1			4	7							1	2				1							20
3	3				4	6	2		1	1			1	1				1							20
4	1	2			3	8	1			4			2	4											25
5	1	2			2	5				1			1	3											15
																								Total	100

Assessment Questions

Remember

1. Reproduce Hooke's law
2. Name the three types of moduli of elasticity
3. List the two applications of air wedge
4. Recall the two conditions required for achieving total internal reflection
5. Define magnetostriction effect
6. Recognize the four applications of ultrasonics in medical field
7. Write the Bragg's condition necessary for obtaining X-ray diffraction in crystals
8. Retrieve the seven types of crystal system
9. Recall four physical significance of wave function
10. Define photoelectric effect

Understand

1. Explain the procedure adopted for determining the Young's modulus of the given material by non-uniform bending method
2. Illustrate the effect of temperature on elasticity of a material
3. Classify the fiber optics based on refractive index profile
4. Indicate the role of optical resonators in the production of laser
5. Compare the merits of magnetostriction and piezo-electric oscillators
6. Summarize the four applications of ultrasonic waves in day-today life
7. Identify the closely packed cubic crystal structure with an example

8. Compare Laue method and powder crystal method used in X-ray diffraction
9. Infer the significance of photoelectric effect
10. Represent the two assumptions involved in solving the Schrödinger time dependent wave equation.

Apply

1. Show that when a cylinder is twisted the torsional couple depends on torsional rigidity
2. Using torsional pendulum, explain the rigidity modulus of the wire
3. Design an experimental setup used for determining the thickness of a thin material
4. A silica optical fiber has a core refractive index of 1.50 and a cladding refractive index of 1.47. Find the numerical aperture for the fiber.
5. Construct the piezo electric oscillator circuit and explain the generation of ultrasonic waves
6. Find the depth of submerged submarine if an ultrasonic wave is received after 0.33 s from the time of transmission.(given v=1400 m/s)
7. Show that the axial ratio for an ideal HCP structure is 1.633
8. Sketch the planes having Miller indices (100) and (111).
9. Assess the various energy levels of an electron enclosed in a one dimensional potential well of finite width ‘a’
10. Compute the relation between de Broglie wavelength and velocity of a particle

Analyse

1. Differentiate uniform bending from non-uniform bending
2. Straight lined fringes are formed only in flat glass plates. Justify.
3. Conclude that the thickness of thin wire is influenced by band width of a material
4. Outline the merits and demerits of magnetostriction oscillator method.
5. Five fold symmetry is not possible in crystal structures. Justify your answer.
6. Compare the degenerate state with non-degenerate state

Evaluate

1. Determine the viscosity of a given liquid using Poiseuille’s method (Given: water, burette, stop clock, capillary tube, stand and travelling microscope)
2. When ultrasonic waves are passed through liquids, cavitations are produced. Criticize the statement
3. Check the packing factor for a simple cubic structure is 0.52
4. Evaluate the expression for time dependent Schroedinger’s wave equation

2 0 2 3

15CH103 ENVIRONMENTAL SCIENCE

(Common to all Branches)

Course Objectives

- Realize the interdisciplinary and holistic nature of the environment
- Understand how natural resources and environment affect the quality of life and stimulate the quest for sustainable development
- Recognize the socio-economic, political and ethical issues in environmental science

Course Outcomes (COs)

1. Demonstrate the importance of interdisciplinary nature of environment, its purpose, design and exploitation of natural resources
2. Analyze the fundamental physical and biological principles that govern natural processes and role of professionals in protecting the environment from degradation.
3. Apprehend the existing environmental challenges related to pollution and its management
4. Evaluate strategies, technologies and methods for sustainable management of environmental systems
5. Characterize and analyze human impacts on the environment

UNIT I **6 Hours**

NATURAL RESOURCES

Forest resources: Use - over exploitation - deforestation - case studies. Water resources: Use - over utilization of surface and ground water - conflicts over water. Mineral resources: Use - exploitation - environmental effects of extracting and using mineral resources - case studies. Food resources: Effects of modern agriculture - fertilizer-pesticide problems (eutrophication, blue baby syndrome, biomagnification) - water logging - salinity - case studies. Energy resources: renewable(solar, wind, tidal, geothermal and hydroelectric power) - non renewable energy sources

UNIT II **6 Hours**

ECOSYSTEMS AND BIODIVERSITY

Concept of an ecosystem: Structure and function of an ecosystem - producers - consumers - decomposers - food chains - food webs and ecological pyramids - Types of ecosystem: Introduction - characteristic features: forest ecosystem - desert ecosystem - ecological succession. Biodiversity - value of biodiversity - threats to biodiversity - endangered and endemic species - Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity - field study

UNIT III **6 Hours**

ENVIRONMENTAL POLLUTION

Pollution: Definition - causes - effects - control measures of air pollution - water pollution : (Sewage water treatment by activated sludge and trickling filter process) - marine pollution - thermal pollution - noise pollution. Disaster management: causes - effects - control measures of floods - earthquake - cyclone - landslides

UNIT IV **7 Hours**

SOCIAL ISSUES AND ENVIRONMENT

Sustainable development: Definition - Unsustainable to sustainable development - urban problems related to energy. Environmental ethics - issues and possible solutions - solid waste management - causes - effects - 3R Principles (landfills, incineration, composting). Water conservation - rain water harvesting - watershed management. Climate change - global warming - acid rain - ozone layer depletion. Environment protection act: Air (Prevention and control of pollution) act - wildlife protection act

UNIT V **5 Hours**

HUMAN POPULATION AND ENVIRONMENT

Human population: Population growth - characteristics - variation among nations - population explosion - women and child welfare programmes - value education - HIV / AIDS. Role of information technology in environment and human health - occupational safety and health administration (OSHA)

FOR FURTHER READING

Human rights:E - waste and biomedical waste -Identification of adulterants in food materials

2 Hours

EXPERIMENT 1

Preparation of N/10 Oxalic acid and M/10 Sodium carbonate solution

4 Hours

EXPERIMENT 2

Estimation of dissolved oxygen in a water sample/sewage by Winklers method

4 Hours

EXPERIMENT 3
Estimation of chloride content in water by argentometric method

4 Hours

EXPERIMENT 4
Estimation of calcium in lime by complexometric method

4 Hours

EXPERIMENT 5
Estimation of chromium in leather tannery effluents

4 Hours

EXPERIMENT 6
Determination of percentage purity of sodium carbonate

4 Hours

EXPERIMENT 7
Estimation of heavy metals in the given solution by EDTA method

4 Hours

EXPERIMENT 8
Determination of concentration of unknown colored solution using spectrophotometer

Total: 60 Hours

Reference(s)

1. Anubha Kaushik, C.P. Kaushik, Environmental Science and Engineering , 4th Multi Colour Edtion, New Age International Publishers, New Delhi, 2014
2. A. Ravikrishnan, Environmental Science and Engineering, 5th revised Edition, Sri Krishna Hitech Publishing company (P) Ltd, Chennai, 2010
3. T. G. Jr. Miller, S. Spoolman, New Environmental Science, 14th Edition, Wadsworth Publishing Co, New Delhi, 2014
4. E. Bharucha, Textbook of Environmental studies, second Edition, Universities Press Pvt. Ltd., New Delhi, 2013
5. A. K. De, Environmental Chemistry, 7th Edition , New age international publishers, New Delhi, 2014

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	2			4	5				1			1	3				1							20
2	4	1			4	7							1	2				1							20
3	3				4	6	2		1	1			1	1				1							20
4	1	2			3	8	1			4			2	4											25
5	1	2			2	5				1			1	3											15
																								Total	100

Assessment Questions

Remember

1. Define the term bio-magnification.
2. Name any four major gaseous responsible for air pollution.
3. Recall four gases responsible for greenhouse effect.
4. State environmental ethics.
5. List any two impacts of water pollution.
6. Mention the two objectives of value education.
7. List the any four consequences of air pollution on human health.

8. Recall any two endangered and endemic species of India.
9. List any two disadvantages of nuclear energy production.

Understand

1. Summarize the structural and functional attributes of an ecosystem.
2. With the help of neat flow chart explain waste water treatment process using activated sludge process.
3. Explain the modern method of rain water harvesting technique diagrammatically and discuss the various strategies adopted for water conservation.
4. Summarize the abstracts of Wildlife (protection) Act, 1972.
5. Indicate the three consequences of noise pollution.
6. Classify the ecosystems on the basis of energy sources
7. Infer two types of photochemical reactions involved in formation and destruction of ozone in the stratosphere.
8. Explain how the impacts of natural disasters can be minimized on human communities with on representative example.
9. Summarize four major effects caused on forests and tribal people due to big dam construction.
10. Infer the any two conflicts over water, confining to our nation.
11. Identify three major threats to Indian biodiversity
12. Relate the concept of food chain and food web with tropic level and mention their three significances.

Apply

1. Identify any seven impacts caused if ground water is used enormously.
2. Select the proper disaster management techiques that can be implemented to manage. a) Earthquake b) Floods
3. Execute the concept age-structure pyramids as a tool to achieve stabilized population in our nation.
4. Predict the significances of child welfare in India.
5. Implement the 3R approach to manage solid waste.
6. Asses the four adverse effects of solid waste.
7. Demonstrate the application of electro of electrostatic precipitator to control air pollution.
8. with suitable example.
9. Assess how climate change affects human health.

Analyse

1. Differentiate between confined and unconfined aquifers.
2. Distinguish between critical and strategic minerals with two examples for each.
3. Outline variations in population growth among nations with necessary diagram.
4. “Day by day our atmosphere gets prone to serious effects” and “deterioration of environment affects human health”. Justify these two statements.
5. Compare the major two advantages and limitations of major greenhouse pollutant CO2.

Evaluate

1. Choose three suitable methods to minimize acid rain
2. Determine the doubling time of population, if annual growth rate of a nation is 25 years.

15GE205 BASICS OF CIVIL AND MECHANICAL ENGINEERING **3 0 0 3**

Common to CSE,ECE,EEE,EIE,FT,IT (I Semester) and to MTRS, BT,TT, FD (II Semester)

Course Objectives

- To impart basic knowledge in the field of Civil Engineering
- To guide students to select the good building materials
- To create awareness on various types of water supply and transportation systems
- To impart basic knowledge in the various engineering materials and manufacturing Processes.
- To understand the working principles of various Internal Combustion Engines, Refrigeration, Boiler and power plants.

Course Outcomes (COs)

1. Understand the fundamental philosophy of Civil Engineering
2. Identify the nature of building components, functions, construction practices and material qualities
3. Understand the fundamental concepts of water supply and transportation systems
4. Recognize the various engineering materials and understand the working principles and operations of manufacturing processes.
5. Understand the working principles and operations of Internal Combustion Engines, Refrigeration, Boiler and power plants.

UNIT I **7 Hours**

INTRODUCTION TO CIVIL ENGINEERING

History, development and scope of Civil Engineering Functions of Civil Engineers. Construction Materials Characteristics of good building materials such as Stones Bricks -Cement - Aggregates and concrete. Surveying: Definition and purpose Classification Basic principles Measurement of length by chains and tapes.

UNIT II **7 Hours**

GENERAL FEATURES RELATING TO BUILDINGS

Selection of site Basic functions of buildings Major components of buildings. Types of foundation Bearing capacity of soils General Principles of Brick masonry Stone masonry Beams Lintels Columns Doors and windows Introduction to Green Building and Interior Design

UNIT III **7 Hours**

WATER SUPPLY AND TRANSPORTATION SYSTEMS

Sources of water Supply Methods of Rain Water Harvesting Flow Diagram of Water treatment Process Modes of Transportation Systems. Classification of Highways-Components of roads Bituminous and cement concrete roads. Importance of railways - Gauges Components of permanent way Types of bridges.

UNIT IV **8 Hours**

ENGINEERING MATERIALS AND MANUFACTURING PROCESSES

Materials classification, mechanical properties of cast iron, steel and high speed steel Casting process-Introduction to green sand moulding, pattern, melting furnace electric furnace Introduction to metal forming process and types Introduction to arc and gas welding Centre lathe, Drilling and Milling machines principal parts, operations.

UNIT V **8 Hours**

INTERNAL COMBUSTION ENGINES AND REFRIGERATION

Internal Combustion (IC) Classification, main components, working principle of a two and four stroke petrol and diesel engines, differences Refrigeration working principle of vapour compression and absorption system Introduction to Air conditioning.

UNIT VI **8 Hours**

ENERGY, BOILERS, TURBINE AND POWER PLANTS

Energy-Solar, Wind, Tidal, Geothermal, Biomass and Ocean Thermal Energy Conversion (OTEC)Boilers classification, Babcock and Wilcox and La-Mont Boilers, differences between fire tube and water tube boiler Steam turbines- working principle of single stage impulse and reaction turbines Power plant classification, Steam, Hydel, Diesel, and Nuclear power plants.

Total: 45 Hours

Reference(s)

1. N. Arunachalam, Bascis of Civil Engineering, Pratheeba Publishers, 2000
2. M. S. Palanichamy, Basic Civil Engineering, TMH, 2009
3. G. Shanmugamand M. S. Palanichamy, Basic Civil and Mechanical Engineering,Tata McGraw Hill Publishing Co., New Delhi, 2009
4. Pravin Kumar, Basic Mechanical Engineering, Pearson Education India, Pearson,2013.
5. G. Shanmugam and S. Ravindran, Basic Mechanical Engineering, Tata McGraw- Hill Publishing Company Limited, New Delhi, 2013.
6. S. R. J. Shantha Kumar, Basic Mechanical Engineering, Hi-tech Publications, Mayiladuthurai, 2015

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	7					10																			17
2	7					10																			17
3	4					6			4																14
4	7					12																			19
5	5					10																			15
6	6					12																			18
																								Total	100

Assessment Questions

Remember

1. Classify Boiler.
2. What are the uses of high carbon steel?
3. Define welding
4. Define soldering.
5. Define Brazing.
6. What do you mean by milling?
7. Classify IC Engines.
8. List the various components of IC Engines.
9. Define Refrigeration.
10. Classify Boiler.
11. What is turbine?
12. Define water tube boiler.
13. Name the main parts of a turbine.

14. Classify power plants.
15. Writedown the scope of Civil Engineering.
16. Define surveying.
17. List the ingredients of concrete.
18. State the basic principles of survey.
19. What is meant by lintel?
20. Write down the components of buildings.
21. List the functions of foundation.
22. What is meant by bearing capacity of soil?
23. What are the factors to be considered in selection of site?
24. Define gauges.
25. Name the components of permanent way.

Understand

1. Compare reaction and impulse turbines.
2. What is the difference between renewable and non-renewable sources of energy?
3. What is the function of a hydraulic turbine?
4. What is the function of a surge tank in Hydel power plant?
5. What is the function of a moderator in Nuclear power plant?
6. How to select the boiler?
7. Why air is pre-heated before enter into boiler?
8. How does a fusible plug function in boiler?
9. What is the function of a spark plug in IC engine?
10. What is the function of a fuel injector in diesel engine?
11. Compare and contrast 4 stroke and 2 stroke engine.
12. Describe the characteristics of good building stone.
13. Explain the various functions of Civil Engineer.
14. Discuss in detail about principles of surveying.
15. Describe the characteristics of cement and concrete.
16. Differentiate the English and Flemish bonds brick masonry.
17. What are the points to be observed in the construction of brick masonry?
18. Elucidate the components of permanent way.
19. Describe the cross section of bituminous pavement.
20. Elucidate different sources of water supply.

Apply

1. Explain in detail about rain water harvesting.
2. Explain the process of water treatment.
3. Enumerate the procedure for construction of water bound macadam road.

15FT106 FIBRE SCIENCE

3 0 0 3

Course Objectives

- Students will have fundamental knowledge on natural and man-made fibres.
- Students will know the manufacturing process for different textile fibres
- Students will know the physical and mechanical properties of fibres.

Course Outcomes (COs)

1. Understand the cultivation and production of natural fibres and man-made fibres
2. Understand the mechanical, comfort, optical and frictional properties of natural and man-made fires.
3. Select suitable fibres for various end uses / applications.

UNIT I **9 Hours**

NATURAL FIBRES

Introduction to fibres: Definition of Staple fibre and Filament, Yarn, and Thread. Classification - Natural fibres, Man-made fibres. Properties - essential properties, desirable properties. Production, cultivation and chemical properties of Natural Fibers: Cotton, Silk, Wool, Jute. Application of natural fibres. Linear density: systems of expression - tex, decitex, millitex, denier, micronaire.

UNIT II **9 Hours**

MAN-MADE FIBRES

Production sequence of Regenerated Fibers: Viscose Rayon, Acetate Rayon, Modal, Bamboo fibres, Soybean. Production Sequence and chemical properties of Synthetic Fibers: Polyester, Nylon, Acrylic and Polypropylene. Introduction to spin finishes, texturisation and heat setting. Features of Speciality fibres: FR fibres, elastane - microdenier fibres, nanofibres, hollow fibres. Application of man-made fibres.

UNIT III **9 Hours**

MECHANICAL PROPERTIES

Degree of order, degree of orientation of molecular chains - Ordered and disordered regions -Density. Definitions: breaking strength, breaking extension, tensile stress and strain, mass specific stress, yield point, initial modulus, secant modulus, work of rupture and work factor. Stress-strain curves for various textile fibres and their significance. Factors influencing tensile properties of fibres. Elastic properties - elasticity, elastic recovery - work recovery. Torsional and flexural rigidity.

UNIT IV **9 Hours**

COMFORT PROPERTIES

Definitions: humidity - Absolute humidity - Relative humidity - Moisture content. Hygroscopic nature of fibres - Regain curves. Factors influencing moisture regain - Conditioning of fibres. Swelling of fibres. Static electricity - generation of static charge, problems encountered during processing, elimination techniques - Triboelectric series. Thermal properties -specific heat - Thermal conductivity - Thermal transitions

UNIT V **9 Hours**

OPTICAL AND FRICTIONAL PROPERTIES

Reflection of light, Luster index, factors influencing luster. Refractive index and Birefringence. Introduction to fibre friction: Theories of friction, measurement of friction and factors influencing fibre friction. Friction in wool -directional frictional effect.

FOR FURTHER READING

Natural fibres, High Performance Fibres, Industrial Application of fibres, Production and Consumption data of natural and man-made fibres, Latest fibre manufacturing techniques.

Total: 45 Hours

Reference(s)

1. H. V. Sreenivasa Murthy Introduction to Textile Fibres, Woodhead Publishing Pvt Ltd, New Delhi 2015
2. Sara J. Kadolph, Textiles, Dorling Kindesley India Pvt Ltd., 2009
3. W. E. Morton and J. W. S. Hearle , Physical Properties of Textile Fibres, Woodhead Publication Ltd., England, 2008
4. S. P. Mishra, Fibre Science & Technology, New Age International Publishers, 2000.
5. V. B. Gupta, Textile Fibres: Developments and Innovations, Vol. 2, Progress in Textiles: Science & Technology, IAFL Publications, 2000.
6. http://nptel.ac.in/courses/116102006/

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	2			3	2					2				2				2					3	20
2	3	4			3	3					3				2				1					1	20
3	2	3			3	3					1				2				3					3	20
4	3	3			2	3					3				2				1					3	20
5	2	3			3	3					1				3				1					4	20
																								Total	100

Assessment Questions

Remember

1. Write the chemical structure of cotton.
2. What is the role of oil and wax in cotton fibres?
3. Elaborate the production process of wool fibre.
4. Elaborate the production process of silk fibre.
5. Define torsional and flexural rigidity.
6. List the factors that influence the torsional and flexural rigidity.
7. State the advantages of amorphous region in a fibre.
8. State the advantages of crystalline region in a fibre.
9. What is specific heat?
10. What is thermal absorption index?
11. List the fibres that have either zero or negative birefringence values.
12. What are the theoretical extreme values of dichroic ratio?

Understand

1. What are the significances of physical and chemical properties of cotton on cotton garments and fabrics that we use every day?
2. Classify the natural fibre.
3. What is linear density?
4. Classify the manmade fibre
5. What is Tex?
6. What is denier?
7. State the composition of wool.
8. State the chemical composition of silk
9. What are the essential properties of fibre?
10. Prepare a table showing various physical and chemical properties of cotton fibres.
11. When is the initial modulus considered to be particularly important?
12. Why are the flexural and torsional rigidities of fibres important?
13. Why Initial modulus rigidity is so important?
14. Why Specific torsional rigidity is so important?
15. What are the advantageous of friction in textiles?
16. What is felting?
17. What are the two kinds of fiber frictions?
18. Elaborate the practical significance of flexural and torsional rigidity of fibres.
19. Draw an ideal stress-strain curve and explain why textile fibres deviate from ideal one.
20. Why is tensile stress and strain of fibre properties so importance?
21. State the advantages and disadvantages of Elastic properties of fibre.
22. Elaborate the Degree of order and degree of orientation of molecular chains cotton fibre.
23. Elaborate Stress-strain curves for natural textile fibres and their significance.
24. Elaborate the elongation-at-break and elastic values of polyester fibre.
25. Enumerate the fine structure of hemp fibre.
26. What are the factors affecting the regain of textile materials?

27. Why Relative Humidity is very important in textile industry?
28. Why humidity is very important in textile industry?
29. Elaborate on thermal properties of fibre with respect to end use.

Apply

1. Identify the various application of wool fibres.
2. How do you apply the elastic fibre materials in apparel industry?
3. How do you produce the high luster fibres and justify?

Analyse

1. Analyse the wool fibre structure and properties.
2. Analyse jute fibre structure and properties.
3. Analyse cotton fibre structure and properties
4. Analyse the advantages and disadvantages of natural fibre.
5. Analyse the various factors influencing tensile properties of fibres.
6. Analyse the various elasticity properties of textile fibres.
7. Analyse the fine structure of cotton fibre.
8. Analyse the fine structure of wool fibre.
9. Analyse the fine structure of silk fibre.
10. How do you minimizing static electricity in textile industry?
11. Analyze the effects of regain on mechanical properties of fibres.
12. Analyze the effects of regain on electrical properties of fibres.
13. Analyze the effects of regain on dimensional stability of fibres.
14. Analyze the effects of regain on thermal properties of fibres.
15. Analyse the cross-sections of normal and mercerized fibres and comment on their lustre levels.

Evaluate

1. Evaluate the various methods of Jute fibre production.
2. How do you assess the fibre friction and factors influencing fibre friction?

15GE107 WORKSHOP PRACTICE 0 0 2 1

Common to AE,AG,AU,ME,MTRS,BT,FT,TT,FD (I Semester) and to CE,CSE,ECE,EEE,EIE,IT (II Semester)

Course Objectives

- To provide hands on training for fabrication of components using carpentry, sheet metal, fitting and welding equipment/tools.
- To develop the skills for preparing the green sand mould using foundry tools and to make simple electrical & household pipe line connections using suitable tools
- To develop the skill to make / operate/utilize the simple engineering components.

Course Outcomes (COs)

1. Fabricate simple components using carpentry, sheet metal, fitting & welding equipment/tools.
2. Prepare green sand mould and make simple electrical & household pipe line connections using suitable tools.
3. Make / operate / utilize the simple engineering components

3 Hours

EXPERIMENT 1

Forming of simple object in sheet metal using suitable tools (Example: Dust Pan / Soap Box) (or) making simple object using Metal Spinning Machine. (Example: Aluminum Cup).

3 Hours

EXPERIMENT 2
Prepare V (or) Half round (or) Square (or) Dovetail joint from the given mild Steel flat.

3 Hours

EXPERIMENT 3
Fabrication of a simple component using thin and thick plates. (Example: Book rack)

3 Hours

EXPERIMENT 4
Making a simple component using carpentry power tools. (Example: Electrical switch Box/Tool box/ Letter box).

3 Hours

EXPERIMENT 5
Construct a household pipe line connections using pipes, Tee joint, Four way joint, elbow, union, bend, Gate way and Taps (or) Construct a pipe connections of house application centrifugal pump using pipes, bend, gate valve, flanges and foot valve.

3 Hours

EXPERIMENT 6
Prepare a green sand mould using solid pattern/split pattern.

3 Hours

EXPERIMENT 7
Construct a domestic electrical wire connections using indicator, one way switch with calling bell, two way switch with lamp, one way switch with fan regulator and one way switch with socket.

3 Hours

EXPERIMENT 8
Alignment and clearance setting of Hook set and Needle of Sewing Machine

3 Hours

EXPERIMENT 9
Change of gears for sewing machine for increase or decreasing the speed of the machine

3 Hours

EXPERIMENT 10
Adjustment of gauges and guides in sewing machines.

Total: 30 Hours

15MA201 VECTOR CALCULUS AND COMPLEX ANALYSIS

3 2 0 4

(Common to all Branches)

Course Objectives

- Implement the Complex Analysis, an elegant method in the study of heat flow, fluid dynamics and electrostatics.
- Summarize and apply the methodologies involved in solving problems related to fundamental principles of Calculus viz: Differentiation, Integration and Vectors.
- Develop enough confidence to identify and model mathematical patterns in real world and offer appropriate solutions, using the skills learned in their interactive and supporting environment.

Course Outcomes (COs)

1. Characterize the calculus of vectors.
2. Apply the theoretical aspects of vector integral calculus in their core areas.
3. Recognize the differentiation properties of vectors.
4. Identify the complex functions and their mapping in certain complex planes.
5. Use the concepts of integration to complex functions in certain regions.

UNIT I **10 Hours**

VECTOR CALCULUS

Gradient -Divergence -Curl - Directional derivative- Solenoidal -Irrotational vector fields -Line Integral -Surface integrals.

UNIT II **9 Hours**

INTEGRAL THEOREMS OF VECTOR CALCULUS

Green's theorem in a plane- Stoke's Theorem- Gauss divergence theorem- Applications involving cubes and parallelepiped.

UNIT III **8 Hours**

ANALYTIC FUNCTIONS

Analytic Functions- Necessary and Sufficient conditions of Analytic Function- Properties of Analytic function - Determination of Analytic Function using Milne Thompson method -Applications to the problems of Potential Flow.

UNIT IV **8 Hours**

MAPPING OF COMPLEX FUNCTIONS

Physical interpretation of mapping- Application of transformation: translation, rotation, magnification and inversion of multi valued functions - Linear fractional Transformation (Bilinear transformation).

UNIT V **10 Hours**

INTEGRATION OF COMPLEX FUNCTIONS

Cauchy's Fundamental Theorem - Cauchy's Integral Formula - Taylor's and Laurent's series- Classification of Singularities - Cauchy's Residue Theorem.

FURTHER READING

Applications to Electrostatic and Fluid Flow.

Total: 45+30=75 Hours

Reference(s)

1. C. Ray Wylie and C. Louis Barrett, Advanced Engineering Mathematics, Tata McGraw-HillPublishing Company Ltd, 2003
2. Erwin Kreyszig , Advanced Engineering Mathematics, Tenth Edition, Wiley India Private Limited,New Delhi 2015
3. J. A. Brown and R. V. Churchill, Complex Variables and Applications , Sixth Edition, McGraw Hill,New Delhi, 1996
4. B. S. Grewal, Higher Engineering Mathematics, Forty third Edition, Khanna Publications , New Delhi 2014
5. Peter V. O. Neil, Advanced Engineering Mathematics, Seventh Edition ,Cengage Learning India Private Limited, 2012
6. Glyn James, Advanced Engineering Mathematics, Third Edition,Wiley India,2007

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					6					8			4			2								22
2	2					4				4					4				6						20
3		2									10								6						18
4	2						4				6				6										18
5	2						4			6				4					6						22
																								Total	100

Assessment Questions

Remember

1. Define gradient of a vector.
2. Define irrotational of a vector.(F)
3. State Green's theorem.
4. State Gauss divergence theorem.
5. Check whether the function is $f(z)=z^3$ analytic?
6. List the necessary condition for a function f(z) to be analytic.
7. Define Bilinear transformation.
8. State the condition for the transformation w = f(z) to be conformal at a point.
9. State the formula for finding the residue of a double pole?
10. State Cauchy's integral formula.

Understand

1. If $\vec{F} = x^2\,\vec{i} + xy^2\,\vec{j}$ evaluate the line integral $\int \vec{F}.\vec{dr}$ from (0,0) to (1,1) along the path y=x.
2. Identify the unit normal vector to the surface $x^2 + xy + z^2 = 4$ at the point (1,-1,2).
3. Identify the value of $\nabla x \nabla \Phi_{.}(F)$, using Stoke's theorem.

4. Formulate the area of a circle of radius a using Green's theorem . (C)
5. Illustrate the two properties of analytic function.
6. Represent the analyticity of the function w = sin z.
7. Identify fixed points of the transformation w = z^2 .
8. Identify the image of the triangular region in the z plane bounded by the lines x= 0, y = 0, and x + y = 1 under the transformation w = 2z.
9. Infer $\int_c \frac{dz}{(z-3)^2}$ where c is the circle $|z|=1$.
10. Identify the residues of the function $f(z)=\frac{4}{z^3(z-2)}$ at its simple pole.

Apply

1. Find $\int_c \overline{F}.dr$ where $\overline{F}=(2y+3)i+xzj+(yz-x)k$ along the line joining the points (0,0,0) to (2,1,1).
2. If $\vec{F}=3xy\dot{i}-y^2\vec{j}$, find $\int_C \vec{F}\cdot d\vec{r}$ where C is the curve in the xy-plane $y=2x^2$ from (0,0) to (1, 0).
3. Apply Green's theorem in the plane to Compute $\int_c (3x^2-8y^2)dx+(4y-6xy)dy$ where C is the boundary of the region defined by x=0, y=0 and x+y=1.
4. Using Gauss divergence theorem,Compute $\iint_s \vec{F}\cdot\hat{n}ds \; where \; \vec{F}=4xz\vec{i}-y^2\vec{j}+yz\vec{k}$ and S is the surface of the cube bounded by x=0,y=0,z=0,x=1,y=1,z=1.
5. If ω=φ+iψ represent the complex potential for an electric field and $\cdot = x^2-y^2+\frac{x}{x^2+y^2}$, find the function φ.
6. If $u=\log(x^2+y^2)$, find v and f (z) such that f (z) =u+iv is analytic.
7. Find bilinear transformation which maps the points I,-1,I of the z plane into the Points 0,1,∞ of the w plane respectively.
8. Find the image of the circle $|z-1|=1$ in the complex plane under the transformation w = $\frac{1}{z}$.
9. Find Taylor's series f(z) = cos z about z = $\frac{®}{3}$.
10. Find the nature of singularity $z\ e^{\left(\frac{1}{z}\right)^2}$.

Analyze.

1. Conclude $div\ grad(r^n)=\nabla^2(r^n)=n(n+1)r^{n-2}$.
2. Demonstrate the irrotational vector and solenoidal vector with an example.

3. Justify stokes' s theorem for $\overline{F} = -yi + 2yzj + y^2k$, where S is the upper half of the sphere $x^2+y^2+z^2=1$.
4. Justify Gauss divergence theorem for $\vec{F} = x^2\,\vec{i} + y^2\,\vec{j} + z^2\,\vec{k}$ where S is the surface of the Cuboid formed by the planes x= 0, x= a, y = 0, y = b, z = 0 and z = c.
5. The complex potential $f(z)=z^2$ describes a flow with constant equipotential lines and Streamlines, Determine the velocity vector.
6. Show that the function $u = x^3 + x^2 - 3xy^2 + 2xy - y^2$ is harmonic and find the corresponding analytic function.
7. Find the image of the rectangle whose vertices are (0,0), (1,0), (1,2), (0,2) by means of linear transformation w = (1+i)z+2-i. Also compare the images.
8. Generate $f(z) = \dfrac{z}{(z-1)(z-3)}$ as Laurent's series valid in the regions: $1 < |z| < 3$ and $0 < |z-1| < 2$
9. Use Cauchy's integral formula Compute $\int_C \dfrac{e^z\,dz}{(z+2)\,(z+1)^2}$ where C is the circle $|z| = 3$.
10. Find $\int_C \dfrac{z+4}{z^2+2z+5}dz$ where C is $|z+1+i| = 2$.

Evaluate

1. Determine $\iint_s (xdydz + 2ydzdx + 3zdxdy)$, where s is the closed surface of the sphere $x^2 + y^2 + z^2 = a^2$.
2. Prove that $curl(curl\vec{F}) = grad(div\vec{F}) - \nabla^2\vec{F}$.
3. Check Stokes theorem for $\vec{F} = (x^2 + y^2)\vec{i} - 2xy\vec{j}$ taken around the rectangle bounded by x=±a,y=0 y=b.
4. Check Green's theorem in the plane to determine $\int_c (3x^2 - 8y^2)dx + (4y - 6xy)\,dy$ where c is the boundary of the region defined by $(i)\,x = 0, y = 0, x + y = 1 (ii)\, y = \sqrt{x}\ and\ y = x^2$.
5. Determine the analytic function f(z) = P + iQ, if Q = $\dfrac{\sin x \sinh y}{\cos 2x + \cosh 2y}$, if f(0) = 1.(C)
6. Determine f(z) and the conjugate harmonic v such that w = u + iv is an analytic function of z given that u = $e^{x^2-y^2}\cos 2xy$.
7. Determine the image of the infinite strip $\dfrac{1}{4} \le y \le \dfrac{1}{2}$ under the transformation w = $\dfrac{1}{z}$

8. Determine the Laurent's series expansion $f(z)=\frac{z-1}{(z+2)(z+3)}$ *for* $2<|z|<3$.

9. Determine $\int_C \frac{z+4}{z^2+2z+5}dz$ where C is $|z+1+i|=2$

10. Using Cauchy's integral formula determine $\int_C \frac{e^z dz}{(z+2)(z+1)^2}$ where C is $|z|=1$

15GE105 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

2 0 2 3

(Common to AE,AG,AU,CE,ME,MTRS, BT,TT,FD (I Semester) and to CSE,FT,IT (II Semester))

Course Objectives

- To understand the basic concepts of electric circuits and magnetic circuits.
- To illustrate the construction and operation of various electrical machines and semiconductor devices.
- To learn the fundamentals of communication systems.

Course Outcomes (COs)

1. Understand the basic concepts of electric and magnetic circuits.
2. Summarize the types of DC machines.
3. Classify the static and dynamic AC machines and explain their operation.
4. Interpret the operation of AC and DC drives
5. Illustrate the characteristics of semiconductor devices and communication systems

UNIT I **7 Hours**

ELECTRIC CIRCUITS

Definition of Voltage, Current, Electromotive force, Resistance, Power & Energy, Ohms law and Kirchoffs Law & its applications - Series and Parallel circuits - Voltage division and Current division techniques - Generation of alternating emf - RMS value, average value, peak factor and form factor- Definition of real, reactive and apparent power.

UNIT II **5 Hours**

DC MACHINES

Introduction of magnetic circuits - Law of Electromagnetic induction, Flemings Right & Left hand rule- Types of induced emf - Definition of Self and Mutual Inductance - DC Motor- Contruction - Working Principle- Applications.

UNIT III **6 Hours**

AC MACHINES

Single Phase Transformer - Alternator - Three phase induction motor - Single phase induction motor - Contruction - Working Principle - Applications.

UNIT IV **5 Hours**

ELECTRICAL DRIVES

Speed control of dc shunt motor and series motor - Armature voltage control - Flux control - Construction and operation of DC servo motor - Construction and operation of DC servo motor stepper motor.

UNIT V **7 Hours**

ELECTRON DEVICES AND COMMUNICATION

Characteristics of PN Junction diode and Zener diode - Half wave and Full wave Rectifiers - Bipolar Junction Transistor - Operation of NPN and PNP transistors - Logic gates - Introduction to communication systems.

FOR FURTHER READING

Voltage Regulator - Stepper motor - Energy meter - SMPS, Satellite and Optical communication.

4 Hours

EXPERIMENT 1

Analyze the VI characteristics of a fixed resistor and a lamp by varying its temperature.

4 Hours

EXPERIMENT 2

Apply the voltage division and current division techniques for series and parallel connections of lamp loads.

4 Hours

EXPERIMENT 3

Understand the concept of electromagnetic induction using copper coil.

4 Hours

EXPERIMENT 4

Understand the construction and working principle of DC machines.

6 Hours

EXPERIMENT 5

Determine the VI Characteristics of PN Junction diode and plot the input and output wave shapes of a half wave rectifier.

4 Hours

EXPERIMENT 6

Realize the working of transistor as an electronic switch through experiments.

4 Hours

EXPERIMENT 7

Lighting applications using logic gates principle.

Total: 60 Hours

Reference(s)

1. T. K. Nagsarkar and M. S. Sukhija, Basic of Electrical Engineering, Oxford University Press, 2011.
2. Smarjith Ghosh, Fundamentals of Electrical and Electronics Engineering, Prentice Hall (India) Pvt. Ltd., 2010
3. A. Sudhakar, Shyammohan S Palli, Circuits and Networks Analysis and Synthesis, Tata McGraw Hill, 2010
4. R. S. Sedha, A Textbook of Applied Electronics, S.Chand & Company Ltd, 2013

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					2					6				4				6						20
2	4					4				2				6					4						20
3	2				10					4					4										20
4	4					6				4					6										20
5	4					4				6														6	20
																								Total	100

Assessment Questions

Remember

1. State kirchoff's current law.
2. State Ohm's law.
3. State kirchoff's voltage law.
4. State Faraday's law of electromagnetic induction.
5. List the properties of flux lines.
6. Define reluctance.
7. Define magnetic flux.
8. State the operating principle of a transformer.
9. State the operating principle of DC generator.
10. What is back emf
11. State Fleming's Left hand rule.
12. State Fleming's right hand rule.
13. Label the V-I characteristics of zener diode.
14. What is junction barrier?
15. What is BJT?
16. List the applications of optical fiber communication.
17. Define aspect ratio

Understand

1. Give the properties of flux lines.
2. Compare series and parallel circuits.
3. Why domestic appliances are connected in parallel?
4. Classify the magnetic circuits.
5. Explain the concepts of self and mutually induced emf.
6. What is leakage coefficient?
7. Interpret the laws of electromagnetic induction.
8. Illustrate the working principle of a transformer.
9. What is a DC generator?
10. List the applications of DC motors.
11. Outline the applications of DC generators
12. Illustrate the construction and working principle of three phase induction motor.
13. Summarise the characteristics of PN junction diode in forward and reverse biasing.
14. Explain the operation of NPN transistor.
15. Draw the symbol of diode and zener diode.
16. Illustrate the input and output characteristics of transistor CE configuration.
17. Exemplify the need for modulation
18. Summarize the advantages of FM overAM.
19. State the need for modulation.
20. Discuss the principle of frequency modulation.

Apply

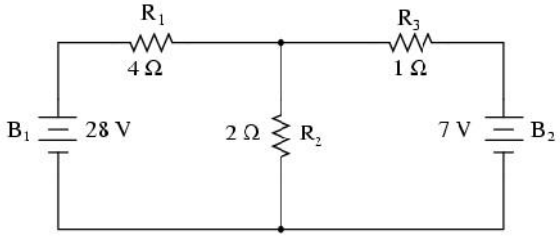
1. Three resistors are connected in series across a 12V battery. The first resistance has a value of 2 ohm, second has a voltage drop of 4V and third has power dissipation of 12 W. Calculate the value of the current in the circuit.
2. A 25 ohm resistor is connected in parallel with a 50 ohm resistor. The current in 50 ohm resistor is 8A. What is the value of third resistance to be added in parallel to make the total line current as 15A.
3. The self inductance of a coil of 500turns is 0.25H. If 60% of the flux is linked with a second coil of 10500 turns. Calculate a) the mutual inductance between the two coils and b) emf induced in the second coil when current in the first coil changes at the rate of 100A/sec.
4. An air cored toroidal coil has 480 turns, a mean length of 30cm and a cross-sectional area of 5 cm2.Calculate a)the inductance i\of the coil and b) the average induced emf, if a current of 4 A is reversed in 60 milliseconds.
5. A toroidal air cored coil with 2000 turns has a mean radius of 25cm, diameter of each turnbeing 6cm. If the current in the coil is 10A, find mmf, flux, reluctance, flux density andmagnetizing force.
6. Cosntruct the circuit of voltage regulator.
7. Show the applications of DC motors.
8. Develop the block diagram of the television and explain each block
9. Build the circuit of full wave bridge rectifier.
10. Develop the block diagram of the optical fibre communication and explain each block
11. Construct the circuit of half wave rectifier.

Analyse

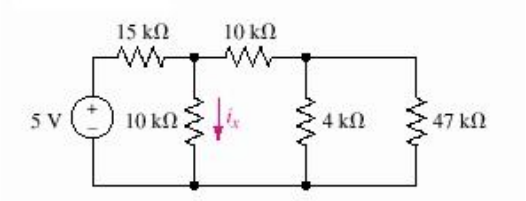
1. Outline the voltage, current and power in a resistor supplied with an alternating voltage.
2. Obtain the equations for the equivalent star network resistances for a given delta network
3. Derive the expression for RMS, average value, peak and form factor of sinusoidal voltage
4. Analyze the voltage, current and power relationship in three phase star connected system
5. Derive the expressions for self inductance and mutual inductance.
6. Analyze the series and parallel magnetic circuit and derive the total mmf required.
7. Compare electric and magnetic circuit.
8. Derive the emf equation of DC Generator.
9. Obtain the expression for current amplification factor.
10. Derive the expression of ripple factor, efficiency of full wave bridge rectifier.

Evaluate

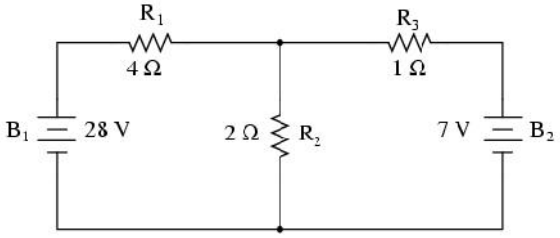
1. Estimate the value of meshcurrents inthefollowingnetwork.



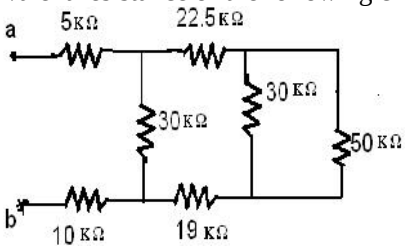
2. For the circuit in Fig. determine*ix*and compute the power dissipated by the 15-kΩ resistor.



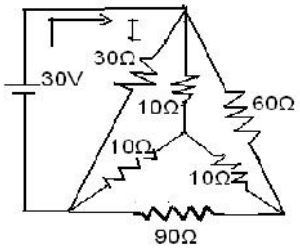
3. Estimate the value of node voltageinthefollowingnetwork.



4. An iron rodof 1cm radius is bent to a ring of mean diameter 30cm and wound with 250 turns of wire. Assume the relative permeability of iron as 800. An air gap of 0.1cm is cut across the bentring. Calculate the current required to produce a useful flux of 20,000 lines if leakage is neglected.
5. The effectiveresistance of two resistors connected in series is 100 Ω. When connected inparallel, then effective value in 24 ohm's. Determine the value of two resistors.
6. Determine the equivalent resistance of the following circuit



7. Calculate the total resistance R_T and total current I in the following circuits using star delta transformation technique



Create

1. Create the circuit diagram of 5V regulated power supply.
2. Plan the combinational circuit diagram of EX-NOR gate using NOR gate.

3 0 2 4

15GE206 COMPUTER PROGRAMMING

Common to CE (I Semester) and to
AE,AG,AU,ME,MTRS,BT,FT,TT,FD (II Semester)

Course Objectives

- To learn the basics of computer organization.
- To study the basics of C primitives, operators and expressions.
- To understand the different primitive and user defined data types

Course Outcomes (COs)

1. Recognize the basic concepts of computers.
2. Implement programs using operators and expressions.
3. Demonstrate the usage of control structures.
4. Execute programs using Arrays and strings.
5. Summarize the concepts of structures and functions.

UNIT I **8 Hours**

INTRODUCTION TO COMPUTERS

Introduction to computers - Characteristics of Computers - Evolution of Computers - Computer Generations - Basic Computer Organization - Number System - Problem Solving Techniques - Features of a Good Programming Language.

UNIT II **9 Hours**

INTRODUCTION TO C PROGRAMMING

Overview of C-Structure of C program-Keywords-Constants- Variables-Data types-Type conversion Operators and Expressions: Arithmetic-Relational-Logical-Assignment- Increment and Decrement-Conditional-Bitwise -Precedence of operators-Managing I/O operations-Formatted I/O-Unformatted I/O.

UNIT III **10 Hours**

CONTROL STATEMENTS

Decision Making and Branching: simple if statement-if else statement-nesting of if else Statement-Switch Statement.Decision Making and Looping: while statement-do while statement-for statement-Nested for statement Jump Statements: goto-break-continue-return statement

UNIT IV **9 Hours**

ARRAYS AND STRINGS

Arrays: Introduction, one dimensional array, declaration - Initialization of one dimensional array, two-dimensional arrays, initializing two dimensional arrays, multi dimensional arrays. Strings: Declaring and initializing string variables- Reading strings from terminal - writing string to screen - String handling functions.

UNIT V **9 Hours**

STRUCTURES AND FUNCTIONS

Structures and Unions: Introduction-defining a structure- declaring structure variables-accessing structure members- structure initialization-Unions-Enumerated data type
User Defined Functions: Elements of user defined functions -Definition of functions-return values and their types- function calls-function declaration-categories of function -call by value and call by reference-recursion-Preprocessor directives and macros.

FOR FURTHER READING

Creating and manipulating document using word - Mail merge - Creating spread sheet with charts and formula using excel - developing power point presentation with Animations - C graphics using built in functions

4 Hours

EXPERIMENT 1

Write a C program to perform arithmetic operations on integers and floating point numbers.

4 Hours

EXPERIMENT 2

Write a C program to implement ternary operator and relational operators.

2 Hours

EXPERIMENT 3

Write a C program to find the greatest of three numbers using if-else statement.

4 Hours

EXPERIMENT 4

Write a C program to display the roots of a quadratic equation with their types using switch case.

2 Hours

EXPERIMENT 5

Write a C program to generate pyramid of numbers using for loop.

4 Hours

EXPERIMENT 6

Write a C program to perform Matrix Multiplication

2 Hours

EXPERIMENT 7

Write a C program to check whether the given string is Palindrome or not.

4 Hours

EXPERIMENT 8

Write a C program to find the factorial of given number.

4 Hours

EXPERIMENT 9

Design a structure to hold the following details of a student. Read the details of a student and display them in the following format Student

details: rollno, name, branch, year, section, cgpa.

****

NAME:

ROLL NO:

BRANCH:

YEAR:

SECTION:

CGPA:

Total: 75 Hours

Reference(s)

1. Pradeep K. Sinha, Priti Sinha, Computer Fundamentals, BPB publications, 2008
2. Ashok. N. Kamthane, Computer Programming, Second Edition, Pearson Education, 2012
3. E.Balagurusamy, Programming in ANSI C, Tata McGraw-Hill, 2012
4. Herbert Schildt, C -The complete Reference, Tata McGraw-Hill, 2013
5. Byron Gottfried, Programming with C, Schaum's Outlines, Tata Mcgraw-Hill, 2013

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	6	4				4					6														20
2	6					2					12														20
3	2				2		4				6		6												20
4	6				2		4		4		4														20
5	4				2		2				2						6				4				20
																								Total	100

Assessment Questions

Remember

1. List the characteristics of a computer.
2. List the features of a good programming language.
3. Define a constant.
4. Define associativity.
5. List the three looping statments in C.
6. State the use of switch case statement.
7. Recall arrays.
8. Recall strings.
9. Define a structure.
10. Define a union.

Understand

1. Explain the generations of computers.
2. Exemplify the problem solving techniques.
3. Illustrate the structure of a C program with an example.
4. Summarise the operators in C.
5. Exemplify the decision making statements in C.
6. Classify the looping statements in C.
7. Classify the types of arrays in C.
8. Summarize the string handling functions in C.
9. Exemplify the process of defining a structure.
10. Explain the components of a function.

Apply

1. Predict the reason for calling C as a structured programming language.
2. Demonstrate the concept of number conversions.
3. Execute a C program to find th roots of a quadratic equation.
4. Implement a C program to use the bitwise operators.
5. Implement a C program to generate fibonacci series.
6. Implement a C program to check whethr a number i prime or not.
7. Implement a C program to perform matrix multiplication.
8. Implment a C program to check whether a string is a palindrome or not.
9. Implement a C program to find the size of a union.
10. Implement a C program to swap two numbers using call by value and call by reference.

Analyse

1. Differentiate while and do while statements.
2. Compare structure and union in C.
3. Organize the basic computer organization.
4. Differentiate == and = operators.
5. Differentiate rak and continue statements.

Evaluate

1. Check the value of the expression c=(x*y+(z/x)) with x=10,y=20,z=30.
2. Determine the sum of n numbers using functions.
3. Determine the vowels using switch case statement.
4. Determine the vowels using switch case statement.
5. Differentiate the use of strcpy() and strncpy() functions.

Create

1. Generate a structure to store the following details: Rollno, Name, Mark1, Mark2, Mark3, Total, Average, Result and Class. Write a program to read Rollno, name and 3 subject marks. Find out the total, result and class as follows:
   a) Total is the addition of 3 subject marks.
   b) Result is "Pass" if all subject marks are greater than or equal to 50 else "Fail".
   c) Class will be awarded for students who have cleared 3 subjects
   i. Class "Distinction" if average >=75
   ii. Class "First" if average lies between 60 to 74 (both inclusive)
   iii. Class "Second" if average lies between 50 & 59 (both inclusive)
   d) Repeat the above program to manipulate 10 students' details and sort the structures as per rank obtained by them.
2. Derive a C program that determines whether a given integer is odd or even and displays the number and description on the same line.

15GE207 ENGINEERING GRAPHICS

0 0 4 2

Common to CE,CSE,ECE,EEE,EIE,IT (I Semester) and to AE, AG,AU,ME,MTRS,BT,FT,TT,FD (II Semester)

Course Objectives

- To learn conventions and use of drawing tools in making engineering drawings.
- To understand the engineering drawing methods and procedures to draw two dimensional drawings from three dimensional model and vice versa.
- To provide the practice for converting simple drawing into the computer aided drawing.

Course Outcomes (COs)

1. Recognize the conventions and apply dimensioning concepts while drafting simple objects.
2. Develop the two dimensional drawings from three dimensional model and vice versa.
3. Utilize the visualization skill to convert simple drawing into the computer aided drawing.

UNIT I **12 Hours**

CONVENTIONS AND BASIC DRAWINGS

Importance - conventions - ISO and BIS - drawing tools and drawing sheets - lettering, numbering, dimensioning, lines and symbols-Conic sections-types constructions-ellipse,parabola and hyperbola-eccentricity and parallelogram method.

UNIT II **14 Hours**

PROJECTIONS

Principles-first and third angle projections - Points - first angle projection of points Straight lines - parallel, perpendicular and inclined to one reference plane-Solid - cylinders, pyramids, prisms and cones- perspective projections.

UNIT III **12 Hours**

ORTHOGRAPHIC PROJECTIONS AND SECTION OF SOLIDS

Orthographic Projections - concepts - front view, top view and side view of simple solids -Section of Solids-simple illustrations.

UNIT IV **12 Hours**

ISOMETRIC PROJECTIONS AND DEVELOPMENT OF SURFACES

Importance- orthographic to isometric projection- simple and truncated solids. Development of surfaces - cylinders, pyramids, prisms, cones and simple truncated objects.

UNIT V **10 Hours**

INTRODUCTION TO AUTOCAD

Basics commands of AutoCAD- two dimensional drawing, editing, layering and dimensioning - coordinate systems-Drawing practice - orthographic views of simple solids using AutoCAD.

Total: 60 Hours

Reference(s)

1. K Venugpoal, Engineering Drawing and Graphics, Third edition, New Age International, 2005.
2. Basant Agrawal, Mechanical drawing, Tata McGraw-Hill Education, 2008.
3. Engineering Drawing Practice for Schools & Colleges, BUREAU OF INDIAN STANDARDS-SP46, 2008.
4. N. D. Bhatt and V. M. Panchal, Engineering Drawing, Charotar Publishing House Pvt. Limited, 2008.
5. K.V.Natarajan, A Text Book of Engineering Graphics, Dhanalakshmi Publishers, 2013.
6. George Omura, Brian C. Benton, Mastering AutoCAD 2015 and AutoCAD LT 2015: Autodesk Official Press, Wiley Publisher, 2015.

15MA301 FOURIER SERIES AND TRANSFORMS

3 2 0 4

Common to all branches of B.E./B.Tech. except CSE

Course Objectives

- Understand the concepts of Fourier series, Transforms and Boundary Conditions, which will enable them to model and analyze the physical phenomena
- Implement the Fourier analysis, an elegant method in the study of heat flow, fluid mechanics and electromagnetic fields.
- Summarize and apply the mathematical aspects that contribute to the solution of one dimensional wave equation
- Develop enough confidence to identify and model mathematical patterns in real world and offer appropriate solutions, using the skills learned in their interactive and supporting environment.

Course Outcomes (COs)

1. Recognize the periodicity of a function and formulate the same as a combination of sine and cosine using Fourier series.
2. Formulate a function in frequency domain whenever the function is defined in time domain.
3. Apply the Fourier transform, which converts the time function into a sum of sine waves of different frequencies, each of which represents a frequency component.
4. Classify a partial differential equation and able to solve them.
5. Use the Z-transform to convert a discrete-time signal, which is a sequence of real or complex numbers, into a complex frequency domain representation.

UNIT I **9 Hours**

FOURIER SERIES

Dirichlet's conditions - General Fourier series - Odd and even functions - Half range cosine and sine series - Root mean square value.

UNIT II **13 Hours**

LAPLACE TRANSFORM

Laplace Transform- Existence Condition -Transforms of Standard Functions - Unit step function, Unit impulse function- Properties- Transforms of Derivatives and Integrals - Initial and Final Value Theorems - Laplace transform of Periodic Functions - Inverse Laplace transforms.

UNIT III **8 Hours**

FOURIER TRANSFORM

Fourier Integral Theorem- Fourier Transform and Inverse Fourier Transform- Sine and Cosine Transforms - Properties - Transforms of Simple Functions - Convolution Theorem - Parseval's Identity

UNIT IV **8 Hours**

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS

Classification of Second Order Quasi Linear Partial Differential Equations - Fourier Series Solutions of One Dimensional Wave Equation - One Dimensional Heat Equation - Steady State Solution of Two-Dimensional Heat Equation - Fourier Series Solutions in Cartesian Coordinates.

UNIT V **7 Hours**

Z -TRANSFORM

Z-Transform - Elementary Properties - Inverse Z-Transform - Convolution Method- Partial fraction method - Solution of Difference Equations using Z-Transform.

FOR FURTHER READING

Solutions of one dimensional wave equation and heat equations using Laplace transforms method.

Total: 45+30=75 Hours

Reference(s)

1. Larry.C.Andrews and Bhimsen.K.Shivamoggi, Integral Transforms for Engineers, First Edition, PHI Learning, New Delhi, 2007
2. Ian.N.Sneddan, The Use of Integral Transforms, Second Edition, McGraw Hill companies, 1972.
3. E. Kreyszig, Advanced Engineering Mathematics, Eighth Edition, John Wiley and Sons, Inc, Singapore, 2008.
4. Peter V. O. Neil, Advanced Engineering Mathematics, Seventh Edition, Cenage Learning India Private Ltd, 2012.

5. B.S. Grewal, Higher Engineering Mathematics, Fortieth Edition, Khanna Publications, New Delhi 2007.
6. C. Ray Wylie and C. Louis Barrett, Advanced Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd, 2003.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					2					6				6				6						22
2	2					6				6					6				6						26
3		2					2				6							6							16
4		2					6				6				6										20
5	2						2			6									6						16
																								Total	100

Assessment Questions

Remember

1. State the Dirichlet's Conditions.
2. Define even and odd function graphically.
3. List out the complex Fourier transform pair.
4. State convolution theorem in Fourier transforms.
5. Label the condition for the existence of Laplace Transform.
6. Reproduce L (t sin at).
7. State the final value theorem for Laplace Transform.
8. Label the inverse Laplace Transform of $1/(s^2+w^2)^2$.
9. Recognize $z\{f(n+1)\}\ in terms of\ \overline{f}(z)$.
10. Recall the Z – Transform of $\cos\left(\frac{n®}{2}\right)$.

Understand

1. Infer the half-range cosine series for the function $f(x)=x, 0<x<®$.
2. Interpret the Fourier series of period 2 for the function $f(x)=\begin{cases}®x & 0\le x\le 1\\ ®(2-x) & 1\le x\le 2\end{cases}$.
3. Identify the Fourier transform of $f(x)=\begin{cases}1-|x| & \text{for } |x|\le 1\\ 0 & \text{for } |x|>1\end{cases}$. Hence evaluate $\int_0^{\infty}\left(\frac{\sin x}{x}\right)^2 dx$ and $\int_0^{\infty}\left(\frac{\sin x}{x}\right)^4 dx$.
4. Illustrate the Fourier Sine and Cosine transform of e^{-ax} and evaluate $\int_0^{\infty}\frac{dx}{(a^2+x^2)}$.

5. Exemplify $\int_0^t \sin u \cos(t-u)\, du$ using Laplace Transform .

6. Indicate the inverse Laplace transform of $\frac{z}{(z-1)(z-2)(z-3)}$ by the method of partial fraction.

7. Use convolution theorem to find the inverse Laplace transform of $\frac{8z^2}{(2z-1)(4z+1)}$.

8. Classify the possible solutions of one dimensional wave equation.

9. Formulate $z\{nf(t)\} = -z\frac{dF}{dz}(z)$

10. Summarize Z-transform.

Apply

1. Execute the function $f(x)=|\cos x|$ *in* $(-\pi, \pi)$ to represent as a Fourier series of periodicity 2π.

2. A taut string of length L is fastened at both ends. The midpoint of the string is taken to a height of b and then released from rest in this position. Find the displacement of the string at any time t.

3. Find the Fourier transform of $f(x)=\begin{cases} a-|x| & for\ |x| \le a \\ 0 & for\ |x| > a \end{cases}$. Hence evaluate $\int_0^\infty \left(\frac{\sin x}{x}\right)^2 dx$ and $\int_0^\infty \left(\frac{\sin x}{x}\right)^4 dx$.

4. Find the Fourier transform of $f(x) = \begin{cases} 1, & for\ |x| < a \\ 0, & for\ |x| > a \end{cases}$ hence evaluate $\int_0^\infty \frac{\sin x}{x} dx$ and $\int_0^\infty \left(\frac{\sin^2 x}{x^2}\right) dx$

5. Verify the initial and final value theorem for the function $1 + e^{-2t}$.

6. Find $L\left(\frac{\cos 2t - \cos 3t}{t}\right)$

7. Using Convolution theorem find the inverse Laplace transform of $\frac{1}{s^2(s^2+25)}$.

8. Find $L^{-1}\left(\frac{p^2-p+2}{p(p+2)(p-3)}\right)$ using Partial fraction method.

9. Using Convolution theorem evaluate $z^{-1}\left(\frac{z^2}{(z-1)(z-3)}\right)$.

10. Solve the differential equation

$y(n+3)-3y(n+1)+2y(n)=0$ *given that* $y(0)=4,\ y(1)=0$ *and* $y(2)=8$.

Analyze

1. Organize the sine series for $f(x)=\begin{cases} x \ \ in \ \ 0<x<l/2 \\ l-x \ \ in \ \ l/2<x<l \end{cases}$ in the interval $(0,l)$.

2. A tightly stretched string of length ' ℓ ' fastened at both ends. The mid-point of the string taken to a height 'b' and show that the displacement at any time 't' is given by

$$y(x,t)=-\frac{8b}{\pi^2}\left[\frac{1}{1^2}\sin\left(\frac{\pi x}{\ell}\right)\cos\left(\frac{\pi at}{\ell}\right)-\frac{1}{3^3}\sin\left(\frac{3\pi x}{\ell}\right)\cos\left(\frac{3\pi at}{\ell}\right)+.....\right].$$

3. Organize the Fourier transform of f(x) given by $f(x)=\begin{cases} a^2-x^2 & for \ \ |x|\le a \\ 0 & for \ \ |x|\ge a \end{cases}$. Hence evaluate $\int_0^\infty\left[\frac{\sin t-t\cos t}{t^3}\right]dt=\frac{\pi}{4}$.

4. Integrate $\int_0^\infty \frac{dx}{(x^2+a^2)(x^2+b^2)}$ using transform method.

5. Organize the Fourier sine and cosine transform of $f(x)=\begin{cases} x, \ 0<x<1 \\ 2-x, 1<x<2 \\ 0, \ x>2 \end{cases}$.

6. Prove that the Laplace Transform of the triangular wave of period 2π defined by

f (t) = $\begin{cases} t & , 0\le t\le \pi \\ 2\pi-t & , \pi<t<2\pi \end{cases}$ is $\frac{1}{s^2}\tan h\left(\frac{\pi s}{2}\right)$.

7. Organize the inverse Laplace transform of $\frac{s+2}{s^2-4s+13}$ using partial fraction.

8. Solve using Laplace Transforms $\frac{d^2y}{dt^2}+4\frac{dy}{dt}+4y=te^{-t}$; $y(0)=0;\ y'(0)=-1$.

9. Find $z^{-1}\left(\frac{z^2}{(z+2)(z^2+4)}\right)$ by the method of partial fraction.

10. Using Z – Transform solve

$$y(n)+3y(n-1)-4y(n-2)=0,\ n\ge 2 \ \ given \ that \ y(0)=3 \ and \ y(1)=-2 \ .$$

Evaluate

1. Determine the Fourier series of the function f(x) of Period 2π given by

$$f(x)=\begin{cases} 1+\frac{2x}{\pi} \ \ in \ \ -\pi\le x\le 0 \\ 1-\frac{2x}{\pi} \ \ in \ \ 0\le x\le \pi \end{cases}$$

2. A string is stretched between two fixed points at a distance 2ℓ apart and the points of the string are given initial velocities 'u' where $u = \begin{cases} \frac{cx}{\ell}, & in\ 0<x<\ell \\ \frac{c}{\ell}(2\ell - x) & in\ \ell<x<2\ell \end{cases}$ x being the distance from one end point. Find the displacement of the string at any subsequent time.

3. Use transforms method to evaluate $\int_0^\infty \frac{dx}{(x^2+1)(x^2+4)}$

4. Determine the Fourier cosine transform of $e^{-a^2x^2}$. Hence prove $e^{-\frac{x^2}{2}}$ is a self-reciprocal.

5. Choose the Laplace transform of the function f(t) with period $\frac{2\pi}{\mu}$, where f(t) =

$\begin{Bmatrix} \sin \mu t & , for\ 0<t<\pi/\mu \\ 0 & , for\ \pi/\mu < t < 2\pi/\mu \end{Bmatrix}$.

6. Using Laplace Transform evaluate $\int_0^\infty te^{-3t} \sin 2t\ dt$

7. Using Convolution theorem find the inverse Laplace transform of $\frac{1}{s^2(s^2+25)}$.

8. Solve using Laplace Transforms $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 4y = te^{-t}$; $y(0) = 0;\ y'(0) = -1$.

9. Solve the equation $y_{n+2} - 7y_{n+1} + 12y_n = 2^n$, *given that* $y_0 = y_1 = 0$.

10. Evaluate inverse Z-transform of $\frac{z}{(z-1)(z-2)(z-3)}$ by the method of partial fraction.

3 0 0 3

15FT302 BASICS OF YARN AND FABRIC MANUFACTURING

Course Objectives

- To learn and acquaint with the basics of yarn formation and fabric formation to supplement the subsequent learning of garment making and fashion portfolio development

Course Outcomes (COs)

1. Choose appropriate process and methods for the production of fibre, yarn and fabric materials to engineer the garments more aesthetically and functionally
2. Select the suitable yarn and fabric for the production of fashionable garment
3. Become more competent resources for apparel and fashion industry

UNIT I **9 Hours**

INTRODUCTION

Process of 'fibre to garment conversion'- Introduction of spinning, weaving, knitting, nonwovens, processing/finishing, garmenting - Basic textile length and weight conversion tables - Fibre and Yarn numbering system (count)- basic calculations

UNIT II **9 Hours**

YARN MANUFACTURING

Yarn manufacturing (spinning system): Definition and classification - Ring Spinning System (Classical cotton spinning system) : processes, principle of operation, spinnability, output yarn quality parameters, application areas and production capability - Post spinning - Types of Ring spun yarn - basic calculations

UNIT III **9 Hours**

MODERN SPINNING SYSTEMS

Modern spinning systems: Definition and Classification - rotor spinning, friction spinning, air jet spinning, and other modern popular spinning systems : processes, principle of operation, spinnability, output yarn quality characteristics, application areas and production capability -Comparison of modern spinning systems and their yarn quality parameters - Types of yarn manufactured from modern spinning systems - basic calculations

UNIT IV **9 Hours**

FABRIC MANUFACTURING

Fabric Manufacturing: Definition - Classification of fabric forming methods : weaving, knitting, nonwovens, braiding and other popular fabric forming methods : classification, processes, principle of operation, output fabric quality parameters, application areas and production capability - Comparison of various fabric forming methods and output fabric quality parameters - Types of fabrics manufactured from various fabric forming methods - basic calculations

UNIT V **9 Hours**

LOOM WEAVING MACHINE

Loom :Definition and Classification - Basic shuttle loom, shuttleless loom and other popular modern looms - Classification, principle of operation, output fabric quality parameters, application areas and production capability -Comparison of various shuttle looms - Comparison of various shuttleless looms - Types of fabrics manufactured from basic shuttle loom and other shuttleless looms - basic calculations

FOR FURTHE READING

Developments in spinning, weaving, knitting, nonwovens - Overview of textile industry - Overview of textile machinery manufacturers- Textile Machinery Exhibition

Total: 45 Hours

Reference(s)

1. Sabit Adanur, Wellington Sears Handbook of Industrial Textiles, Technomic Publishing Co. Inc. 2001.
2. M. K. Talukdar, P. K. Sriramulu, and D. B. Ajgaonkar, Weaving: Machines, Mechanisms, Management, Mahajan Publishers Pvt. Ltd. 1998.
3. W. S. Murphy, Handbook of Weaving, Abhishek Publications, 2001.
4. Albrecht Wilhelm,Fuchs Hilmar, and Kittelmann Walter, Nonwoven Fabrics: Raw Materials, Manufacture, Applications, Characteristics, Testing Processes, 2002.

5. R. K. Dharmadhikary, T. F. Gilmore, H. A. Davis and S. K. Batra, Thermal Bonding of Nonwoven Fabrics, Textile Progress, Vol. 26, No.2, Textile Institute, 1995.
6. www.materialsciknits.com/principlesWoven.pdf

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	4			3	2					3				2				2						20
2	3	3			2	3					3				3				3						20
3	2	3			3	3					3				3				3						20
4	2	2			3	4					3				4				2						20
5	3	3			2	3					3				3				3						20
																								Total	100

Assessment Questions

Remember

1. Define yarn formation
2. Enlist various yarn formation methods
3. What is short staple spinning technique?
4. Define ‘carded‘ spinning process
5. Define ‘combed‘ spinning process
6. Define fibre numbering system
7. State what Ne represents.
8. What is pre-comber draw frame
9. Enlist the twist types
10. Define crimp

Understand

1. Write the significance of TM
2. Wire the formula for TPI
3. Comment on DREF 1 and DREF 2
4. What is the normal staple length of cotton fibre.
5. Differentiate the principle behind the Air jet weaving and Projectile weaving.
6. Write the differenence between direct and indirect count system
7. Enlsit few of the renowned manufactures of spinning machinery
8. What is non-woven material
9. How fleece is different from the fabric
10. What is EPI and PPI
11. What is twistless spinning?

Apply

1. What is the conversion factor of Ne and Tex
2. What is the formula for TPI
3. How to calculate GSM
4. What is the resultant count of Ne 40s and Ne 20s
5. How to calculate the cover factor of a fabric>

Analyze

1. Differentiate between short staple spinning and filament spinning
2. Distinguish between carded and combed spinning
3. Enlist the differences between shuttle loom and shuttleless loom
4. Enlsit the differences between siro spinning and cover spinning
5. Differntiate between EPI and PPI

6. Anlyse when sectional warping machine is required?
7. Compare wales per inch and ends per inch.
8. Contrast between cop and cone

Evaluate

1. Evaluate ring spinning and rotor spinning in terms of spinnablility
2. Evaluate careded and combed spinning process
3. Judge the performance of manual and autoconer in terms of clearing effiency
4. Evaluate the performance of airjet and waterjet looms for industrial fabrics
5. Evaluate TFO and ring doubling in terms of quality

15FT303 TECHNOLOGY OF KNITTING AND STRUCTURES

3 0 0 3

Course Objectives

- To understand the basics of warp and weft knit structures and its derivatives.
- To comprehend the working principle of weft and warp knitting machine and their elements
- To understand the knitting machine parameters for producing various knitted fabrics

Course Outcomes (COs)

1. Select appropriate knitting machines for producing various knitted fabrics
2. Distinguish between the various knitted fabrics
3. Design various kinds of knitted fabrics for fashion design

UNIT I **9 Hours**

FUNDAMENTALS OF KNITTING

Comparison of weaving and knitting, classification of warp and weft knitting machines, comparison of warp and weft knitted fabrics, elements of knitted loop structure. Symbolic, Graph paper and Diagrammatic representation of stitches. Knitting needles - Types, Knitting action, advanages and disadvanages

UNIT II **9 Hours**

WEFT KNITTING MACHINE

Elements of knitting machine - Cylinder, Sinker, Cam, Needle, Creel, Feeders - positive feeder, storage positive feeder, elastane feeder, take down mechanism. Patterning mechanism. Electronic devices for needle selection. Working principle of plain, rib, interlock and purl knitting machines. Formation of knit, tuck and float stitches.

UNIT III **9 Hours**

WEFT KNITTED STRUCTURES

Production of weft knitted fabric structures -Single jersey, Rib, Purl, Interlock.Derivatives of single and double jersey structures: Accordion type of fabrics, plaited fabrics, 2X2 rib structure, half cardigan, full cardigan,eight lock, Ponte-di-Roma, Ottoman rib, Bourrelet, Texi- pique, Pin-tuck, Milano rib, French pique, Swiss pique.

UNIT IV **9 Hours**

WARP KNITTING MACHINE

Elements of Tricot and Raschel warp knitting machines - warp beam, guide bar, needle, needle bar, sinker, presser bar, links, trick plate. Knitting cycle and working principles of Tricot and Raschel knitting machine. Pattern controlling mechanism - pattern wheels, pattern chains links, Electronic Jacquard.

UNIT V **9 Hours**

WARP KNITTED STRUCTURES

Representation of warp knit structures. Point Paper, Chain-Link Notation, single fabrics, Chain stitch, Tricot lap, Full tricot, Lock Knit, Reverse Lock Knit, satin, Loop raided fabrics, Queen's cord, Sharkskin, Blind lap, open work effects, Marquisette, sand- flair net, Hexagonal net.. `

FOR FURTHER READING

Latest developments in warp and weft knitting machines, Properties and applications of warp and weft knitted structures. Seamless knitting. Study of fleece fabrics. Study of knitted fabrics with Elastomeric yarn.

Total: 45 Hours

Reference(s)

1. D. B. Ajgaonkar, Knitting Technology, Universal Publication Corporation, Mumbai, 1998
2. Anbumani N, Knitting Fundamentals, Machines, Structures and Developments, New Age Inernational Private Limited, New Delhi, 2007.
3. Samuel Raz, Flat Knitting: The New Generation, MeisenbachGmbH, Bamberg, Meisenbach, 1991.
4. D Spencer, Knitting Technology, 3rd Edition, A Comprehensive Handbook and Practical Guide, Apr 2001,Woodhead Publishing, ISBN :9781855733336
5. K.F. Au, Advances in Knitting Technology,Woodhead Publishing, England 2011
6. nptel.ac.in/courses/116102008

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			3	3					2				2				1					2	20
2	3	4			3	2					2				1				3					2	20
3	3	3			3	4					2				2				2					1	20
4	2	2			3	3					2				3				2					3	20
5	2	3			2	3					4				3				1					2	20
																								Total	100

Assessment Questions

Remember

1. Define sinker loop.
2. List the advantages of compound needle.
3. Mention the importance of positive feeder.
4. Name some needle selection mechanism.
5. What do you mean by plated fabrics?
6. What is pattern controlling mechanism?
7. State the functions of fleece fabrics.

Understand

1. Give the classification of circular weft knitting machines.
2. Show the diagrammatic representation of sinker loop.
3. Illustrate sinker along with name of the parts.
4. What is the use of patterning mechanism?
5. Draw the 2 X 2 rib structure.
6. Illustrate guide bar, needle bar along with name of the parts.
7. Explain the working principle of Rachel knitting machine.
8. Classify warp knitting.

9. Classify weft knitting.
10. Compare knit, tuck and float stitches.
11. Why the pattern wheels are used in knitting machines?
12. How punched steel tape jacquard is used to produce designs in knit fabrics?
13. How the electronic devices are used in needle selection of jacquard?
14. What did you understand from plaited fabrics?
15. How will you ornament rib structure?
16. How bourre-let structure differs from other derivatives of interlock?
17. How French pique differs from other derivatives of interlock structure?

Apply

1. Construct the knitting cycle of spring beard needle with suitable sketches
2. Predict the characteristics of weft knitted rib fabrics.
3. Construct the specialfeatures of tricot knitted fabrics

Analyse

1. Criticaly analyze the significance of needle arrangement in rib and interlock machines.
2. Latch needle is called self acting needle - Justify.
3. Differentiate half and full cardigan.
4. Distinguish between Raschel and Tricot knitting machines and knitted structures
5. Distinguish between pattern wheels, pattern chains links and Electronic Jacquard in warp knitting machines.

Evaluate

1. Calculate the production of a warp knitting in terms of running meter per hour and production in kilograms per hour working with the following parameters.
   Speed 2400 rpm, Machine width 130 inches, Fabric width 2.5 meters, course per cm 30.
2. Determine the weight of fabric produced per hour of a warp knitting machine working with the following parameters. No of guide bars 2, Yarn take up speed of FGB 20 meters per minute and that of BGB 10 meters per minute. Yarn count of FGB is 40 Tex and that of BGB is 30 Tex.Fabric weight 105 grams per square meter. Machine efficiency - 90%.
3. How many sinkers would be needed on a machine equipped with a circular cylindrical bed housing 100 needles?
4. if on a 21 inch knitting machine, the yarn shrinkage ratio for a plain jersey is 3.11 and CPI is 40 with 25s cotton count. Calculate the weight per linear yarn.

Create

1. Create the new knit structure with combinations of stitch.
2. Create a 3D knit structure and seamless garments.
3. Generate the checked pattern design weft knitted fabric design using combination of tuck, float and knit stitch.

15FT304 WOVEN FABRIC STRUCTURE AND DESIGN

2 0 2 3

Course Objectives

- To understand the various types of woven fabric structures
- To comprehend the design, draft and pepplan for various woven fabric structures
- To determine the suitability of loom requirements to produce fabrics with different structures

Course Outcomes (COs)

1. Differentiate between various types of woven fabric structures
2. Select the suitable woven fabric structure for various textile and apparel applications
3. Identify the suitable looms to produce the various types of woven fabric structures

UNIT I **6 Hours**

ELEMENTS OF WOVEN DESIGN AND ELEMENTARY WEAVES

Construction of elementary weaves- plain: warp rib, weft rib, mat, hopsack. Twills: modification of twills, Herring bone twill, broken twill, elongated twill, rearranged twills, diaper and diamond weaves. Satin - sateen and their derivatives. Ordinary and Brighton honey comb: modifications, Crepe weaves, Huck-a-back.

UNIT II **6 Hours**

SPECIAL RIB AND CORD STRUCTURES

Cork-Screw weaves, Bedford cords: plain faced, twill faced, Wadded, crepe-on. Welts & piques: wadded piques, Loose and fast back welts and piques. Mock-leno: Distorted mock - leno.

UNIT III **6 Hours**

COLOUR AND WEAVE EFFECTS

Color theory: light and pigment theory, modification of color, color combination, application of colors, color and weave effects. Spot figuring: arrangement of figuring for dobby and jacquard, Extra warp and extra weft figuring.

UNIT IV **6 Hours**

BACKED FABRIC PILE AND DOUBLE CLOTHS

Backed fabrics: Warp and weft back, reversible and non-reversible. Warp pile, fast wire pile, terry weaves, terry stripe and terry check. Weft pile: plain back, twill back velveteen, Lashed pile, corduroy, Weft plush.

UNIT V **6 Hours**

STITCHED DOUBLE CLOTHS

Double cloth: Classification, self stitched, face to back, back to face, Combination face to back and back to face stitched double cloth. Wadded double cloth: weft and warp Wadded double cloth. Center warp & Weft Stitched double cloth. `

FOR FURTHER READING

Effect of different weaves on fabric properties, Braiding, Extra warp and extra weft figuring with multi colour, Effect of Length, density and fatness on pile, 3D Fabrics, other types of double cloth.

3 Hours

EXPERIMENT 1

Analysis of Plain, Twill weave and its Derivatives

3 Hours

EXPERIMENT 2
Analysis of Huck-a-back, Honey Comb and Brighton Honey Comb,Sourcing and analysis of the given woven fabrics.

3 Hours

EXPERIMENT 3
Design, Draft and Peg plan of Mock Leno, Extra Warp and Extra Weft Figuring

3 Hours

EXPERIMENT 4
Analysis of Welts and Pique, Crepe and Backed Cloth (warp and Weft), Bedford cords, Jacquard Fabrics

3 Hours

EXPERIMENT 5
Design, Draft and Peg plan of Double cloth,Pile Fabric (Warp and Weft)

3 Hours

EXPERIMENT 6
Evaluation of Color and Weave Effects

3 Hours

EXPERIMENT 7
Design the set of parameters of a woven fabric for the given specific end-use

3 Hours

EXPERIMENT 8
Analyse the knitted fabric and state the end-uses.

3 Hours

EXPERIMENT 9
Sourcing and analysis of the given woven fabrics.

3 Hours

EXPERIMENT 10
Sourcing and analysis of the given woven fabrics.

Total: 60 Hours

Reference(s)

1. Z. Grosicki, Watson's Textile Design and Colour, Universal Publishing Corporation, Mumbai, 1998.
2. Z. Grosicki, Watson's Advance Textile Design, Universal Publishing Corporation, Mumbai, 1998.
3. E G Gilligan,Woollen and Worsted Woven Fabric Design,,Woodhead publication,UK,2004
4. H. Nisbet, Grammar of textile Design, Tarporevala sons & Co. Pvt. Ltd., 1994.
5. W. S. Murphy, Textile weaving & Design, Abhishek Publications, 2000
6. nptel.ac.in/courses/116102005/26

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			2	3					2				2				2					2	20
2	3	3			2	3					2				1				3					3	20
3	3	4			1	3					3				3				2					1	20
4	3	2			2	2					2				3				4					2	20
5	3	2			3	2					2				3				3					2	20
																							Total		100

Assessment Questions

Remember

1. Define the term design, draft and peg plan.
2. Mention different types of basic weave structures.
3. Mention importance of plain weave structure
4. What is the correlation between the cover factor and weave structure?
5. What is the purpose of “peg plan”?

Understand

1. Classify pile structures.
2. Mention the applications of plain weave fabric
3. How double cloth differs from backed fabric?
4. How satin fabrics are having high luster?
5. What do you understand from pile fabric?
6. What is the purpose of wadded thread?
7. What do you understand from spot figuring?
8. What factors will you consider while selecting the type of Extra Thread Figuring?
9. What factors will you consider while evaluating the fabric?
10. Why should we calculate crimp?
11. How important are EPI and PPI in designing a fabric?

Apply

1. Design the ordinary Honey Comb weave on a repeat size of 12 x12 along with draft and peg plans and also explain their suitability for towels.
2. Draw and explain the design, draft and peg plans for Base twill of 5/5 Pointed twill.
3. Design the Base twill of 4/4 Herringbone twill along with help of draft and peg plans
4. Design and explain the extra warp figuring weave with a suitable structure
5. Design and explain the warp backed fabrics with suitable structures.
6. Draw design, draft and peg plan for the center weft and center warp double cloth

Analyse

1. Differentiate double cloth and backed fabric
2. Differentiate warp pile fabric and weft pile fabrics.
3. Why twill weaves are widely used in suitings?
4. Justify, why honey comb weave are widely used in toweling.
5. Correlate fabric weight per square meter and count
6. Distinguish between velvet and velveteen
7. Distinguish between Warp and weft back

Evaluate

1. How will you evaluate the fabric that is suited for winter season?
2. Critique the flexibility of cord structures and itssuitabilityfor garment end uses.

Create

1. Relate dobby and jacquard design.
2. Create the new weave structure with combinations of weaves.
3. Create new designs with combination of weave structures.
4. Create new designs with combination of weave structures.
5. Design a fabric that will suit for winter and summer seasons.
6. Use modern technology to Design a light weight fabric for winter season

15FT305 PATTERN ENGINEERING 3 0 2 4

Course Objectives

- To impart knowledge on human body measurements and creating pattern from the measurements.
- To develop commercial pattern with design aspect by manipulating the basic pattern.
- To fabricate patterns of different sizes by grading the basic pattern.

Course Outcomes (COs)

1. Understand the human body proportions and head theory
2. Gain knowledge about taking measurements.
3. Understand the principles of pattern making.

UNIT I **9 Hours**

INTRODUCTION TO PATTERN MAKING

Anthropometry measurements, Human Anatomy, Clothing sizing systems, Body Ideals - Eight Head theory: Body proportions, Height and weight distribution. Pattern making tools, Types of paper pattern, Pattern making methods Pattern details. Measuring techniques - measuring the form-circumference, vertical and horizontal measurements.

UNIT II **9 Hours**

BASIC PATTERN AND MANIPULATION

Drafting Bodice Blocks, Torso Blocks - Skirt Blocks. Fit- importance, standards, Evaluating fit-Bust, neckline, shoulder, armscye, collar, sleeve. Flat Pattern Techniques: Dart manipulation - slash and spread and pivotal transfer methods. Displacement of bust dart - waist line, side seam, arm hole, neck line, front edge. Creating Fullness using - tuck darts, pleats, flares, gathers, style lines.

UNIT III **9 Hours**

BODY COMPONENTS: SLEEVE, COLLAR, CUFF

Sleeve: Set-in-Sleeves (plain, puff, bell, bishop, circular), Raglan, Sleeves combined with bodice (Modified armholes, Kimono, Dolman). Cuff: shirt cuff, self-faced cuff, French cuff, contoured cuff. Collars: Classification, Factors to be considered while selecting Collars. Types - peter pan, partial roll, cape, scalloped, sailor, square, full roll convertible, shawl, Shakespeare.

UNIT IV **9 Hours**

BODY COMPONENTS: YOKE, POCKET

Yokes: Factors to be considered while selecting Yoke, preparing patterns for yokes - partial yoke, yoke without fullness, yoke with fullness, yoke supporting or releasing fullness. Pockets: Factors to be considered while selecting Pocket. Types - patch, bound, welt, side seam, front hip.

UNIT V **9 Hours**

PATTERN GRADING

Grading- definition, principles, types, grading points, & importance of manual and computerized grading and softwares used for grading.

FOR FURTHER READING

Preparing size charts - Men, Women and Children wear garments, Drafting a pattern for Work wear garment, Study on different types of Plackets and facing, Design development by introducing fullness and allowances, Grading of asymmetrical patterns.

3 Hours

EXPERIMENT 1

Measuring the dress forms - Male, female and children.

3 Hours

EXPERIMENT 2
Develop a pattern for basic bodice.

3 Hours

EXPERIMENT 3
Develop a pattern for Baba suit.

3 Hours

EXPERIMENT 4
Develop a pattern for A-line frock.

3 Hours

EXPERIMENT 5
Create a pattern for Round Neck T-Shirt

3 Hours

EXPERIMENT 6
Develop a pattern for Blouse.

3 Hours

EXPERIMENT 7
Create a pattern for Salwar and Kameez.

3 Hours

EXPERIMENT 8
Develop a pattern for Pleated Skirt.

3 Hours

EXPERIMENT 9
Create a pattern for Mens Formal Shirt.

3 Hours

EXPERIMENT 10
Develop a pattern for Mens Formal Trouser.

Total: 75 Hours

Reference(s)

1. Helen Joseph Armstrong, Pattern Making for Fashion Designers 5th Edition, Prentice-Hall, New Jersey, 2010.
2. Fan J, Yu W, and Hunter L., Clothing Appearance and Fit: Science and Technology, Wood head Publishing Limited, 2004
3. Ashdown S. P., Sizing in Clothing, Wood head Publishing Limited, 2007
4. Winifred Aldrich, Pattern Cutting for Menswear, 4th edition, Blackwell Science Publisher, USA, 2006.
5. Winifred Aldrich, Metric Pattern Cutting for Childrens Wear and Baby Wear, Blackwell Publishing, 2004
6. Mary Mathew, Practical Clothing Construction, Part-II, Designing Drafting and Tailoring, Cosmic Press, Chennai, 1999.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			2	3					2				2				2					2	20
2	3	3			3	4					3				1				2					1	20
3	2	4			2	2					2				3				2					3	20
4	4	3			2	3					2				3				1					2	20
5	3	4			3	2					2				2				2					2	20
																								Total	100

Assessment Questions

Remember

1. What is anthropology?
2. Define Pattern.
3. List the types of pattern methods.
4. What do you mean by on-fold?
5. Define Dart manipulation.
6. What is Dart equivalent?
7. Mention the importance of standard measurements.
8. What do you mean by style-line?
9. Define Garment fit.
10. Define Truing.
11. What are the key components influencing pattern engineering?
12. List the different types of patterns.
13. What are the different methods to introduce fullness?

Understand

1. How to standardize the body measurements?
2. Enlighten the importance of marking the grain line in the pattern.
3. Explain the importance of Notch tool usage on the patterns.
4. Explain the requirements of grain lines and classify its types.
5. sumarize in brief about sizing and grading of garment and its pattern
6. Discuss the utility of dart manipulation in patterns for fit of the garment, with examples
7. What do you mean by “Disproportion” in human body?
8. Explain the eight head theory
9. Explain the methods of marker planning.
10. Explain any four fitting problems and remedies

Apply

1. Differentiate between basic and working patterns
2. How to convert a plain sleeve into Puffed sleeve?
3. Give few examples for Convertible Collar
4. What are the importances of Garment openings?
5. Mention the importance of crown in a sleeve pattern.
6. What are the basic measurements required for a trouser?
7. Give the advantages of computerized pattern Grading system.
8. Develop a Men’s body block for the given measurements.

Analyse

1. Differentiate seam and ease allowance.
2. Differentiate Drafting and Draping.
3. Mention the role of head theory in pattern preparation.
4. Explain the method of converting the side seam and waistline darts in to a princess line in bodice pattern using slash and spread technique.
5. Compare the difference between drafting and draping
6. Compare the manual and computerized marker planning

Evaluate

1. How to convert a dart in to Pleats and Flares using Slash and Spread technique?
2. How to convert a waist dart to centre front dart using pivotal transfer technique?

15FT306 FASHION DESIGN - PRINCIPLES AND SILHOUETTES 3 0 2 4

Course Objectives

- To enable Students understand and comprehend the fundamentals of visual art.
- To impart the knowledge of properties of lines, shapes, colors and compositions made out of them.
- To enable the students develop characteristic shapes, forms and textures.

Course Outcomes (COs)

1. Understand and classify fashion design principles.
2. Interpret the perspectives of visual contents present in the fashion images and art.
3. Use the knowledge of abstraction techniques and develop textures, shapes and forms.

UNIT I **9 Hours**

FUNDAMENTALS OF VISUAL ART

Drawing with perspectives - single point and two point perspectives. Drawing without perspectives planar drawing. Situation sketching, drawing from a photograph. Highlighting shades and values in a drawing, Abstraction and developing shapes from common drawing elements: angle and proportion

UNIT II **9 Hours**

FASHION RENDERING

Color theory, Psychological primary colors & secondary colors, Different types of color schemes. Color rendering - water colors, color pencils, oil pastels and acrylics. Features of painted Artefacts. Elements and principles of design in Art and sculpture

UNIT III **9 Hours**

ART INTERPRETATION

Different types of Art styles-Romantism, Neo classicism, Art deco, Modern art, Abstract expressionism, Surrealism, Pop art & Post modern Art. Aesthetics of art -subject view, composition view, content view and context view. Gestalt principles of perception, Visual core concepts of fashion.

UNIT IV **9 Hours**

PRINCIPLES OF FASHION DESIGNING

Principles of fashion designing: embellishments, asymmetrical forms, biomorphic forms, structured garments, layering and wrapping styles, fluid draping and flagging drape lines, body conscious dresses, feminine patterns, movement and pattern, texture and motifs.

UNIT V **9 Hours**

FASHION ACCESSORIES

Fashion accessories-Hair accessories, headgear, neck accessories, Shoe accessories, ear accessories, brooches, ties and scarves, shawls, sashes. Carried accessories - Handbags and umbrellas.

FOR FURTHER READING

Preparation of style plan using any one principles of design -Illustrations, Color schemes and Accessories coordination plan.

3 Hours

EXPERIMENT 1

Develop a single perspective drawing; assume a photographic picture for reference.

3 Hours

EXPERIMENT 2
Draw a two perspective drawing of the given object.

3 Hours

EXPERIMENT 3
With reference to 2D rendered sketch, develop different shapes or figures from it.

3 Hours

EXPERIMENT 4
Render a real life drawing in color highlighting different painting techniques: scumbling and glazing

3 Hours

EXPERIMENT 5
Render a still life drawing in black and white or any analogous color scheme.

3 Hours

EXPERIMENT 6
Use color poping concept and render a sketch

3 Hours

EXPERIMENT 7
Interpret the differences between contour lines in sculpture and contour lines of planar drawing by drawing and comparing two sketches.

3 Hours

EXPERIMENT 8
Preparation of accessories album

3 Hours

EXPERIMENT 9
Render any two fashion design principles in detail

3 Hours

EXPERIMENT 10
Illustrate drape lines of two silhouettes in highlight them with shade and value.

Total: 75 Hours

Reference(s)

1. Laura Volintesta, language of fashion design: 26 principles every fashion designer should know, Rockport publishers, 2014.
2. Lois Fichner-Rathus, Understanding Art, Clark baxter, Tenth Edition, 2011
3. Francis D.K. Ching with Steven P. Juroszek, Design drawing, John wiley & sons , second edition, 2010
4. Janice G Ellinwood, Fashion by design, Fairchild books, 2011
5. Valerie steele, Encyclopedia of clothing and fashion, Thomson gale, 2005
6. Http://www.fashion-era.com

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			3	3					3				2				1					1	20
2	3	3			4	2					2				3				1					2	20
3	4	3			3	2					1				2				2					3	20
4	3	4			3	3					2				2				1					2	20
5	3	3			3	2					3				3				1					2	20
																							Total		100

Assessment Questions

Remember

1. List the different types of perspectives
2. Name any few types of sculptures
3. Label the different types of color schemes
4. Recall the characteristic features of Pop art
5. Highlight the different types of adorn able accessories
6. Enlist the types of color rendering mediums
7. Name the psychological primary colors
8. Quote different line types used in 2D rendering
9. Name the elements of drawing
10. List the principles of design
11. Label the characteristic properties of design elements.
12. State color perception theory
13. Define hue, chroma and saturation
14. Define look

Understand

1. Illustrate the difference between sculpture and painting in terms of elements and principles of design
2. Discuss in detail different techniques of painting
3. Elaborate on color theory and color schemes
4. Summarize the principles of fashion with reference to visual core concepts
5. Identify the different types of looks
6. Interpret the phenomenon of Illustration
7. Illustrate the different types of silhouettes available in contemporary fashion

Apply

1. Demonstrate the different phases of designing a fashion garment
2. Predict the aesthetics of art in four different views
3. Highlight the stylistic features of baroque and romantism
4. Predict the scheme of content view in aesthetics of art
5. Demonstrate different effects achieved in painting
6. Demonstrate the any three principles of fashion designing in detail

Analyse

1. Compare and contrast subject view and context view in aesthetic of art.
2. Compare and contrast ethnic style references and avant-garde style references
3. Resolve the differences between Op art and surrealism
4. Conclude the rules off composition in graphic design
5. Analyze the reasons for failure of an artwork
6. Distinguish between renaissance and neo classicism
7. Compare the journalistic art criticism and scholastic art criticism
8. Differentiate between formal and sensorial properties of art
9. Resolve the differences between structural silhouettes and fluidity silhouettes
10. Determine the characteristic aspects of 2D rendering

Create

1. Develop a single point perspective of given image
2. Produce a two point perspective depiction of still life – interior articles in a drawing room
3. Develop a process plan for making a painting of newlywed couple.
4. Generate a scheme of print motifs using icons from religious art
5. Derive a methodology for verbally expressing a visual art
6. Derive a accessories plan using tropical colors as inspiration
7. Regenerate a drawing using pointillism technique

15FT307 FASHION ILLUSTRATION LABORATORY 0 0 2 1

Course Objectives

- To make the students understand the basic concepts of fashion art and learning the aspects of rendering.
- To develop their skills in fashion arts and creating innovative sketches
- Developing design improvisation of basics fashion rendering.

Course Outcomes (COs)

1. Visually interpret other people's ideas
2. Diagnose the colour combination for various rendering
3. Ilustrate fashion and apparel articles

2 Hours

EXPERIMENT 1
Illustration of Pencil Shading,Lines and Strokes

2 Hours

EXPERIMENT 2
Illustration of Elements of Design

2 Hours

EXPERIMENT 3
Illustration of Principles of Design

2 Hours

EXPERIMENT 4
Illustration of Human Anatomy, Head, Leg motions

2 Hours

EXPERIMENT 5
Illustration of different Hair styles

2 Hours

EXPERIMENT 6
Illustration of Hand and Feet postures

2 Hours

EXPERIMENT 7
Sketching of Lay figure drawing using Head theory

2 Hours

EXPERIMENT 8
Sketching of Normal and Fashion Croquis

2 Hours

EXPERIMENT 9
Preparation of Prang Colour Chart

2 Hours

EXPERIMENT 10
Preparationof Colourswatches for Tints, Tones and Shades

2 Hours

EXPERIMENT 11
Illustration of different styles of Sleeves, Cuffs, Necklines

2 Hours

EXPERIMENT 12
Illustration of different styles of Yokes,Skirts, Waistbelts

2 Hours

EXPERIMENT 13
Illustration of different styles of Pockets, Trousers, SkirtTops

2 Hours

EXPERIMENT 14
Illustration of different kinds of Accessories and Designs

2 Hours

EXPERIMENT 15
Rendering of different textures of fabrics

Total: 30 Hours

15FT308 COMPUTER AIDED TEXTILE DESIGN LABORATORY

0 0 2 1

Course Objectives

- To train the students on developing basic fabric weaves and simulate their appearance
- To impart the lnowledge of developing print designs appropriate for a concept.
- To equip them in developing concept boards, logo designs and brochure designs.

Course Outcomes (COs)

1. Develop new fabric weaves and simulate their appearance
2. Develop new print designs appropriate for a concept.
3. Prepare concept boards, logo designs and brochure designs for fashion products.

3 Hours

EXPERIMENT 1
Create a plain weave and twill weave structure.

3 Hours

EXPERIMENT 2
Create a dobby design in two different color patterns.

3 Hours

EXPERIMENT 3
Create an elaborate jacquard design.

3 Hours

EXPERIMENT 4
Develop an extra warp and extra weft design.

3 Hours

EXPERIMENT 5
Develop a Fashion accessory sketch highlighting its shade and depth.

3 Hours

EXPERIMENT 6
Develop a print design using floral icons and geometric shapes.

3 Hours

EXPERIMENT 7
Develop an all over large scale figure design for draperies.

3 Hours

EXPERIMENT 8
Design a conceptual board based on a theme using a collage of images.

3 Hours

EXPERIMENT 9
Develop a logo design using symbols and motif shapes.

3 Hours

EXPERIMENT 10
Develop a brochure design for an event featuring event schedules and logos.

Total: 30 Hours

15FT309 MINI PROJECT I **0 0 2 1**

Course Objectives

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Course Outcomes (COs)

1. Formulate a real world problem, identify the requirement and develop the design solutions.
2. Express the technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Prepare report and present the oral demonstrations

15GE310 LIFE SKILLS: BUSINESS ENGLISH **0 0 2 -**

Course Objectives

- To acquire command in both the receptive skills (Listening, Reading) and the productive skills (Writing and Speaking) of English language
- To understand and make effective use of English language in business contexts

Course Outcomes (COs)

1. Listen, Read, Speak, and Write Business English to the level of becoming independent users
2. Appear for the Business English Certificate (BEC) Vantage level examination conducted by the Cambridge English Language Assessment

15 Hours

LISTENING AND READING (RECEPTIVE SKILLS)
Listening for writing short answers - filling gaps in sentences - identifying topic, context and function - identify different functions of language in business situations - identify prompts -identify paraphrases of required information - Scanning - reading for gist - understanding sentence structure - error identification - identify paraphrases - cohesive words and phrases - understand the importance of analysing the distractors - identify grammatical and semantic relationships

15 Hours

WRITING AND SPEAKING (PRODUCTIVE SKILLS)

Business Emails - notes - memos to colleagues or friends - Giving instructions - explaining a development - asking for comments - requesting information - agreeing to requests - explaining - apologising - reassuring - complaining - describing - summarising - recommending - persuading Turn-taking - sustaining interaction - initiating - responding - giving personal information - Talking about present circumstances, past experiences and future plans - expressing opinion - speculating - organising a larger unit of discourse - giving information - expressing and justifying opinions - speculating - comparing and contrasting - agreeing and disagreeing

Total: 30 Hours

Reference(s)

1. Whitehead, Russell and Michael Black. Pass Cambridge BEC Vantage Self-Study Practice Tests with Key, Heinle,a part of Cengage Learning, Delhi, 2003.

15MA401 NUMERICAL METHODS AND STATISTICS

2 2 0 3

Course Objectives

- To understand the methods to solve polynomial equations and Implement the mathematical ideas for interpolation numerically.
- To summarize and apply the methodologies involved in solving problems related to ordinary and partial differential equations.
- To apply the concepts testing of hypothesis in their core areas.

Course Outcomes (COs)

1. Classify the equations into algebraic, transcendental or simultaneous and apply the techniques to solve them numerically.
2. Demonstrate and obtain the differentiation and integration of functions using the numerical techniques.
3. Obtain the solutions of all types of differential equations, numerically.
4. Apply basic statistical inference techniques, including confidence intervals, hypothesis testing to science/engineering problems.
5. Design an experiment for an appropriate situation using ANOVA technique

UNIT I **6 Hours**

SOLUTION OF EQUATIONS

Solution of algebraic and transcendental equations: Newton- Raphson method - Solution of system of linear equations: Gauss elimination method - Inverse of a matrix: Gauss-Jordan method- Eigen values of a matrix by Power method.

UNIT II **5 Hours**

INTERPOLATION, DIFFERENTIATIONAND INTEGRATION

Interpolation: Newton's forward and backward interpolation formulae – Numerical differentiation: Newton's forward and backward interpolation formulae.

Numerical integration: Trapezoidal rule- Simpson's rules for single integrals- Two point Gaussian quadrature formula.

UNIT III **7 Hours**

SOLUTION OF DIFFERENTIAL EQUATIONS

Solution of first order ordinary differential equations: Fourth order Runge- Kutta method - Solution of partial differential equations: Elliptic equations: Poisson's equation- Parabolic equations by Crank Nicholson method- Hyperbolic equations by explicit finite difference method.

UNIT IV **6 Hours**

TESTING OF HYPOTHESIS

Sampling distributions- Large sample test: Tests for mean- Small sample tests: Tests for mean (t test), F- test- Chi-square test for Goodness of fit and Independence of attributes.

UNIT V **6 Hours**

DESIGN OF EXPERIMENTS

Completely randomized design - Randomized block design - Latin square design.

FOR FURTHER READING

Collection of data and use the testing of hypothesis to analyze the characteristics of the data.

Total: 30+30 = 60 Hours

Reference(s)

1. Grewal B. S, *Numerical Methods in Engineering and Science with Programms in C & C++*, Ninth Edition, Khanna Publications, 2010.
2. Sankara Rao. K, *Numerical Methods for Scientists and Engineers*, Third Edition, PHI earning Private Limited, New Delhi, 2009.
3. Gerald C. F and Wheatley P.O, *Applied Numerical Analysis*, Seventh Edition, Pearson Education, New Delhi, 2004.
4. Johnson R.A, *Miller and Freund's Probability and Statistics for Engineers*, Seventh Edition, Prentice Hall of India, New Delhi, 2005.
5. Walpole R.E, Myers R.H, Myers R.S.L and Ye K, Probability *and Statistics for Engineers and Scientists*, Seventh Edition, Pearsons Education, Delhi, 2002.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					6					8			4			2								22
2		2									12								6						20
3	2					2				4					4				6						18
4	2						4			6				4					6						22
5		2					4				6				6										18
																								Total	100

Assessment Questions

Remember

1. Define Algebraic and Transcendental equations.
2. Recall the order of convergence of Newton-Raphson method.
3. Recognize the derivatives of Newton's Forward and Backward Interpolation formula.
4. List the conditions for applying Simpson's rule.
5. Reproduce the formula of Fourth order Runge – Kutta method.
6. Label the procedure used in Liebmann's process.

7. State the axioms of probability.
8. Define the probability density function.
9. Recall the region of acceptance.
10. Label the types of errors in the hypothesis testing.

Understand

Illustrate the condition of convergence of Regula False position method.

1. Indicate the order and condition of convergence of Newton's method.
2. Infer the working rule in Gaussian elimination method.
3. Interpret y' (2) from the following:

X :	0	1	2	3	4
Y:	6.9897	7.4036	7.7815	8.1281	8.4510

4. Interpret the value of $\int_1^5 \log x \, dx$.
5. Using Taylor's method find the solution of the initial value problem $\frac{dy}{dt} = t + y,\ y(0) = 0.$
6. Exemplify the working rule for solving a boundary value problems using finite difference method.
7. If A and B are events in S such that P(A $\cap$ B)=1/4, P($\overline{A}$)=2/3 and P(A $\cup$ B)=3/4. Identify P($\overline{A}$/B).
8. Identify the MGF of the binomial distribution and hence find its mean and variance.
9. Sample of 900 members is found to have a mean of 3.4 cms. Can it be regarded as a simple sample from a large population with mean 3.2 cms and SD 2.3 cms.
10. Narrate the properties and the advantages of $¡^2 - test.$

Apply

1. Find the inverse of the following matrix using Gauss Jordan method

$$\begin{pmatrix} 1 & 0 & -2 \\ 3 & 4 & 8 \\ -1 & 0 & 5 \end{pmatrix}$$

2. Solve $x^3 - 5x^2 + 2x + 10 = 0$ using Graffe's root squaring method.

3. The table given below reveals the velocity V of a body during the time 't' specified. Find its acceleration at t = 1.1:

t:	1.0	1.1	1.2	1.3	1.4
v:	43.1	47.7	52.1	56.4	60.8

4. *Compute* $\int_0^1 \int_0^1 \frac{dx\,dy}{1+x+y}$ *by simpson's rule.* (C)
5. Compute $dy/dx = y^2 - x^2 / y^2 + x^2$ with y(0)=1 at x=0.2 find y by Taylor's series method.
6. Use Runge-kutta method, find y(0.01) from dy/dx= -x, y(0)=1.
7. A bag contains 7 red and 3 black marbles and another bag contains 4 red and 5 black marbles. One marble is selected at random and is transferred from the first bag into the second bag and then a marble is taken from the second bag. If this marble is happened to be red, find the probability that a black marble was transferred.
8. In a distribution exactly normal, 7% of the items are under 35 and 89% are under 63.

What are the mean and SD.

9. In a sample of 1000 people in Tamilnadu 540 likes music and the rest like dance. Can we assume the both music and dance are equally popular in Tamilnadu.
10. In 150 tosses of a coin, 90 heads were observed. Test the hypothesis that the coin is fair at 1% LOS.

Analyze / Evaluate

1. Organize to find the solution by Gaussian elimination method: $6x + 3y +12z = 36$; $8x -3y +2z = 20$; $4x +11y –z =33$.
2. Determine the solution using Neton-Raphson method, $\cos x – x e^x = 0$.
3. Use Newton's forward interpolation formula to find x when y = 20

X :	1	2	3	4
Y:	1	8	27	64.

4. From the following data, find y' at x = 43:

X:	40	50	60	70	80	90
Y:	184	204	226	250	276	304

5. Using Euler's formula, to find the value of y when x = 0.4, given $\frac{dy}{dx}=\frac{xy}{2}$ Y (0) = 1, y (0.1) = 1.01, y (0.2) = 1.022 and y (0.3) = 1.023.
6. Evaluate the first three steps of the initial value problem $\frac{dy}{dx}=\frac{x-y}{2}$ y(0)=1 by Taylor series method and next step by Runge- kutta method.
7. The marks obtained by a number of students in a certain subject are approximately normally distributed with mean 65 and and SD 5. If 3 students are selected at random from this group, what is the probability that at least one of them would have scored above 75.
8. Choose the calculation of finding the mean and variance of Poisson distribution.
9. In a nationwide survey, 1200 persons selected at random were asked their opinion whether BJP should be limited to 5 years in the party. Out of this sample, 780 persons answered in the affirmative. Make a decision on this problem.
10. Test whether the example having the values 63,63, 64, 65, 66, 69, 70, 70 and 71 has been chosen from a population with mean 65 at 5% LOS.

15FT402 BASICS OF CHEMICAL PROCESSING 3 0 2 4

Course Objectives

- To have fundamental knowledge on chemical processing of textiles.
- To know the method of application of pre-treatments / dyes / prints /finishing/effluent treatment process.
- To know the machinery used for pre-treatment / dyeing/printing/finishing/effluent treatment process.

Course Outcomes (COs)

1. Understand the fundamentals of preparatory, dyeing, printing and finishing processes.
2. Understand the working of dyeing machines and printing machines.
3. Identify the suitable chemical processing methods for the processing of fibres /yarns/fabrics.

UNIT I **9 Hours**

PREPARATORY PROCESSES

Introduction - Process sequence of wet processing for wovens and knits. Singeing electric and gas singeing. Desizing hydrolytic, oxidative and enzymatic. Scouring alkaline and enzymatic. Bleaching - hypochlorite, peroxide and sodium chlorite bleaching. Optical whitening. Mercerizing tension, tensionless and tubular mercerization.

UNIT II **9 Hours**

DYEING

Dyeing equipment - jigger, winch, soft flow, jet dyeing, J-box, padding mangles, package dyeing and garment dyeing machine. Classification of dyes. Dyeing of cotton using direct, reactive, vat and sulphur dyes. Dyeing of polyester using carrier, HTHP and thermo sol. Dyeing of cellulosic blends - one bath and two bath process.

UNIT III **9 Hours**

PRINTING

Ingredients of print paste. Styles of printing - direct, discharge, resist, tie and dye and batik. Methods of printing - block, stencil, roller, rotary, flat bed, transfer and chest printing. Special prints -flock, foam, foil, glitter, kadi, leather, pearl and rubber. After treatments of printed goods. Digital printing.

UNIT IV **9 Hours**

FINISHING

Mechanical finishing -raising, shearing, sueding, anti shrink finish, compacting, decatizing, calendaring, embossing. Chemical finishing - softening, crease resist, biopolishing, flame retardant, water repellent, water proof, soil release, antimicrobial, UV protection finish. Denim washing - stone washing, acid washing, sand blasting.

UNIT V **9 Hours**

COMPUTER COLOR MATCHING CONCEPTS

Color; Electromagnetic spectrum – visible range, measurement of color strength – color matching – theory and applications. Spectrophotometer and color matching systems. Quality control using color matching systems, color difference – pass / fail system and shade sorting

FOR FURTHER READING

Digital printing, German ban, Eco-labels, Environmental management system, Low wet pick-up techniques-Expression and topical techniques.

3 Hours

EXPERIMENT 1

Hydrolytic desizing and scouring of grey cotton fabric and assessment of the desized and scoured fabric

3 Hours

EXPERIMENT 2

Comparison of whiteness index and tenacity of peroxide and sodium hypochlorite bleached samples

3 Hours

EXPERIMENT 3

Assessment of rubbing and perspiration fastness of cotton fabrics

3 Hours

EXPERIMENT 4

Assessment of rubbing, perspiration fastness of dyed cotton fabrics and comparison of different ISO wash fastness tests on dyed fabrics **3 Hours**

EXPERIMENT 5

Dyeing of cotton using direct / vat / reactive dyes

3 Hours

EXPERIMENT 6

Dyeing of polyester, nylon, polyester/ cotton and polyester / viscose

3 Hours

EXPERIMENT 7

Dyeing of silk yarn / fabric with acid dyes

3 Hours

EXPERIMENT 8

Printing of cotton fabric using direct or discharge styles.

3 Hours

EXPERIMENT 9

Printing of cotton fabric using resist style.Bio polishing finish on denim fabric.

3 Hours

EXPERIMENT 10

Crease resistant finishing of cotton fabrics and measurement of dry and wet CRA

Total: 75 Hours

Reference(s)

1. E. R. Trotman, Dyeing and Chemical Technology of Textile Fibres, Charles Griffin and Co. Ltd., London. 1990.
2. V. A. Shenai, Technology of Bleaching and Mercerzing - Vol. III, Sevak Publications, Mumbai 1991.
3. V. A. Shenai, Technology of Dyeing - Vol. VI, Sevak Publications, Mumbai, 2000.
4. V. A. Shenai, Technology of Printing - Vol. IV, Sevak Publications, Mumbai 1996.
5. V. A. Shenai, Technology of Textile Finishing, Sevak Publications, Bombay, 1995.
6. http://nptel.ac.in/courses/116102016/

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			2	3					3				3				2						20
2	3	4			3	4					2				2				2						20
3	3	4			2	2					3				3				3						20
4	3	3			3	2					3				3				2						20
5	2	3			3	3					3				3				3						20
																								Total	100

Assessment Questions

Remember

1. List the preparatory process in textile chemical processing.
2. What are the objectives of signeing?
3. State the objectives of desizing.
4. Name the mechanical finishes.
5. List the print paste ingredients.
6. What do you mean by “Toxicity”?

7. List chemical effluent treatment systems.
8. Write the advantages of soft flow dyeing machine.
9. What are the advantages of zero-zero finish?
10. Expand the term “HTHP”.
11. List after treatments for printed goods.

Understand

1. Classify desizing.
2. Classify dyes.
3. Explain the enzyme desizing process of cotton fabric.
4. Summarize the tensionless mercerization process.
5. Elaborate on the biological effluent treatment process.
6. Distinguish between water repellent and water proof finish.
7. Explain various dyeing machiness.
8. Write the recipe for direct dyeing, vat dyeing and sulphur dyeing
9. What do you mean by temporary finishing?

Apply

1. How will you assess the the quality of desizing, souring, bleaching and mercerization processes?
2. How will you choose the the best bleaching agent for cotton fabric?
3. How will you assess the durability of a crease resistant / water resistant / water proof finish?
4. A buyer is demanding good color fastness for cotton fabric. Which dye you will suggest for god color fastness and validate the same with proper reasons.

Analyse

1. Differentiate between dyeing and printing.
2. Differentiate between BoD & CoD.
3. Differentiate between mechanical finishing and chemical finishing.
4. Differentiate between Raising, shearing and sueding.
5. Compare and contrast discharge style and resist style of printing.
6. Dyeing and printing are basically surface design techniques”. Justify the statement.
7. Critically analyze the fastness properties of various dyes.

Evaluate

1. Determine the process of computer color matching.
2. Determine the quality of resist style printing process.
3. Determine the crease resistant finishing process.
4. Determine the preparatory process efficiency requirements for a cotton fabric.

15FT403 TESTING AND QUALITY CONTROL 3 0 0 3

Course Objectives

- To understand various sampling techniques
- To understand working principles/ procedures of various textile testing instruments
- To identify the suitable test methods for various applications

Course Outcomes (COs)

1. Select the suitable sampling technique for fibre, yarn, fabric and apparel tests.
2. Determine the fibre,yarn, fabric and apparel quality parameters
3. Interpret test reports and prepare the summary report of fibre, yarn, fabric and apparel.

UNIT I **9 Hours**

STATISTICAL EVALUATION AND FIBRE IDENTIFICATION

Need for quality evaluation - Sampling techniques - Central tendency and Dispersion. Error: Types - Sources. Determination of number of tests. Fiber Identification testing Handle/Feel Test, Visual Examination, Burning test, Twist on Drying, Floatation Test Microscopic analysis and Chemical Analysis

UNIT II **9 Hours**

ESSENTIAL QUALITY

Fibre Length Measurement: Principles and Methods. Linear Density Measurement Methods: Fibre and Yarn. Fineness Measurement: Principle and Methods. Strength Measurement: Principles and Methods. Tensile Properties of Fibre, Yarn and Fabric. Tear and Bursting Strength. Comprehensive Testing Instruments: Low, Medium and High Volume Instruments, Advanced fibre information system

UNIT III **9 Hours**

DESIRABLE QUALITY

Neps: Types - Measurements. Yarn Twist Measurement. Unevenness - Measurement principles - Methods - Limitations - Interpretation of results. Random occurring faults: Classification - Measurement - Analysis. Hairiness: Measurement principles - Interpretation. Dimensional Stability: Distortion - Shrinkage - Measurement.

UNIT IV **9 Hours**

COMFORT QUALITY

Fabric thickness - Areal density -Cover factor. Moisture content and regain: Significance - Measurement method. Permeability - Air - Water vapour - Breathability - Thermal Insulation. Handle: Stiffness - Flexural rigidity -Drapeability - Crease recovery and resistance - Abrasion- Pilling - Flex - Primary and total handle value.

UNIT V **9 Hours**

APPAREL QUALITY

Strength Testing: Loop and Knot Strength test for sewing threads - Seam Strength Test - Seam Slippage - Seam Severance Test - button strength tester - Snap tester - Zipper Strength Tester. Spirality test for knitted garments - Apparel Dimensional Stability Testing.

FOR FURTHER READING

Latest development -Fibre, yarn, fabric and garment testing, Eco - Textile Testing, Flammability Testing, Safety of Children's Clothing, Children's Products Safety: Children's Sleepwear Regulations, Bonded and Laminated Apparel Fabrics Testing

Total: 45 Hours

Reference(s)

1. Jinlian Hu, Fabric Testing,Woodhead Publishing Ltd., England,2008
2. V. K. Kothari, Testing and Quality Management Vol.1, IAFL Publications, New Delhi, 1999.
3. J. E. Booth, Principles of Textile Testing, CBS Publishers & Distributors, New Delhi, 1996
4. B. P. Saville, Physical Testing of Textiles, Woodhead Publishing Ltd., England, 1999.
5. P. J. Morris, J.H. Merkin and R.W Renal, Modelling of Yarn Properties from Fibre Properties, Journal of Textile Institute, PP-322-335, 1999
6. J. V. Rao &Rajendra Kumar Gaur, Sewing Threads Technology, Stitches, Seams, Problems, Needles, Northern India Textile Research Association, Ghaziabad, 2006.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			3	2					2				1				3					2	20
2	3	4			2	4					3				2				1					1	20
3	3	3			3	2					2				3				2					2	20
4	4	3			2	3					3				2				1					2	20
5	2	3			3	3					2				2				3					2	20
																								Total	100

Assessment Questions

Remember

1. What is the significance of relative humidity in textile testing?
2. Define standard atmosphere for testing.
3. What are the atmospheric conditions that should be maintained in a testing laboratory?
4. Write the RH% and temperature to be maintained in testing room along with the tolerances.
5. What is core sampling?
6. Give an example for the use of random number table in sampling.
7. In core sampling, the fibres will be damaged and hence the results will be wrong. Comment.
8. The laboratory is maintained at standard test atmosphere so that the results obtained are accurate. Justify or refute.
9. If we could maintain the regain of the textile material at standard levels, it is not necessary to maintain testing room at standard atmosphere. Justify or refute.
10. Define moisture content and regain
11. What is meant by a dynamic test?
12. What is meant by a static test?
13. What is meant by a fatigue test?

Understand

1. What are the classes of seldom-occurring faults?
2. What are the long thin faults in Uster fault classification system?
3. What are the long thick faults in Uster fault classification system?
4. In what units the Classimat faults are expressed?
5. Differentiate between an imperfection and a fault.
6. Discuss the various instruments that can be used for the measurement of yarn count.
7. Elaborate the problems that are encountered while measuring lea count of yarn accurately. Suggest suitable remedies to overcome them.
8. What are the various methods by which proper conditioning can be obtained while measuring yarn count?
9. What is meant by CRL test condition?
10. Illustrate by a simple diagram the CRL test condition.
11. What is meant by CRE test condition?
12. Illustrate by a simple diagram the CRE test condition.
13. What is meant by CRT test condition?
14. Illustrate by a simple diagram the CRT test condition.

Apply

1. A ring bobbin has a net yarn content of 55 g and the length of the yarn is 2800 m. Calculate the yarn count in Ne, tex, denier and metric systems.
2. Suggest a method by which the length of yarn can be obtained accurately for lea count determination.
3. Derive the relationship between yarn count and yarn diameter.
4. Determine the amount of water in a cotton bale of 175 kg at standard regain.
5. What is the significance of the number 28 in cover factor calculations? From where this number has come?
6. Calculate the warp cover factor and weft cover factor for the following details: Ends per inch and picks per inch are 80 and 76 respectively; warp and weft yarn count (both): 60s Ne.

Analyze

1. Differentiate between crease resistance and crease recovery.
2. Differentiate between an imperfection and a fault.
3. Compare and contrast the squaring and cut-squaring techniques as regards the principle and its execution
4. Prove that tong sampling results in a biased sample.
5. Critically Analyze the sources of errors in the measurement of regain in the various regain testing instruments/equipment.
6. Distinguish between the merits and demerits of the following methods of fibre fineness measurement: (a) Gravimetric method (b) Optical method (c) Air flow method
7. Distinguish between the various methods of cotton fibre maturity measurement with regard to their merits and demerits.

Evaluate

1. In a twist measuring instrument based on twist contraction principle, 10 specimens were tested with a gauge length of 25 cm. The total number of rotations for all the 10 specimens was 4500. Calculate the average tpm of the yarn.
2. A microscope was employed to measure the twist of a yarn specimen. The diameter of the yarn was found to be -----inches and the angle θ was 30°. Calculate the yarn tpi.
3. In a cut-and-weigh method of a sliver with a cut length of 0.1m, the readings obtained were 0.40, 0.38, 0.39, 0.43, 0.44, 0.41, 0.39, 0.40, 0.40, 0.41. Calculate the PMD and CV%.
4. A finisher draw frame sliver was given a draft of 12 in speed frame and 30 in ring frame. A periodic peak fault originated in finisher draw frame had a wavelength of 2 cm. What would be the wavelength of this fault in a yarn spectrogram?
5. The number of fibres in a cotton sliver is 30,000. The average linear density of the fibres is 3.8 µg per inch. Calculate the count of the sliver in Ne, tex, metric and denier systems.
6. Calculate the warp cover factor, weft cover factor and cloth cover for a plain weave structure, if the yarn count is 40s Ne and threads per cm is 30.
7. Calculate the warp cover factor, weft cover factor and cloth cover for a plain weave structure, if the yarn count is 80s Ne and threads per cm is 60.

Create

1. Derive mathematical model to predict final product from fibre properties
2. Design the instrument to test the tensile strength measurement for elastic based textile materials
3. Relate the yarn properties with fabric properties

15FT404 APPAREL MANUFACTURING 3 0 2 4

Course Objectives

- To provide basic knowledge on various garment manufacturing processes
- To impart knowledge on making of various parts or components of garments.
- To make them familiar with finishing of garments with suitable accessories.

Course Outcomes (COs)

1. The student will be able to Determine the fabric requirement for each construction style
2. The student will be able to Determine the various design specifications for various stitch classes
3. The student will be able to Determine various collar / sleeve construction techniques

UNIT I **9 Hours**

BASIC TERMINOLOGY

Measuring, marking, cutting drafting, fabric,grain, selvedge, bodice block. Preparation for sewing straightening of fabric grain, off grain, preshrinking, pressing and cutting of material. Seams & seam finishes- definition, types of seams, seam performance, seam selection, Stitches - definition, Stitch classes, stitch parameters, selection of stitches.

UNIT II **9 Hours**

FULLNESS IN GARMENTS

Darts - definition and types. Tucks - definition and classification. Pleats - definition and classification. Gathers and Ruffles. Preparation and uses of true bias, facing, and bindings. Neckline finishes - facings, Binding. Garment fitting and assembling - standards for a good fit; Assembling and checking fit of the garment, solving the fitting problems.Pattern alteration - principles of pattern alteration.

UNIT III **9 Hours**

PREPARATION OF FABRIC FOR CUTTING

Importance of grain in cutting and construction, steps in preparing the fabrics for cutting: Laying Rules- laying the pattern on fabric, cutting, marking and stay stitching. Plackets - single piece placket, two piece placket, tailored placket, zipper placket, narrow binding placket. Hems - preparing the hem, types of hems - stitched and turned hem, seam binding, hem finish, catch stitched hem, narrow machine stitched hem, rolled or whipped hem, shell edged hem.

UNIT IV **9 Hours**

BODY COMPONENTS:SLEEVE,COLLAR & YOKE

Set-in-sleeve -sleeveless styles with modified arm holes. Styles with bodice and sleeve combined other types of sleeve styles. Collar construction - peter pan, partial roll, puritan, sailor, flared jabot, full roll convertible, full shirt, shawl, cape, mandarin, shirt, square, scalloped, sailor and rippled collar. Yokes - decorative seams and asymmetrical designs, creating variety in yoke design

UNIT V **9 Hours**

BUTTONS,BUTTON HOLES,FASTENERS & POCKETS

Position, length of the buttonhole, types of buttonhole, steps in constructing worked buttonhole and fabric or bound buttonhole, Button loops -thread loops, cloth or fabric loops, corded loops, corded frogs; Buttons -buttons with holes, shank buttons; Zips and Fasteners - definition, types, press buttons, hooks and eyes, eyelets and cord, Velcro; Pockets - selection of pocket design, constructing pockets patch pocket, bound pockets - pocket in a seam.

FOR FURTHER READING

Stitching defects, Pattern alteration in a garment, Hem for circular or flared skirts, Construction details of different styles, Front hip pocket.

3 Hours

EXPERIMENT 1
Develop samples for Basic Hand Stitches, Seams, Seam Finishes.

3 Hours

EXPERIMENT 2
Prepare samples for Different Types of Fullness and Yokes of various styles

3 Hours

EXPERIMENT 3
Design samples of placketsContinuous bound placket,2-piece placket, tailors placket, flyopening

3 Hours

EXPERIMENT 4
Create samples of NecklinesBias facing, Bias Binding

3 Hours

EXPERIMENT 5
Prepare samples of Collars PeterPancollar, Fullshirt collar, Shawl collar and Mandarin Collar.

3 Hours

EXPERIMENT 6
Construct samples of Pockets-patchpocket, boundpocket and fronthippocket

3 Hours

EXPERIMENT 7
Develop samples of Sleeves-Plain, Puff, Raglon, Kimono

3 Hours

EXPERIMENT 8
Prepare samples of Fasteners, Trimmings and Decorations.

3 Hours

EXPERIMENT 9
Application of seams in appropriate places based on garment types.

3 Hours

EXPERIMENT 10
Applying fullness in various parts of the childrens wear.

Total: 75 Hours

Reference(s)

1. B. Claire and Shaeffer, Sewing for Apparel Industry, Pearson's Prentice Hall, New Jersey, 2000.
2. B. Claire Shaeffer& Glee Barre, High Fashion Sewing Secrets from the World's Best Designers: A Step- By-Step Guide to Sewing Stylish Seams, Buttonholes, Pockets, Collars, Hems, And More, Rodale Books Publisher, New York, 2001.
3. Marry Mathew, Practical Clothing Construction Part I, Basic Sewing Process, Cosmic Press, Chennai, 1999.
4. Cooklin Gerry, Garment Technology for Fashion Designers, Blackwell Science Publisher, USA, 1997.
5. Leila Aitken, Step by Step Dress MakingCourse, Sterling Publishing Co. Inc. NewYork, 1994.
6. www.fashiondex.com/Bubonia_Sample_1.pdf

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			2	3					3				2				1					2	20
2	3	4			3	2					3				1				3					1	20
3	3	3			2	2					3				2				2					3	20
4	2	2			3	2					3				2				3					3	20
5	2	3			2	3					2				3				3					2	20
																								Total	100

Assessment Questions

Remember

1. Define grain of a fabric.
2. Label the Stitch Parameters
3. Define a seam.
4. State garment fitting
5. List any two types of neckline finishes.
6. Define ruffles
7. List any fourtypes of hems
8. Define placket.
9. State narrow stitch line
10. List any 3 types of yokes

Understand

1. Indicate the importance of bodice block
2. Illustrate the importance of straighteningoffabricgrain
3. Identify the necessity of pattern alteration
4. Indicate the techniques involved in finishing thehems
5. Illustrate kalidar kurta.
6. Formulate the construction steps involved in circular skirt
7. Illustrate yoke with fullness
8. Indicate the machine type in which the narrow stitch can be applied
9. Identify the suitable seam for trouser
10. Select a suitable dart for kameez

Apply

1. Choose the method to overcome stitching defects
2. Demonstrate the suitable method to diagnosestitchingdefects
3. Predict the type of alteration technique that can be adopted for front and back mismatching
4. Select a suitable gather type for salwar
5. Find the typeof placket that can be applied for an informal kurta

Analyze

1. Compare bias and a garment bias.
2. Differentiate facing and binding
3. Justify the importance of fasteners in a garment.
4. Justify various styles of yokes.
5. Compare the application of fullness in yoke and collar
6. Is tailors placket suitable for cuff in finiishing? If yes why?

Evaluate

1. Choose a suitable fullness for men's shirt
2. Determine the importance of plackets in the opening
3. Critique the importance of seam finishes
4. Defend the choice of using filament threads for overlock stitches
5. Crtique the practice of choosing needle sizes with reference to fabric thickness

Create

1. Combine the technique of peter pan and partial roll collar.
2. Derive a suitable yoke for a decorative skirt.
3. Relate the application technique of rippled collar for a men's shirt.
4. Combine yoke and fullness and design an innovativesportswear.

15FT405 APPAREL PRODUCTION MACHINERY AND EQUIPMENT

3 0 0 3

Course Objectives

- To be familiar with the functions and working of various machines used in apparel industry.
- To know the manufacturing process of various machines in apparel industry.
- To sort out the various troubles which occurs in garment manufacturing unit.

Course Outcomes (COs)

1. Understand the type of fabric spreading and cutting machines.
2. Gain knowledge about the sewing production equipments and its functions.
3. Know different fusing and finishing machine used in apparel industry.

UNIT I **9 Hours**

SPREADING MACHINES

Spreading: Fabric package types, fabric types, spreading methods, and machines, requirements of spreading, factors affecting spreading. Basic concepts of marker making -Computer aided marker making (CAM)- Features of a digitizer, marker and lay planning, duplicating, fabric consumption, plotters- flat bed plotter, drum plotter.

UNIT II **9 Hours**

CUTTING MACHINES AND SINGLE NEEDLE LOCK STITCH MACHINES

Cutting: Mechanisms and features-straight knife, round knife, band knife, die cutting, laser cutting, computerized and other modern techniques, principles of drill, notches and thread makers SNLS: Sewing Needle-Size, Parts, Types and applications. Sewing machine parts and its functions- Needle bar, Bobbin, Bobbin case / hook, Throat plate, Take-up devices, Stitch regulator. Classification- SNLS, DNLS, Multi needle & Bar tacking machine. Chain stitch, overlock, flat lock, button fixing, button holing-working principle and functions

UNIT III **9 Hours**

OVER LOCK, FLAT LOCK AND SPECIAL ATTACHMENTS IN SEWING MACHINE

Over-lock and Flat-lock Sewing Machines: Loopers - eye and blind, spreader, Trimmers, Take-up devices: types, Stitch cycle timing diagram, Machine adjustments Feeding mechanism-types and functions- drop, differential, belt, variable top and bottom feed, puller, needle feed and unison feed. Machine speed and rate of feed, stitch size regulation. Types, guides- arm, cylindrical and flat guides, folders and binders, types of presser foot & its functions

UNIT IV **9 Hours**

FUSING AND FINISHING MACHINES

Fusing equipments - working principles, types, and its functions. Pressing equipments- working principles, types & its functions. Garment folding-types Packaging- types. Selection of packaging design based on materials, method and equipments.

UNIT V **9 Hours**

TROUBLE SHOOTING AND MACHINE MAINTENANCE

Trouble Shooting: Problems in sewing -Broken, Miss Stitch, needle hole, needle and thread breakage, control of oil stains, seam pucker, feed mechanism problems and sewing operations, causes and their remedial measures.

Sewing Machine Maintenance: Preventive maintenance, break down maintenance, schedule- daily, weekly and monthly, setting and adjustment.

FOR FURTHER READING

Ticketing and bundling, Threading diagram, Special needles, CNC Sewing Machines, 3D body scanner and Maintenance tools

Total: 45 Hours

Reference(s)

1. R.Rathinamoorthy & R.Surjit, Apparel Machinery and Equipment, Woodhead Publishing India in Textiles, New Delhi, 2015
2. Carr and Latham's, Technology of Clothing Manufacture, 4th Edition, Om Books International, New DelhiMay 2008
3. Fairhurst, Advances in apparel production,ISBN 1 84569 2950, Woodhead publishing, 2008
4. Wedny Gardiner, Sewing Basics, Sally Milner Publishing, 2003.
5. Fredrerick H Abernathy, John T Dunlop, A Stitch in Time- Apparel Industry, Blackwell sciences, 1999.
6. Claire Shaeffer, Sewing for Apparel Industry, Pearson?s Prentice Hall, New Jersey, USA, 2000.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			3	3					3				2				2						20
2	3	4			3	3					3				2				2						20
3	2	3			4	2					3				3				3						20
4	3	3			3	3					2				4				2						20
5	2	3			3	3					3				5				3						20
																								Total	100

Assessment Questions

Remember

1. Define Spreading.
2. What are the different fabric packages?
3. Define marker efficiency.
4. What are the different marker duplicating methods?
5. List the types of Sewing machine Needle.
6. Select the application of puller feed mechanism
7. Outline the factors that affect the marker efficiency

8. List the use of Feed-of Arm machine
9. Select the important sewing machine parts
10. Select the functions of garment folders
11. List the important factors to be considered while selecting Sewing machine needle

Understand

1. Interpret the requirements of spreading process
2. Infer the fabric spreading classification
3. Summarize the limitations of lock stitch machine.
4. Illustrate the sewing timing Diagram for a SNLS machine & Chain stitch machine
5. What are the necessary exercises to be carried on fabric to be spreaded?
6. Explain the functions of spreading and cutting machine for garment production
7. How is cloth wastage saved by maximum utilisation by well marker planning and few cores during spreading
8. What is differential feeding mechanism?
9. What is the function of feed dog?
10. What are the advantages of over-edge stitch over lock stitch?

Apply

1. Demonstrate how sewing machine needle are numbered
2. Calculate sewing thread consumed for a sewn garment which has 80 cm length of stitch class – 503
3. Suggest needle sizes and SPI to be used for Poplin fabric of 90 gsm

Analyse

1. Find the problems associated with ‘Drop Feed’ system.
2. How will you overcome the gathering effect in flat lock machine?
3. Find the role of differential feed mechanism in chain lock sewing machine.
4. Find the limitations of lock stitch machine.
5. Compare between Blind looper and loop spreader
6. Identify the advantage of Die cutting
7. Identify the functions of a feed dog
8. Identify the advantages of UPS
9. Categorize the parameters to be considered in fabric spreading
10. Analyze the parts and function of chain stitch machine with neat diagram
11. Compare and contrast the Basic sewing machine with CNC Sewing machine
12. What precautions should be taken while cutting directional fabrics?

Evaluate

1. Evaluate the rate of feed for the machine which runs at the speed of 2000 stitches per minute and forms 14 stitches per inch.
2. Assess if sewing machine works in an average speed of 120000 stitches per hour. The stitch density is 5.7 stitches /cm, the machine operates with drop feed mechanism. Calculate the ratio of fabric feed in the sewing machine.

15FT406 SURFACE EMBELLISHMENT 2 0 2 3

Course Objectives

- To familiarize the students about the various techniques of surface embellishment with relevance to garment embellishments
- To be aware of various types of embroidery and methods of producing it.
- To make the students confident about doing surface embellishment work.

Course Outcomes (COs)

1. Develop the skills to establish the importance of surface embellishment
2. Gain knowledge about the hand & machine embroideries and its applications.
3. Interpret the purpose of traditional and special embellishment techniques.

UNIT I **6 Hours**

INTRODUCTION TO SURFACE EMBELLISHMENT

Introduction, Definition, Need, Types, Raw materials, Importance of surface embellishment, Selection of needle, thread and fabric for hand embroidery and machine embroidery. various methods of surface embellishment- embroidery and surface ornamentation.

UNIT II **6 Hours**

HAND EMBROIDERY

General rules for hand embroidery. Types of hand embroidery stitches-Running, Couching, Button hole, Satin, Long & Short, Wheat, Chain, Stem, Herringbone, Cross stitch, Knotted stitches, Fish bone, Fly stitch, Braids, Back, Hem, Seed, Needle weaving, Whip stitches.

UNIT III **6 Hours**

MACHINE EMBROIDERY

General rules for machine embroidery. Types of frames and methods of transferring the designs. Attachments to sewing machines for embroidery, Types of machine embroidery stitches- Eyelet work, Cut work, Richelieu work, Lace work, drawn thread and fabric work, patch work, Mirror work, Applique, Shaded embroidery, Shadow work, Badla work, Bead and Sequins work, Couched thread embroidery, Satin stitch, Vermicelli, Zigzag, Wavy stitch, Granite stitch. Computerized embroidery machine- Concept of design and development, software used in embroidery machines, process of designing, method and types of stitch application, punching and digitizing.

UNIT IV **6 Hours**

EMBELLISHMENT TECHNIQUES

Materials used and Applications. Types of embellishment techniques- Ribbon work, Applique work, quilting work, patch work, smocking, honey comb, gathered with embroidery, fabric painting-hand, Stencil-dabbing and Spraying. Dyeing and printing-advanced tie and dye techniques, batik and block printing. Trimmings and decorations-Laces , Pompons, Fringes, Tassels, Tucks, Show buttons, Eyelet and cord, Bead and Sequins work, Cut work, Crocheting.

UNIT V **6 Hours**

TRADITIOANL EMBROIDERIES OF INDIA AND CARE

Care and maintenance of embroidered articles-care and maintenance methods for embroidered apparel, pressing. Traditional Embroideries of India-Phulkari, Kasuti, Kashmiri embroidery, Kutch work, Chikkankari, Kantha. Quality control in Embroidery - Quality parameters, Quality control systems.

FOR FURTHER READING

Aari and Zardozi work of India- Definition, importance, types and method of application. Tribal Embroideries,

Embroidery techniques of turkey, Greece- cretan stitch, Scottish cretan stitch, open cretan stitch, closed cretan stitch and knotted cretan stitch.

2 Hours

EXPERIMENT 1

Running, Couching, Button hole.

2 Hours

EXPERIMENT 2

Satin, Long and short,wheat

2 Hours

EXPERIMENT 3
Chain, Stem, Herringbone.

2 Hours

EXPERIMENT 4
Cross stitch, Knotted stitches, Fish bone.

2 Hours

EXPERIMENT 5
Fly stitch, Braids, Back, Hem, Seed.

2 Hours

EXPERIMENT 6
Needle weaving, Whip stitches, Eyelet work

2 Hours

EXPERIMENT 7
Cut work, Richelieu work, Lace work.

2 Hours

EXPERIMENT 8
Drawn thread and fabric work, Patch work, Mirror work.

2 Hours

EXPERIMENT 9
Applique, Shaded embroidery, Shadow work, Badla work

2 Hours

EXPERIMENT 10
Bead and Sequins work, Couched thread embroidery,

2 Hours

EXPERIMENT 11
Machine embroidery stitches, Satin stitch,

2 Hours

EXPERIMENT 12
Vermicelli, Zigzag.

2 Hours

EXPERIMENT 13
Wavy stitch, Granite stitch

2 Hours

EXPERIMENT 14
Computerized machine embroidery stitches

2 Hours

EXPERIMENT 15
For every stitches students have to prepare the design sheet and its corresponding portfolio.

Total: 60 Hours

Reference(s)

1. Ruth Chandler, Modern Hand Stitching-Dozens of stitches with creative free-form variations,2014
2. Sophie Long, Mastering the Art of Embroidery: Traditional Techniques and Contemporary Applications for Hand and Machine Embroidery, Heritage Publishers, London, 2013
3. Christen Brown ,Embroidered & Embellished, C&T Publishing, 2013
4. Jacqueline Farrell, Needlework: Hand & Machine Embroidery (Needlework), Hamlyn, UK, 2000.
5. http://www.dmc-usa.com/Education/How-To/Learn-the-Stitches/Embroidery-Stitches.aspx
6. http://www.needlenthread.com/tag/hand-embroidery-stitches

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	4			2	3					2				2				1					3	20
2	3	4			3	3					3				2				1					1	20
3	3	3			2	3					2				2				2					3	20
4	2	3			3	3					2				2				2					3	20
5	3	3			3	3					2				1				3					2	20
																								Total	100

Assessment Questions

Remember

1. Define Embroidery
2. List the various methods of surface ornamentation
3. Define needle weaving
4. State the purpose of backing material
5. Recall the general rules for hand and machine embroidery
6. List out the importance of surface ornamentation.
7. Define machine embroidery
8. Define: Texture.
9. List the types of fiber used to produce the sewing threads
10. List the types of sewing threads available in the market.

Understand

1. Classify Embroidery
2. Identify the needles used for embroidery
3. Infer the points to remember when we change the needle
4. Identify the fabrics in which we can produce embroidery
5. Explain the Hand embroidery
6. Illustrate the tools required to create embroidery
7. Abstract couching
8. Represent the different ways in which smocking effect can be produced
9. Interpolate the various methods of surface embellishment
10. Explain Richelieu work

Apply

1. Select the raw materials required for surface ornamentation
2. Find the raw material quality requirements for surface ornamentation
3. Select the types of stitches followed in surface ornamentation
4. Find out how to evaluate the embroidery design
5. Assess the quality analysis of embroidery materials
6. Show the purpose of Tissue paper in embroidery?
7. Execute the ways the design can be transferred to the fabric?
8. Demonstrate the special attachments in embroidery machines and its importance
9. Implement the machine embroidery and its classification
10. Show the importance of digitizing

Analyse

1. Differentiate between Surface embroidery and canvas work.
2. Differentiate patch work and quilt work.
3. Differentiate throat plate and slide plate.
4. Differentiate machine embroidery & computerized machine embroidery and individual fashion

5. Outline the basic principles that have to be adapted to create embroidery using multi head computer controlled embroidery machines

Evaluate

1. Justify the factors that affect selection of needle, threads and fabrics for embroidery
2. Parse the importance of maintenance of embroidered articles
3. Resolve the performance of backing materials
4. Compare shaded embroidery and shadow embroidery
5. Structure the process of designing , method and types of stitch application, punching and digitizing

Create

1. Generate a party wear by applying any one type of embroidery using bead and sequins work
2. Produce the baby wear with ornamentation
3. Design a fancy wear with hand work
4. Design a fancy wear for children
5. Produce a winter wear with bobbin thread embroidery

15FT407 TESTING AND QUALITY CONTROL LABORATORY

0 0 2 1

Course Objectives

- To understand working principles/ procedures of various textile testing instruments
- To test the fibre, yarn, fabric ang accessories.

Course Outcomes (COs)

1. Select the suitable sampling technique for fibre, yarn, fabric and apparel tests.
2. Test the fibre,yarn, fabric, apparel and accessories for their quality parameters
3. Interpret test reports and prepare the summary report of fibre, yarn, fabric and apparel.

3 Hours

EXPERIMENT 1

Fibre identification tests by microscopic, burning and chemical tests.

3 Hours

EXPERIMENT 2

Analysis of Cotton fibre length (Baer Sorter, Fibrograph and Single Fibre)

3 Hours

EXPERIMENT 3

Measurement of Fibre fineness (air-flow) and Strength (Stelo)

3 Hours

EXPERIMENT 4

Measurement of single yarn and ply yarn twist

3 Hours

EXPERIMENT 5

Evenness testing of sliver, roving and yarn, linear density of sliver, roving, and yarn

3 Hours

EXPERIMENT 6

Measurement of yarn strength: Lea strength; Single yarn by Tensorapid and Tensojet

3 Hours

EXPERIMENT 7

Testing of fabric thickness, drape, stiffness and crease recovery,fabric tensile strength, tearing strength and bursting strength

3 Hours

EXPERIMENT 8
Measurement of shrinkage and Spirality in Knitted Fabric

3 Hours

EXPERIMENT 9
Analysis of fabric abrasion resistance and fabric pilling of various GSM and blended fabrics

3 Hours

EXPERIMENT 10
Measurement of seam strength, button strength, zipper strength and seam slippage

Total: 30 Hours

15FT408 APPAREL MACHINERY LABORATORY 0 0 2 1

Course Objectives

- To be familiar with the functions and working of various machines used in apparel industry.
- To know the manufacturing process of various machines in apparel industry.
- To sort out the various troubles shooting which occurs in garment manufacturing unit.

Course Outcomes (COs)

1. Understand the type of fabric spreading and cutting machines.
2. Gain knowledge about the sewing production equipments and its functions.
3. Know different fusing and finishing machine used in apparel industry.

3 Hours

EXPERIMENT 1
Analysis of threading, stitches per inch, changing the pressure foot, adding folders for special purpose and prepare the sample for single needle lock stitch machine.

3Hours

EXPERIMENT 2
Analysis of threading, stitches per inch, and prepare the sample for double needle lock stitch machine. Explore the types of folders used in DNLS machine.

3 Hours

EXPERIMENT 3
Analysis of threading, stitches per inch, and prepare the sample for Over-lock stitch machines

3 Hours

EXPERIMENT 4
Analysis of threading, stitches per inch, and prepare the sample for Flat-lock stitch machine.

3 Hours

EXPERIMENT 5
Effect of adjustment on feed ratio in Over-lock, flat-lock stitch machines

3 Hours

EXPERIMENT 6
Study of threading and stitches per inch in Flat-lock sewing machine with elastic attachment

3 Hours

EXPERIMENT 7
Practice threading and setting alterations in Button sewing and Button Hole machine

3 Hours

EXPERIMENT 8
Perform threading and stitches per inch in Feed-of-the- Arm machine

3 Hours

EXPERIMENT 9
Analysis of threading and prepare the sample for computer control direct drive bar tacking sewing machine.

3 Hours

EXPERIMENT 10

Analysis of threading and prepare the sample for multi-needle high speed industrial sewing machine.

Total: 30 Hours

0 0 2 1

15FT409 MINI PROJECT II

Course Objectives

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Course Outcomes (COs)

1 Formulate a real world problem, identify the requirement and develop the design solutions.

2 Express the technical ideas, strategies and methodologies.

3 Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.

4 Test and validate through conformance of the developed prototype and analysis the effectiveness.

5 Prepare report and present the oral demonstrations

15GE410 LIFE SKILLS: VERBAL ABILITY

0 0 2 -

Course Objectives

- Read and understand the unseen passages with appropriate speed
- Effectively deal with different kinds of structures
- Develop strategies for vocabulary development

Course Outcomes (COs)

1. Improve their performance in the verbal ability sections of different competitive examinations.

15 Hours

UNIT 1

Synonyms - Antonym - Word groups - Verbal analogies - Etymology - Spellings - Critical Reasoning - Cloze Test - One Word Substitutes - Idioms and Phrases - Text Completion

15 Hours

UNIT 2

Sentence Formation - Sentence Correction - Sentence Improvement - Completing Statements - Sequencing of Sentences - Paragraph Formation - Instructions - Change of Voice - Change of Speech - Reading Comprehension - Sentence Equivalence

Total: 30 Hours

Reference(s)

1. Murphy, Raymond. English Grammar in Use - A Self - study Reference and Practice Book For Intermediate Learners of English.IVed. United Kingdom: Cambridge University Press. 2012.
2. Lewis, Norman.Word Power Made Easy. New York: Pocket Books.1991.
3. Baron's The Official Guide for New GMAT Review 2015. New Jersey: John Wiley &Sons, Inc.

15FT501 QUALITY ASSURANCE IN APPAREL INDUSTRY

3 0 0 3

Course Objectives

- To have fundamental knowledge on quality and quality standards.
- To know the methodology of quality assurance in the apprel industry.
- To apply statistical tools in the apparel industry.

Course Outcomes (COs)

1. Understand the fundamentals of quality and quality standards and inspection agencies.
2. Identify and classify defects in raw materials, production and and finished product.
3. Analyze and develop a SOP / Inspection procedure.

UNIT I **9 Hours**

FUNDAMENTALS

Quality: Definition, Dimensions & its importance. Inspection: Inspection loop, Systems of inspection, Types of inspection, Quality Control, Quality Assurance, Quality Management, Operating characteristic curve: Producers risk, Consumers risk, AQL, LTPD. Q-7 tools and its application.

UNIT II **9 Hours**

QUALITY STANDARDS, SYSTEMS AND INSPECTION AGENCIES

Quality Standards: AATCC, ASTM, BIS, BS, DIN, ISO, CSE.. ISO 9001, ISO 14001, Oeko-Tex, OHSAS 18000:2000, GOTS, REACH, CPSIA (Consumer product safety improvement act), Scocial Compliance. Inspection agencies: Government and private agencies, third party testing / inspection services, AEPC, Textiles Committee.

UNIT III **9 Hours**

QUALITY ASSURANCE IN FABRICS AND ACCESSORIES

Types of defects in fabrics , major and minor faults , Fabric inspection systems , 4 point and 10 point, prescribing inspection procedure for raw materials and accessories. Tolerance limits and quality standards for fabrics, other raw materials and accessories.

UNIT IV **9 Hours**

QUALITY ASSURANCE IN APPAREL PRODUCTION

Standard Operating Procedure (SOP), Prescribing specifications for process and machines: Spreading, Pattern Making, Cutting, Bundling, Ticketing, Stitching, Pressing / Finishing. Care labeling of apparel: Standards and methods. Safety issues for different accessories in children garment, prescribing inspection procedures for process and finished garment. Tolerance limits and quality standards for cutting, sewing and finished garments.

UNIT V **9 Hours**

QUALITY ASSURANCE IN PACKING AND ORGANIZATION

System and standards for packing, warehousing and shipping. Cost of quality: Cost of conformance, cost of non-conformancence. Relationship between various costs, value of tracking quality costs, Reporting quality cost. Customer Complaints / Returns and their handling mechanism, Protection and Satisfaction. Role of different stakeholders in the quality of apparel, Product recall in children garment, Quality maturity grid, Quality and profitability, Organization for Quality.

FOR FURTHER READING

Standard performance specification for men's wear, women's wear and children's wear , woven and knitted. Quality circle, Total Quality Management and Quality Function Deployment.

Total: 45 Hours

Reference(s)

1. Janace E. Bubonia, Apparel Quality: A Guide to Evaluating Sewn Products, Bloomsbury Publishing, 2014.
2. Quality Management Handbook for the Apparel Industry, Clothing trade, New Age International Publishers, 2012
3. Subrata Das, Quality Characterisation of apparel, Woodhead Publishing.2010.
4. Douglas C. Montgomery, Statistical Quality Control: A Modern Introduction, 6th edition, Wiley India Pvt. Limited, 2010.
5. Sara J Kadolph, Quality Assurance for Textiles and Apparel, Fairchild Publicatons Inc., Chicago, 2007.
6. www.astm.org

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	2			1	2				2	3				4							3			20
2	1	2				4				3				3	1			3				3			20
3			6			6				2	2			2				1				1			20
4	1	1	3		4					6					2			1				2			20
5	3				5						2				4			4				2			20
																								Total	100

Assessment Questions

Remember

1. Define Quality.
2. Define the term “Quality Assurance”.
3. Expand “AATCC”.
4. Define cost of quality.
5. State any six fabric defects.
6. List any four garment defects.
7. Sate few care label systems that are applicable for apparels.

8. What are the advantages of 4 point fabric inspection system?
9. List the quality specifications for button.
10. Mention any six quality standards that are applicable to apparel.

Understand

1. Compare quality inspection, quality control and quality assurance.
2. Compare 100% Inspection, No inspection and statistical sampling.
3. Differentiate between producer's risk and consumer's risk.
4. Summarize various fabric inspection systems.
5. Compare and contrast ISO 9001, 9002 & 9003 systems.
6. Describe GOTS certification process.
7. Compare and contrast WRAP and SA 8000.
8. Explain the salient features of OHSAS 18000 system.
9. Interpret the children protection standards (CPS).
10. Summarize the features of "Quality Maturity Grid".

Apply

1. Find the pass / fail criterion of an apprel industry with the following data:
2. AQL Level: 1.0, Order quantity: 1 lakh pieces. Lot size: 1000. Rejected pieces during sampling inspection.
3. Demonstrate the applicability of Q-7 tools in the apparel industry.
4. How will you assess the the quality of garmenting process?
5. Implement a testing procedure for screening amines in dyed fabric.

Analyze

1. Analyze the applicability of Q-7 tools in apparel industry.
2. Critically analyze various systems of inspection.
3. Resolve the requirements of flame retardancy
4. Attribute the reasons for choosing third party testing for fabric finishing quality requirements
5. Resolve the quality assurance standards for garment package test.

Evaluate/ Create

1. "Customer complaits / goods returns" is one way of evaluating a supplier. Defend the statement with proper examples.
2. Develop a statistical sampling inspection plan that satisfies most of the stakeholders in the apparel industry.
3. Design packing, warehousing and shipping standards for a garment industry.
4. Formulate the merchandising standards for a men's formal shirt.
5. Design a quality control system that suit for all type of apparel production.
6. Design a quality control system for shoe manufacturing industry.

15FT502 INDUSTRIAL ENGINEERING IN APPAREL INDUSTRY

3 0 2 4

Course Objectives

- To understand the Industrial Engineering concepts and their uses.
- To utilize the various Industrial Engineering techniques in apparel manufacturing process.
- To understand the Material movement in the apparel manufacturing process.

Course Outcomes (COs)

1. Apply the Industrial Engineering concepts and their uses.
2. Assess the productivity in the apparel industry.
3. Select appropriate process route and techniques to minimize the cost of production.

UNIT I **9 Hours**

INTRODUCTION TO INDUSTRIAL ENGINEERING

Industrial Engineering - concepts, functions and applications; Fundamentals of industrial engineering - operations analysis and design, operations control and management; productivity concept and importance, factors affecting productivity, kinds of productivity measures.

UNIT II **9 Hours**

WORK STUDY

Definition and concepts of time and motion study; objectives of method study and work measurement for the apparel industry; method study procedure; flow process charts for the various processes in the apparel industry; flow diagram, string diagram, multiple activity chart, SIMO chart; motion economy; time study procedures, standard data required for time study, use of time study in wage incentive and collective bargaining; operator efficiency distributions - SAM.

UNIT III **9 Hours**

PRODUCTION PLANNING AND INVENTORY CONTROL

Materials management - meaning, functions and objectives; Production, planning and control - Aggregate production planning and control, hierarchical production planning and control, desegregation of aggregate plan. Inventory control: purpose, types, functions, EOQ, ABC, VED and FMEA analysis – Product risk assessment. Introduction to MRP and MRP II, JIT, Kanban. Skill matrix, Quick Change Over, SMED.

UNIT IV **9 Hours**

CONCEPTS OF PRODUCTIVITY

Productivity Definition-Importance-Productivity-Managements Role and Responsibility-The Key Elements Of Productivity-Productivity Measurement-Productivity Analysis-Productivity Improvement; Total Productivity Management - Introduction- Adoption of Total Productivity Management And Techniques For Total Productivity Expansion- Procedures For Adopting And Advancing The Use of Total Productivity Management- Key points in the roll out of total productivity management programs - case studies. Ways to minimize cost of manufacturing.

UNIT V **9 Hours**

VALUE MANAGEMENT

Introduction - Value Management and Industrial Engineering- Value Management Process - Key Value Management Techniques - Information Phase Techniques -Function Analysis Techniques- Evaluation Techniques- Value Management - Focus - Communications - Multidisciplinary Team Approach - Function Analysis / FAST Diagram.

FOR FURTHER READING

Toyota Production System (TPS), Lean Manufacturing, World Class Manufacturing, Increasing the productivity of resources - Building design and storage space requirement for the apparel industry - Financial planning and control- Ergonomics in apparel industry - Sales forecasting and techniques.

3 Hours

EXPERIMENT 1

Calculate Standard Minute Value

3 Hours

EXPERIMENT 2

Study the Work measurement of level of garment industry

3 Hours

EXPERIMENT 3

Analyse optimized techniques for manufacturing apparel products through Methods study

3 Hours

EXPERIMENT 4

Analyse optimized line sequence for manufacturing apparel products through Methods study

3 Hours

EXPERIMENT 5
Analyse the suitable Line balancing techniques for given garment style

3 Hours

EXPERIMENT 6
Analyse the Factory simulation game of apparel production

3 Hours

EXPERIMENT 7
Create plant layout for given lot production

3 Hours

EXPERIMENT 8
Analyse the Operation break down of given garment style

3 Hours

EXPERIMENT 9
Carryout Industrial calculation for Efficiency, planning of apparel production

3 Hours

EXPERIMENT 10
Carryout Industrial calculation for maximum output and minimum output of apparel production

Total: 75 Hours

Reference(s)

1. Kjell B. Zandin and Harold B. Maynard, Maynard's Industrial Engineering Handbook, McGraw-Hill Professional, 2001.
2. Jacob Solinger, Apparel Manufacturing Handbook, Bobbin Blenheim Media Corporation, Nashville, USA, 1988.
3. W. G. Ireson and E. L. Grant, Handbook of Industrial Engineering and Management, Prentice Hall of Robi, New Delhi, 1988.
4. Johnson Maurice, Introduction to Work Study, International Labour Organization, Geneva, 1995.
5. O. P. Khanna, Industrial Engineering & Management, DhanpatRai& Sons, Delhi, 1987.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	3				4				3	2				1			2					2		20
2	1	2			2	3				4	1				3				3				1		20
3	2					5				5	1				2			1	2				2		20
4	1	1				4					6				3				2				3		20
5	2	2				2				7					3			3	1				2		20
																								Total	100

Assessment Questions

Remember

1. Define the term “EOQ”.
2. Expand the therm “JIT”.
3. What are the techniques available in Industrial engineering?
4. Mention the importance of Time Study.
5. What are the kinds of productivity measures that are available in an apparel industry?
6. What do you mean by bundle allowance?
7. What are the reports made by IE Department in apparel industries?
8. What is plant layout?
9. State the importance of Work Study.

10. Expand the term “PERT”.
11. How will you improve the operator efficiency in the work study.

Understand

1. Explain the duties and responsibilities of an Industrial Engineer.
2. How much computer knowledge is required for an Industrial Engineer?
3. How will you use performance rating in calculating basic time?
4. How will you improve the efficiency of a Sewing Line?
5. Differentiate between basic time and standard time.
6. How to calculate Production Target and Worker’s Bonus on Initial Days of Production Start?
7. Differentiate between Aggregate production and hierarchical production
8. Differentiate between JIT and Kanban.
9. Explain the functions of production planning and control.

Apply

1. How will you apply the IE Concepts in the finishing section of a garment factory?
2. Determine the garment price rate based on standard time.
3. Calculate time taken to complete the one operation of a baby frock.
4. Describe the procedure to calculate standard time of an operation.
5. Calculate time taken to complete the full garment of a given style.
6. Calculate time taken to complete the one operation of men’s formal wear.
7. Describe the flow process charts for the various processes in the apparel industry.
8. Determine the standard data required for time study.
9. How will you assess the operator efficiency distribution?
10. Predict the importance of total productivity management.

Analyse / Evaluate / Create

1. Can anybody acheve 100% ffficiency of GSD SAM?
2. Compare and contrast progressive bundle system and unit production system.
3. Analyze monthly efficiency report of a wewing line.
4. How to calculate effficiency of a line that produces multiple styles in a day?
5. How to calculate WIP level in cutting, sewing and finishing section?
6. Create a scheme for multiple activity chart used in work study.
7. Suggest a framework to calculate garment pricing based on standard time.

15FT503 FASHION DESIGN PROCESS 3 0 2 4

Course Objectives

- To enable Students identify end user design needs and expectations
- To impart the knowledge of conceptualizing designs and present them.
- To enable students prototype the concepts.

Course Outcomes (COs)

1. Identify design needs and visualize them.
2. Conceptualize designs, illustrate and present them.
3. Translate the designs into prototypes.

UNIT I **9 Hours**

INTRODUCTION TO FASHION DESIGN RESEARCH METHODOLOGY

Elements and principles of design summary. Fashion design research methodology - record first impressions, Similes, metaphors and Analogy. Design problem definition, conceptualization, Sources of inspiration, Methodology for sourcing inspiration - SCAMPER (substitute, combine, adapt, minimize, purpose, eliminate, rearrange) methodology for systematically pursuing visual research.

UNIT II **9 Hours**

DEVELOPMENT OF DESIGNS

Development of designs and silhouettes, Concept editng and finalization, Full fashion illustration development, mood board creation processes, color and fabric board creation processes, Accessories planning. Types of fashion looks - classic, bohemian, casual, eclectic, minimalistic and sporty

UNIT III **9 Hours**

FASHION TRENDS AND FORECASTING

Fashion cycle, trend analysis techniques, types of forecasting, Color forecasting process - Key colors. Social and Cultural aspects. Consumer segmentation based on Psychographic profiles.

UNIT IV **9 Hours**

PATTERN DEVELOPMENT

Pattern development processes - draping & alterations, Fit analysis - Elements of Fit. Flat sketches, Fabric selection process - Determinants of fabric selection, Aesthetic properties of fabric. Technical specification development -Stitches, Seams, Determination of garment performance standards..

UNIT V **9 Hours**

PRESENTATION TECHNIQUES

Final presentation board preparation processes - Presentation techniques, catalogue preparation, graphical layout schemes. Garment costing, market positioning of designs, fashion photoshoot techniques, content development, Marketing medium - Advertisements, social media.

FOR FURTHER READING

Design development folder preparation - Inspiration, Illustration board, Fabric board, Client board, Mood board. Real Pattern preparation and sample preparation for one look.

3 Hours

EXPERIMENT 1

Create a inspiration journal, brainstorm, visualize and focus

3 Hours

EXPERIMENT 2

Conceptualize, visualize and sketch designs

3 Hours

EXPERIMENT 3

Compile psychographics profile of end user

3 Hours

EXPERIMENT 4

Sketch and develop fashion illustrations - illustration board

3 Hours

EXPERIMENT 5

Develop mood board for fashion designs

3 Hours

EXPERIMENT 6

Draft patterns for the developed fashion designs

3 Hours

EXPERIMENT 7

Develop a technical flat sketch of anyone fashion design

3 Hours

EXPERIMENT 8

Prepare fabric requirements and fabric swatch library

3 Hours

EXPERIMENT 9

Translate the design into physical prototype

3 Hours

EXPERIMENT 10

Prepare a cost estimate of the final design.Effect of subculture on the design process

Total: 75 Hours

Reference(s)

1. Karl Aspelund, The design process, Fairchild, 2015.
2. Amolie Claude and Valerie Praguin, The collection process: fashion design process 4, Esmod editions, 2012.
3. Mckelvey and J. Munslow, Fashion design: process, innovation and practice, John wiley and sons, 2nd edition, 2011.
4. Simon Seivewright, Basics Fashion Design 01: Research and Design, A & C Black, 2nd edition, 2012.
5. John Hopkins, Fashion Design: The Complete Guide, A & C Black, 2012.
6. Www.bgfashion.net

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1		1				4				2	1			4	2			3				3			20
2	1	3			3	1				2	5			2	1							2			20
3	2	3				5				2				3	3							1			20
4	3	1			2	4				1	1			3				4					2		20
5	2					2					3				6			6					1		20
																								Total	100

Assessment Questions

Remember

1. List the different sources of inspiration
2. Name the different types of forecasting.
3. Give few examples of statement jewelry
4. Label the requirements of embroidery
5. Recall the concept of draping
6. List the elements of psychographics
7. Give few examples of draped silhouettes
8. Define bohemian.
9. Define minimalistic and sporty.
10. Define classic.

Understand

1. State forecasting
2. Illustrate a design brief
3. Exemplify the use of forecast report in design development
4. Illustrate the benefits of SCAMPER technique
5. Define trend
6. Elaborate on design consolidation process
7. Discuss a accessory co-ordination plan for spring summer casual wear
8. State a mood board
9. Interpret the end user expectations and frame a psychographic profile
10. Identify the sketch modeling requirements

Apply

1. Demonstrate design process methodology
2. Show the design philosophy in the form of Illustrations
3. Compare the techpack folder and product development folder
4. Demonstrate a color story for the given silhouette.
5. Predict the embellishment techniques suitable on fine fabrics. ex: chiffons
6. Show the effects of patterning in design development
7. Demonstrate the determinants of fabric selection process
8. Compare the design concept with competitor designs and elaborate on the merits and demerits.
9. Demonstrate the CAD tools available for fashion illustration
10. Illustrate fashion cycle process.

Analyse / Evaluate

1. Analyze the impact of look on design philosophy
2. Resolve the differences between short term forecasting and long term forecasting
3. Differentiate between classical look and chic look
4. Assess the role of color in mood board
5. Justify the requirement of techpack in product development

Create

1. Create a scheme of artworks from the given inspiration
2. Suggest a framework to calculate product pricing
3. Generate an illustration board to complement classic look
4. Create a mood board for the theme romantism
5. Generate a color story apt for Autumn winter
6. Derive a pattern making methodology for producing a draped silhouette with appropriate example
7. Formulate a scheme of style variants for the specified look
8. Re-frame the fashion look with reference to forecast report
9. Organize a color blend out process subject to colot story framing

15FT504 FASHION MERCHANDISING AND MARKETING

3 0 0 3

Course Objectives

- To understand the fashion merchandising and marketing process in apparel business.
- To comprehend the various types of merchandising in apparel business
- To exemplify the marketing research and product launching in apparel industry.

Course Outcomes (COs)

1. Differentiate between the merchandising and marketing
2. Exemplify the three types of merchandising in apparel business
3. Explain the marketing research activity and product launching techniques in apparel industry

UNIT I **9 Hours**

MERCHANDISING

Merchandising - Types, functions, characteristics and requirements of a merchandiser, Role of merchandiser in export/retail/buying house. Role of exporters, manufacturer, merchant exporter, job workers (CM/CMT), buying offices, buying agents, buyer relationship management, buyer communication. Brands and their importance, Buyer negotiation techniques, Branding strategy, Protecting a brand, Positioning a brand.

UNIT II **9 Hours**

FUNCTIONS OF MERCHANDISING

Functions, duties and responsibilities of merchandisers in garment unit, sampling procedures, samples, types of samples, production planning, vendor based rationalization, order placement, in-house and sub contractor units, follow-up of yarn, fabric, processes and accessories, approvals, types of approvals, approval procedures, buyer approval and organizational approval, record maintenance. Vendor evaluation and rating.

UNIT III **9 Hours**

MARKETING RESEARCH

Role of marketing research in apparel business, use of research findings for marketing decisions and action plans. Marketing research techniques -translation of business and marketing problems into research issues and design, survey design and data source collation, data types and collection methods, sample design and statistical inference.

UNIT IV **9 Hours**

INDUSTRIAL BUYING AND PRODUCT LAUNCHING

Industry buying process analysis – merchandise creation and assortment planning, distribution performance measurements, apparel sales forecast and budgeting, problems of cultural research. Application of marketing research -market potential - product launching -customer satisfaction - measurement of apparel product and buying beliefs and attitudes. Pricing strategy. Distribution-channel selection, internet and channel design

UNIT V **9 Hours**

ADVERTISING AND MARKET PROMOTION

Market constraints - quality, image, brand name, merchandising methods, sales promotion, publicity, advertising, packaging - marketing organizations - general concepts of international marketing, principles relevant to apparel products -global market -international trade agreements, international pricing strategies, promotional barriers like cultural and language related barriers. `

FOR FURTHER READING

Brand Case Studies, Buyer terms and Case study on buying houses, Case study on Major Fashion hubs, Estimating market potential, Strategies for export promotion.

Total: 45 Hours

Reference(s)

1. Virginia Grose, Basics Fashion Management 01: Fashion Merchandising, AVA publiser,switerland, 2011
2. Philip Kotler, Principles of Marketing, Pearson Education India, 2008.
3. Mary Wolfe, Fashion Marketing & Merchandising,3rd Edition,Goodheart-Willcox Publisher 18604 West Creek Drive,Tinley Park,2009.
4. Jeannette Jarnow and Kitty G. Dickerson, Inside the Fashion Business, Prentice Hall, New Delhi, 1996.
5. Pradip V. Mehta and Satish K. Bhardwaj, Managing Quality in the Apparel Industry, New Age International Ltd., New Delhi, 1998.
6. Grace I. Kunz, Merchandising: Theory, Principles, and Practice, 3rd Edition fair child book, USA,2010.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2			1	2				3	6				3				1				1		20
2		3			1	2				4	2				3				3				2		20
3		1			2	1				3	3				6				2				2		20
4	2				2	3					6				4								3		20
5	1	4				5				1	3				2				4						20
																								Total	100

Assessment Questions

Remember

1. Define Merchandising.
2. List the roles of exporters.
3. What is “Marketing Research”?
4. List out the types of data and it’s collection methods
5. What are the risks for an importer?
6. Differentiate the CM and CMT operation in apparel industry
7. What are the risks for an exporter?
8. What is CMT?
9. What is CM?
10. State the significance of branding

Understand

1. What is the significance of Market constraints?
2. What is the purpose of survey design?
3. Differentiate Marketing and Merchandising.
4. Give the Application of marketing research.
5. What are the implications of WTO?
6. Write the Functions, duties and responsibilities of merchandisers in garment unit.
7. “Customer satisfaction is important in product launching “–justify.
8. In what ways Marketing research techniques are useful in the apparel industry
9. Classify the types of buyers
10. Distinguish between buying house and export house merchandising
11. State the Role of exporters in apparel industry
12. State the role of job workers (CM/CMT)in apparel industry .

Apply

1. The men’s department received a shipment of 16 1/3 dozen knit shirts, 20 1/4 dozen dress shirts, and 11 1/2 dozen pullover shirts. How many shirts (units) were received?
2. A customer ordered the following fabrics:
   24 3/4 yards at $52.00 yard
   52 1/2 yards at $24.00 yard
   12 1/4 yards at $16.00 yard
   What was the total dollar amount purchased?
3. Demonstrate the different phases of buying process
4. Predict the role of indicators in demand forecasting process
5. Show the impact of fashion life cycle in procurement planning

Analyse

1. Differentiate between the merchandising and marketing.
2. Distinguish between the retail merchandising and export merchandising.
3. Distinguish between the fashion merchandising and retail merchandising
4. Distinguish between exporter and merchant exporter
5. Distinguish between exporter and manufacture

Evaluate / Create

1. How will you determine the market potential?
2. How will you promote the export market?
3. Evaluate the market constrain.
4. Merchandise on an invoice dated March 5 is received on March 12 with terms 2/10 ROG. What is the last day the cash discount is allowed?
5. A discount is a reduction in the quoted price of merchandise that a vendor allows retail buyers. What is a cash discount?
6. Shipment is passed with 2.5 AQL by a buyer QA. Suppose after receiving the shipment buyer do re-inspection of the same shipment at their warehouse. What will be the %defective in this inspection?
7. Calculate turnover for a month that had BOM stock of $250,000 and EOM stock of $275,000. Sales for the month totaled $200,000.

15FT507 APPAREL MANUFACTURING LABORATORY II

0 0 2 1

Course Objectives

- To study about different types of seams, stitches, sewing threads and their qualities.
- To gain knowledge on various garment parts and their variations.
- To impart knowledge on use of accessories for garments.

Course Outcomes (COs)

1. Construct garments for children.
2. Construct samples for men
3. Construct samples for woman

3 Hours

EXPERIMENT 1

Construct a garment for Children's Rompers.

3 Hours

EXPERIMENT 2

Construct a garment for Children's Frock.

3 Hours

EXPERIMENT 3

Create a garment for Peddle Pusher.

3 Hours

EXPERIMENT 4

Develop a design for embroidery and construct Pinafore

3 Hours

EXPERIMENT 5

Construct a garment for one piece Sleep Suit for girl

3 Hours

EXPERIMENT 6

Construct a garment for Mens Formal Shirt

3 Hours

EXPERIMENT 7

Develop a grade rule and construct a garment for Mens Formal Trouser.

3 Hours

EXPERIMENT 8
Construct a Trench coat garment for babies

3 Hours

EXPERIMENT 9
Construct a Tracksuit garment for Boys.

3 Hours

EXPERIMENT 10
Construct a dungaree garment for Boys.

Total: 30 Hours

15FT508 COMPUTER AIDED APPAREL DESIGN LABORATORY

0 0 2 1

Course Objectives

- To train the students on drafting patterns in CAD, add pattern details and maintain pattern in portable digital format.
- To impart them knowledge in identifying fabric, marker constraints and prepare efficient marker plans
- To equip them in developing full illustrations in CAD for desired looks and simulate fabric designs

Course Outcomes (COs)

1. Draft patterns in CAD, add pattern details and maintain pattern in portable digital format.
2. Identify fabric, marker constraints and prepare efficient marker plans
3. Develop full illustrations in CAD for desired looks and simulate fabric designs

3 Hours

EXPERIMENT 1
Draft a pattern for frock, develop a style variant of the drafted pattern, seam them and grade in three sizes.

3 Hours

EXPERIMENT 2
Draft a womens top having cowls at neck. Show the transfer of dart by pivoting method, seam the patterns and grade them in two sizes.

3 Hours

EXPERIMENT 3
Draft a mens trouser pattern, develop three different leg fits from it, seam the patterns and grade them in three inseam lengths.

3 Hours

EXPERIMENT 4
Draft a mens casual shirt pattern and develop a marker plan on a plaid fabric having 2X2 cm size pattern. The patterns should be matched at sleeve setting, pocket attachment, yoke and placket. Consider the fabric width as 140cm.

3 Hours

EXPERIMENT 5
Draft a full skirt. Assume a engineered stripe line passes through the princess seam line on the both sides of center front. The fabric width is 120cm with the engineered stripe located at 45cm from the selvedge. Develop an appropriate marker.

3 Hours

EXPERIMENT 6
Digitize the given basic block pattern, maintain the pattern details and pattern image. Grade the pattern in three different sizes.

3 Hours

EXPERIMENT 7
Draft a Shawl collar jacket pattern in misses size 8 and prepare a marker plan in 120cm plain weave poplin fabric and 120cm herring bone twill fabric.

3 Hours

EXPERIMENT 8
Develop a 3D visual display of Womens business suit with coordinating accessories. Suggest a suitable fabric structure and show its simulation.

3 Hours

EXPERIMENT 9
Develop a 3D visual display of conceptual Figure skating suit for men and women both. Coordinate it with right accessories.

3 Hours

EXPERIMENT 10
Develop a 3D visual display of any three Bohemian silhouettes with coordinating accessories.

Total: 30 Hours

15FT509 TECHNICAL SEMINAR I **0 0 2 1**

Course Objectives

- To develop the self-learning skills to utilize various technical resources available from multiple field.
- To promote the technical presentation and communication skills.
- To impart the knowledge on intonation, word and sentence stress for improving communicative competence, identifying and overcoming problem sounds.

Course Outcomes (COs)

1. Refer and utilize various technical resources available from multiple field.
2. Improve the technical presentation and communication skills.
3. Understand the importance of intonation, word and sentence stress for improving communicative competence, identifying and overcoming problem sounds.
4. Interact and share their technical knowledge to enhance the leadership skills.
5. Understand and adhere to deadlines and commitment to complete the assignments.

15FT510 MINI PROJECT III **0 0 2 1**

Course Objectives

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Course Outcomes (COs)

1. Formulate a real world problem, identify the requirement and develop the design solutions.
2. Express the technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Prepare report and present the oral demonstrations.

15GE511 LIFE SKILLS: APTITUDE I **0 0 2 -**

Course Objectives

- To expose the undergraduate students to such methods and practices that help, develop and nurture qualities such as character, effective communication, aptitude and holding ethical values.

Course Outcomes (COs)

1. Distinguish the pattern of coding and decoding.
2. Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions
3. Difference between sequence and series
4. Evaluate critically the real life situations by resorting and analyzing analytical reasoning of key issues and factors
5. Identify the odd man out
6. Calculate the percentages and averages
7. Demonstrate the blood relation concept in Verbal Reasoning
8. Plot the diagrams based on direction
9. Explain the various operations

3 Hours

CODING AND DECODING

Introduction - Description of Coding method - Coding patterns - Concepts of Coding and Decoding - Problems involving Coding and Decoding methods

3 Hours

SEQUENCE AND SERIES

Introduction - Sequences of real numbers - Number and Alphabet series - Description of Number and Alphabet series - Analogy - Odd man out- Power series

3 Hours

DATA SUFFICIENCY

Introduction to Data Sufficiency - Overview of the wide variety of Data Sufficiency problems - Basic introduction on how to determine what information is sufficient to solve a given problem - Common pitfalls to avoid

3 Hours

DIRECTION

Introduction to Direction - sense test - Overview of the wide variety of Direction problems -Direction - Plotting diagrams

3 Hours

PROBLEM ON AGES

Introduction- basic concept - usage of percentage and averages- applications

3 Hours

ANALYTICAL REASONING

Introduction - basic concept - non verbal analytical reasoning - arrangements

3 Hours

BLOOD RELATION

Introduction - Basic concept - Kinds of relation - Tree diagram - Relations

3 Hours

BLOOD RELATION

Introduction -Basic concept - Kinds of relation - Tree diagram - Relations

3 Hours

VISUAL REASONING

Introduction - Basic concepts - Odd man out - Next series - Mirror image and water image

3 Hours

SIMPLIFICATIONS

Introduction - Basic concepts - Arithmetic operations -Equation solving methods - Puzzles

Total: 30 Hours

Reference(s)

1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Fourth Edition, Tata McGraw-Hill Publishing Company Ltd, 2012
2. Arun Sharma, How to prepare for Data Interpretation for the CAT, First Edition, Tata McGraw-Hill Publishing Company Ltd, 2012.
3. Dr.R S Aggarwal, Quantitative Aptitude, Seventh Revised Edition, S.Chand Publishing Company Ltd, 2013.
4. Edgar Thorpe, Course In Mental Ability And Quantitative Aptitude For Competitive Examinations, Third Edition, Tata McGraw-Hill Publishing Company Ltd, 2013.
5. Arun Sharma, How to prepare for Quantitative Aptitude for the CAT, Fifth Edition, Tata McGraw-Hill Publishing Company Ltd, 2013

15GE601 PROFESSIONAL ETHICS 2 0 0 2

Course Objectives

- To understand Human values, ethical theory, codes of ethics, work place responsibilities, rights, engineering experimentation, global issues and contemporary ethical issues
- To understand personal ethics, legal ethics, cultural associated ethics and engineer's responsibility

Course Outcomes (COs)

1. Articulate engineering ethics theory with sustained lifelong learning to strengthen autonomous engineering decisions
2. Be an example of faith, character and high professional ethics, and cherish the workplace responsibilities, rights of others, public's welfare, health and safety
3. Contribute to shape a better world by taking responsible and ethical actions to improve the environment and the lives of world community
4. Fortify the competency with facts and evidences to responsibly confront moral issues raised by technological activities, and serve in responsible positions of leadership
5. Be Proficient in analytical abilities for moral problem solving in engineering situations through exploration and assessment of ethical problems supported by established experiments

UNIT I **6 Hours**

HUMAN VALUES

Morals and Ethics - Honesty - Integrity - Values - Work Ethic - Civic Virtue - Respect for Others - Living Peacefully - Caring and Sharing - Self-Confidence - Courage - Co-operation - Commitment - Empathy.

UNIT II **6 Hours**

ENGINEERING ETHICS AND PROFESSIONALISM

Scope of 'Engineering Ethics'- Variety of moral issues - Types of inquiry - Accepting and sharing responsibility - Ethical dilemmas - Moral autonomy - Kohlberg's and Gilligan's theory - Consensus and controversy - Profession and Professionalism - Models of Professional Roles - Right action theories - Senses of corporate responsibility - Codes of ethics: Importance - justification - limitation - Abuse - Sample codes NSPE - IEEE - Institution of Engineers (India).

UNIT III **6 Hours**

ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation - Engineers as responsible experimenters - Balanced outlook on law - Cautious optimism - Safety and risk - Assessing and reducing risk - Safe exits - The Challenger case study - Bhopal Gas Tragedy - The Three Mile Island and Chernobyl.

UNIT IV **6 Hours**

WORKPLACE RESPONSIBILITIES AND RIGHTS

Fundamental Rights - Responsibilities and Duties of Indian Citizens - Teamwork - Ethical corporate climate - Collegiality and loyalty - Managing conflict - Respect for authority - Collective bargaining - Confidentiality - Conflicts of interest - Occupational crime - Professional rights - Employee rights.

UNIT V **6 Hours**

GLOBAL ISSUES

Multinational corporations: Technology transfer and appropriate technology - International rights - promoting morally just measures - Environmental ethics: Engineering, ecology - economics - Human and sentient centred - and bio and eco centric ethics - Computer ethics and internet - Engineers as managers - Consulting engineers - Engineers as expert witnesses and advisors - Moral leadership.

FOR FURTHER READING

The Challenger case study - Bhopal Gas Tragedy - The Three Mile Island and Chernobyl case studies - Fundamental Rights, Responsibilities and Duties of Indian Citizens -Sample code of ethics like IETE, ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management.

Total: 30 Hours

Reference(s)

1. Mike W Martin and Roland Schinzinger, Ethics in Engineering, 4th edition, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi, 2014.
2. M Govindarajan, S Natarajan and V S Senthil Kumar, Engineering Ethics, PHI Learning Private Ltd, New Delhi, 2012.
3. R S Naagarazan, A text book on professional ethics and human values, New age international limited, New Delhi, 2006.
4. Charles D Fleddermann, Engineering Ethics, Pearson Education/ Prentice Hall of India, New Jersey, 2004.
5. Charles E Harris, Michael S Protchard and Michael J Rabins, Engineering Ethics - Concepts and Cases, Wadsworth Thompson Learning, United States, 2005.
6. http://www.slideworld.org/slidestag.aspx/human-values-and- Professional-ethics

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	5	5				5					5														20
2		5			5						5											5			20
3		5					10				5														20
4	5					5				5												5			20
5	5					5				5					5										20
																								Total	100

Assessment Questions

Remember

1. Define Human Values.
2. What are Morals and Values?
3. What do you mean by Civic virtue and Respect for others?
4. Write the various meanings of Spirituality?
5. List four different types of Virtues.
6. Mention different Human values.
7. What is meant by moral autonomy?
8. Classify the types of inquiry
9. What are the steps needed in confronting moral dilemmas?
10. List the levels of moral development suggested by Kohlberg
11. What do you understand by self-interest and ethical egoism?
12. What are the steps needed in confronting moral dilemmas?
13. What are the three virtues of religion?
14. What are the professional responsibilities?

Understand

1. Which are the practical skills that will help to produce effective independent thought about moral issues?
2. Why does engineering have to be viewed as an experimental process?
3. Why isn‘t engineering possible to follow a random selection in product design?
4. Why is the code of ethics important for engineers in their profession?
5. What does the Balanced Outlook on Law stress in directing engineering practice?
6. Are the engineers responsible to educate the public for safe operation of the equipment? How?
7. What kind of responsibility should the engineer have to avoid mistakes that may lead to accident due to the design of their product?
8. What is the use of knowledge of risk acceptance to engineers?
9. Why is Environmental Ethics so important to create environmental awareness to the general public?
10. Why do the engineers refuse to do war works sometimes?

Apply

1. How does the consideration of engineering as a social experimentation help to keep a sense of autonomous participation is a person’s work?
2. How does the code of ethics provide discipline among the engineers?
3. Exemplify the space shuttle Challenger case accident?
4. How does the manufacturer understand the risk in a product catalog or manual?
5. How does the knowledge of uncertainties in design help the engineers to access the risk of a product?
6. How can the quantifiable losses in social welfare resulting from a fatality be estimated? Give some examples.
7. How does the engineer act to safeguard the public from risk?

15FT602 APPAREL PRODUCTION MANAGEMENT 3 0 0 3

Course Objectives

- To understand the concepts in production planning and control.
- To apply the various techniques in production planning and control.
- To understand the material management and their movement in the production.

Course Outcomes (COs)

1. Apply the concepts of product and process planning in the apparel industry.
2. Analyze the production scheduling and aggregate concepts in the apparel industry.
3. Understand the tools for effective inventory control.

UNIT I **9 Hours**

INTRODUCTION

Objectives and benefits of planning and control-Functions of production control-Types of production systems -job- batch and continuous-Product development and design-Marketing aspect - Functional aspects-Operational aspect-Durability and dependability aspect- aesthetic aspect. Profit consideration-Standardization, Simplification & specialization- Break even analysis-Economics of a new design.

UNIT II **9 Hours**

PRODUCT PLANNING AND PROCESS PLANNING

Product planning-Extending the original product information-Value analysis-Problems in lack of product planning-Process planning and routing-Pre requisite information needed for process planning-Steps in process planning-Quantity determination in batch production-Machine capacity, balancing-Analysis of process capabilities in a multi product system.

UNIT III **9 Hours**

PRODUCTION SCHEDULING

Production Control Systems-Loading and scheduling-Master Scheduling-Scheduling rules-Gantt charts-Perpetual loading-Basic scheduling problems - Line of balance - Flow production scheduling-Batch production scheduling-Product sequencing - Production Control systems-Periodic batch control-Material requirement planning kanban - Dispatching-Progress reporting and expediting-Manufacturing lead time-Techniques for aligning completion times and due dates.

UNIT IV **9 Hours**

INVENTORY CONTROL AND RECENT TRENDS IN PPC

Inventory control-Purpose of holding stock - Effect of demand on inventories-Ordering procedures. Two bin system -Ordering cycle system-Determination of Economic order quantity and economic lot size-ABC analysis-Recorder procedure-Introduction to computer integrated production planning systems-elements of JIT -Fundamentals of MRP II and ERP.

UNIT V **9 Hours**

AGGREGATE PLANNING

Aggregate Units of production, Issues of aggregation- smoothing, bottle neck problem, planning horizon, treatment of demand; Cost in aggregate planning; Aggregate in chase strategy, constant workforce, and mixed strategies and additional strategies; Disaggregating aggregate plans.

FOR FURTHER READING

Prototype to production model analysis producing many styles consecutively in one line establishing factory capacity, planning for multi style production Plant loading for multi-style production for extended period Challenges/ issues faced in apparel industry

Total: 45 Hours

Reference(s)

1. Steven Nahmias, "Production and Operations Analysis", 6 edition; Tata McGraw-Hill, 2009
2. S. K. Mukhopadhyay, "Production Planning & Control: Text and Cases", PHI Learning Pvt. Ltd., 2007
3. Martand Telsang, "Industrial Engineering and Production Management", S. Chand and Company, First edition, 2000
4. Stephen N. Chapman, "The fundamentals of Production Planning and Control.", Pearson Education, 2009
5. K.C.Jain & L.N. Aggarwal, "Production Planning Control and Industrial Management", Khanna Publishers, 1990.
6. Upendra Kachru, “Production and operations management Text and cases" Excel books 1st edition 2007.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	1				3				2					6				2				4		20
2	1	3				1				3				2	1				3				6		20
3	2	1				4					3			1	3				3				2	1	20
4		4			1	5					4			3					2				1		20
5		2				3				2	3				5				3				2		20
																							Total		100

Assessment Questions

Remember

1. State the importance of style changing.
2. What is the process sequence for Cut Order Planning?
3. State various production systems.
4. What d o you mean by “EOQ”?
5. Mention the advantages of EOQ.
6. What do you mean by “Aggregate planning”?
7. State the characteristic features of MRP II.
8. List the applications of Gantt charts.
9. What do you mean by “Break Even Analysis”?
10. What do you understand by the term “KANBAN”?

Understand

1. Compare and contrast line production and the unit production system.
2. Differentiate between single and multiple line concepts.
3. Explain the flow process by help of a chart in an apparel unit.
4. How do you schedule various operations in an apparel unit?
5. Explain the process sequence to achieve the required production level within a time frame.
6. How to arrange the sequence of machine according to the style of the garment?
7. Compare and contrast MRP and MRPII.
8. Compare and contrast production planning and process planning.
9. Compare and contrast line production and the batch production system.
10. State process planning.

Apply

1. Select the product layout and process layout for a specific style.
2. How will you calculate the production rate in the Cutting department?
3. Calculate the production rate per hour in the sewing department?
4. Calculate the production rate in the finishing and packing department per hour?
5. How to plan a line balance for a given style order in an apparel unit?
6. How will you calculate quantity determination in batch production.
7. How to plan a machine capacity requirement for a given style order in an apparel unit?
8. Calculate the production rate per hour in the cutting department?
9. Predict the importance of using gantt chart in production scheduling.

Analyse / Evaluate / Create

1. Analyze various apparel industries with respect to their production planning and control activities. units for their
2. Justify the role of “ABC analysis” in apparel industry.
3. Justify the role of “prototype to production model analysis” in apparel industry.
4. Determine the importance of apparel production management in the current scenario.
5. Criticize the aggregate planning for the effectiveness.
6. Create a PPC plan for a garment insudtry whose plant capacity is 1000 pieces per day.
7. Design a planning schedule for an apparel industry. Assume data accordingly

15FT603 APPAREL COSTING AND EXPORT DOCUMENTATION 3 0 0 3

Course Objectives

- To impart knowledge on various costing techniques
- To know the export documentation procedures

Course Outcomes (COs)

1. Understand types of budget and principles of costing.
2. Understand the elements and practices of costing and pricing.
3. Gain knowledge on export process and documentation.

UNIT I **9 Hours**

BUDGETING AND PRINCIPLES OF COSTING

Budgeting - aims of Budgeting, types of budget. Costing - aims of costing, Elements of cost - Material cost, Labour cost and overheads, difference between budgeting and costing. Depreciation cost - reasons and methods of calculating depreciation.

UNIT II **9 Hours**

COST FACTORS AND PRACTICES

Costing of garments: cost determinants - cost of yarn - fabric production - processing, lot size and design affecting cost, cutting, making and trim cost. Cost of bought out components - Thread, Button, Zipper, Interlining. Costing methods, Cost estimation bulk production. Cost calculation by interpreting Specification sheet Practical cost calculation for Ladies, Mens and Children's wear - woven and knitted

UNIT III **9 Hours**

PRICING OF APPAREL PRODUCTS

Determining Pricing of apparel products:Price elasticity of demand and supply, sample costing-marginal revenue and marginal cost, cost plus pricing methods;Full cost pricing,conversion cost pricing differential cost pricing ,variable cost pricing,direct cost pricing derivation of cost of apparel products-woven/knits;The budgeting process:Budgeting principles for the apparel industry,fixed vs.variable budget ,master budget,laminations of budgerts any justification effort

UNIT IV **9 Hours**

CONCEPT OF EXPORTING

Difference between foreign trade and domestic trade- Legal requirements for exporting - IE code number - Registration with Sales Tax Department, Central Excise Department and Export Promotion Councils / Commodity Boards. Selecting export product: Product knowledge, foreign demand, basis for deciding on the number of products for export, Selecting export markets: country identification, risk evaluation; deciding on the number of export markets, Pre-shipment export finance - role of commercial banks

UNIT V **9 Hours**

EXPORT DOCUMENTATION

Importance of Export/Import Documentation, Terms of Payment: Letter of Credit - Documentary collection - open account. Terms of Shipments- Incoterms - Essential elements of an export contract, Freight forwarders power of Attorney, Shippers letter of Instructions, Different types of Invoices, Bills of Lading, VOC and NVOCCs, Packing list, Inspection certificates, Marine and Air Casualty Insurance Policies and certificates, Dock and Warehouse receipts, COO, Certificates of Free Sale, Delivery Instructions and Delivery Orders, Drafts of payment, Letters of credit, Electronic export information, Air cargo security and C-TPAT, Negotiation of documents - action in the event of discrepancies. Online documentation. International trade policy

FOR FURTHER READING

Govt of India export entitlement policy on garment exports. AEPCs role in the administration of export entitlement policy. Export promotional activities of AEPC Facilities available for garment exporters.cash compensatory support. Duty draw back, Export finance through banks.Export credit guarantee corporation Export-Import Bank, Market Development Assistance;1005 export oriented scheme of the Govt. of India:Free Trade Zones;

Total: 45 Hours

Reference(s)

1. Charles T. Horngren, Introduction to Management Accounting, Prentice Hall, New Delhi, 2001.
2. M. I. Mahajan, Export Policy, Procedures and Documentation, Snow-white Publishers, Mumbai, 2007.
3. Thomas E. Johnson and Donna L. Bade, Export/Import Procedures and Documentation, 2010
4. Levi, International Finance, Tata McGraw-Hill, 1997.
5. R. Narayanaswamy, Financial Accounting - A Managerial Perspective, Prentice Hall India Pvt. Ltd., New Delhi, 1997.
6. S. K. Bhattacharya & John Dearden, Accounting for Management Text and Cases, Vikas Publishing House, New Delhi, 2000.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	2				3				1	3				4				2				3		20
2		2			2	1					3				5				4					3	20
3	1	1			1	2				3	1				5				6				2		20
4	2	3				1				2					6				3				3		20
5	2	3			1	2					1				3				7				2		20
																								Total	100

Assessment Questions

Remember

1. Define Balance sheet.
2. Mention the elements of costing.
3. What are the different costs involved in garment production?
4. Define fixed cost and variable cost.
5. List few bought out components.
6. Name any six export documents.
7. State the different types of Estimation.
8. What do you understand by “Duty Drawback”?
9. Give the relationship between Cost, Price and Profit.
10. What do you mean by overhead cost?

Understand

1. Differentiate between gross and net profit.
2. Explain in detail on various types of budgeting.
3. Summarize various costing methods adopted in garment industry.
4. Elaborate on different pricing methods with suitable examples.
5. Discuss how exchange control manual helps in managing foreign exchange.
6. Differentiate between foreign trade and domestic trade.
7. Summarize the advantages of export promotion councils.
8. Exemplify various types of Invoices.
9. Differentiate between foreign trade and domestic trade.
10. Differentiate between export and import documentation.

Apply

1. Calculate the cost for a men's wear with suitable example.
2. Give the suitable pricing method for garment export industry with suitable examples.
3. Elaborate on various transport and financial documents related to exports.
4. How will you select the export market?
5. How will you select the terms of payment.
6. Calculate the cost for a women's wear with suitable example.
7. Give the suitable pricing method for garment import industry with suitable examples.
8. Elaborate on various documentary collection method.
9. Predict the importance on the role of commercial bank used in exporting.
10. Elaborate the process of sample costing in the apparel product.

Analyse / Evaluate / Create

1. Analyze the various factors responsible for the pricing of apparel.
2. Justify the role of export documents in apparel industry.
3. Justify the role of pricing of apparel products in apparel industry.
4. Determine the importance of online documentation in the current scenario.
5. Criticize the pre-shipment export finance.
6. Create a report for export finance through banks.
7. Design a export documentation for an apparel industry. Assume data accordingly.

15FT604 RETAIL MANAGEMENT AND VISUAL MERCHANDISING

3 0 0 3

Course Objectives

- To elucidate the basics of human structure and measurements.
- To develop knowledge about fabric selection and styles for intimate apparels.
- To impart technical knowledge about fabric properties that deals with the functional aspect of intimate apparels.

Course Outcomes (COs)

1. Determine the types of retailers, locations and their presentations.
2. Understand the process and importance of floor planning in retail store
3. Analyze and develop the suitable layout for stores.

UNIT I — 9 Hours

INTRODUCTION TO RETAILING

Types of retailing, multi-channel retailing-Retail institutions and multi- channel.Strategic Retail Management - introduction to retail management, building and sustaining relationships in retailing, strategic planning, forms of retailing, retail institutions by ownership, retail institutions by store-based strategy. Organizational Structures -need for organizational structures, organization chart components, constructing an organization chart, trends in organizational structures.

UNIT II — 9 Hours

CUSTOMERS DEMOGRAPHY AND INFORMATION

Consumer demographics and life-styles, consumer profiles, consumer needs and desires, shopping attitudes and behaviour, consumer decision process, environmental factors affecting consumers, the retail information system, Gathering information through EDI and UPC.

UNIT III **9 Hours**

STORE LOCATION AND MANAGEMENT

Trading, area analysis, site selection, site evaluation, organizational pattern, human resource management, customer relationship management operations management -Operational dimensions - Retail image and promotional strategy- Retail communication - Retail communication mix. Communicating with the Customer -Establishing and maintaining a retail image, promotional strategy, the significance of retail image, atmosphere, and elements of retail promotional mix.

UNIT IV **9 Hours**

DISPLAY AND PRESENTATION

Different kinds of images, image changes for men, women and children wear. The four P's of marketing, Display -Types of display, Exhibitions, Types of Display settings, Elements of display, store display. Store - Types of retailers, locations of retailers, presentations in different types of retail stores. Fashion merchandise presentation - The American general store - Indian departmental stores and fashion centres. Design composition - Two composition methods, basic design methods, creating attention, creating displays, design solutions, and the purpose of design.

UNIT V **9 Hours**

STORE LAYOUT, COLOUR AND STORE LIGHTING

Objectives of store layout, types and selection of layout, merits and demerits, allocation of store space.Exterior store design -Planning store exterior kinds of store fronts, elements of store exterior - Signage, Banners, Marque, lighting, Types of window display areas.Interior store design - Planning of store, kinds of displays.Color planning for the selling floor, colour communication - customers, season, merchandise, Display properties -Properties, choosing properties, rent, buy, or build, Supplies-setting up shop - The display - hop studios, the toolbox, shop materials. Lighting - phases, light sources, types of lamps, lighting fixtures, light planning -light and shadow, lighting all store types, electrical receptacles.

FOR FURTHER READING

Small store applications , Planning a retail promotional strategy , Inventory Analysis and Control, EOQ model with stock-out allowed, Decision Making and Queuing Theory, Applications of queuing theory, Errors of Display, Elements of store interior, merchandise walls, floors, ceilings, colour and lighting, Creation - museum look, super market, boutique, warehouse clubs, Budgets and repairs of mannequin , Fashion news and communication , The Merchandise Fixtures and Mannequin, Signs and Communication

Total: 45 Hours

Reference(s)

1. Jay Diamond and Ellen Diamond, Contemporary Visual Merchandising and Environmental Design, PrenticeHall, NewDelhi, 2007.
2. ElaineStone, Fashion Merchandising, BlackwellScience Ltd., 2000.
3. DonaldJ.Bowersox&DavidJ.Closs, Logistical Management, TataMcGraw-Hill Editions, New Delhi, 2000.
4. PhilippePierreDornier, Global Operations & Logistics,J ohnWiley&SonsInc, NewYork,2002.
5. Y.P.Singh, Effective Retail Management, Anmol PublicationsPvt.Ltd., New Delhi, 2001.
6. JohnFernieandLeighSparks, Logistics and Retai lManagement: Insights into Current Practice and Trends,Kogan Page, UK,2004.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1		2			1	2				2	2			1				1	3			6			20
2	1	2				3				3	1				5			2				3			20
3	1	2			1	2				3	1			2					6				2		20
4		1			3						3			1	2			4				6			20
5		2			2	1				4	4				1			1				5			20
																								Total	100

Assessment Questions

Remember

1. Define Economic order quantity
2. List any two techniques available in retail planning
3. State the importance of inventory management system.
4. State MRP.
5. Label the term multichannel retailing
6. List four different kinds of images
7. List any 2 types of display settings.
8. State 4P's of Marketing.
9. Define design composition
10. List any four types of window displays.

Understand

1. Identify the elements of a store interior
2. Select suitable method to achieve the optimum floor planning in a retail store.
3. Identify the importance of ABC Analysis?
4. Illustrate the method to arrange garment styles in a sequence in a showroom.
5. Summarize Inventory Management system.
6. Interpret the influencial factors of sales promotion in visual merchandising influence.
7. Exemplify Indian departmental stores and fashion centres.
8. Infer on the elements of store exterior influence customers
9. Illustrate a good color planning for the selling floor.
10. Indicate errors in display

Apply

1. Choose the correct evaluating method for the material movement rate in a retail store
2. Demonstrate proper floor planning is necessary
3. Demonstrate the latest methods in retail management system
4. Compute the floor plan for a Girls Long frock and Gent's trousers
5. Find the best method of presentation on fashion merchandise
6. Predict the significance of Exhibitions.
7. Construct the objectives of store layout
8. Show the importance of flower arrangements in stores.
9. Construct the objectives of store location.
10. Demonstrate the latest methods in store location and management.

Analyse / Evaluate / Create

1. Justify the material movement according to the style of the garment
2. Attribute the material movement in the store according to the floor planning
3. Differentiate the stock rate according to the style and department wise per day
4. Conclude on what basis store interior design is been selected
5. Defend sign production in supermarkets and fashion stores influences the growth of business.

6. Design a store with proper selection of store layout, lighting, fixtures and mannequin with appropriate signs.
7. Design a store with proper selection of area analysis, site selection, site evaluation, organizational pattern, human resource management with appropriate signs.

15FT607 APPAREL MANUFACTURING LABORATORY III

0 0 2 1

Course Objectives

- To develop the basic practical knowledge on seams and stitches
- To create various style features of the garment such as sleeve, collar and fuller appropriately.
- To improve the stitching skills with reference to various machines.

Course Outcomes (COs)

1. Understand the basic stitch handling skills
2. Create new style with different stitches and seam combinations of different shapes.
3. Understand the sequence of operation of joining together for required style

3 Hours

EXPERIMENT 1
Design and construction of Ladies Jacket with shawl collar

3 Hours

EXPERIMENT 2
Design and construction of Ladies Full Skirt with pleats

3 Hours

EXPERIMENT 3
Design and construction of Ladies Halter Tops

3 Hours

EXPERIMENT 4
Create style variations and construct Salwar Kameez.

3 Hours

EXPERIMENT 5
Design, draft and construct Blouse.

3 Hours

EXPERIMENT 6
Develop styles, produce pattern and construct Trouser

3 Hours

EXPERIMENT 7
Design, draft and construct Braziers and Panties.

3 Hours

EXPERIMENT 8
Design and construction of Mens Casual Polo Shirt on two different fabrics

3 Hours

EXPERIMENT 9
Design and construction of Mens Cargo Shorts.

3 Hours

EXPERIMENT 10
Develop a design and construct garment for Maternity Wear

Total: 30 Hours

15FT608 TREND ANALYSIS AND FORECASTING LABORATORY

0 0 2 1

Course Objectives

- To enable students interpret a trend and justify their significance.
- To enable students classify trend into mega trend, major trend and minor trend.
- To enable them develop fashion trend reports.

Course Outcomes (COs)

1. Interpret fashion trends and justify their significance
2. Categorize the trend pattern into mega trend, major trend and minor trend relevant to fashion indexes.
3. Develop fashion trend reports and issue trend alerts.

3 Hours

EXPERIMENT 1

Identify the trends in vogue and those forecasted for the next calendar year in the Teens segment. List 10 sources and compile a report.

3 Hours

EXPERIMENT 2

Identify 10 key street style looks and cite fashion clothing appropriate for their adoption.

3 Hours

EXPERIMENT 3

Interpret the megatrend: Super human - amplification of strength through exo skeletons and technology enhanced label. Prepare a trend report and suggest its scope for adoption.

3 Hours

EXPERIMENT 4

Attribute the trends liable for adoption in holiday collections. Cite 10 inspirations and generate a report.

3 Hours

EXPERIMENT 5

Interpret the psychographic profile of Gen Z segment and map 10 different themes appropriate for their adoption.

3 Hours

EXPERIMENT 6

Interpret the mega trend: New semantics-replacing words with visual symbols and determine their applicability to casual clothing. Prepare a report highlighting their values.

3 Hours

EXPERIMENT 7

Examine the visual traits of 10 different Ethnic dress styles. Suggest an appropriate clothing category suitable for adoption and prepare a report.

3 Hours

EXPERIMENT 8

Analyze the trend: climate apartheid and generate a design scheme using smart fabrics that regulate temperature. The scheme should consist of minimum 10 silhouettes.

3 Hours

EXPERIMENT 9

Screen the inspiration sources and identify 10 street style trends. Support your identification with appropriate references and concepts.

3 Hours

EXPERIMENT 10

Collect new design images used in Advertisement visuals and interpret the graphic building techniques employed in it.

Total: 30 Hours

15FT609 TECHNICAL SEMINAR II **0 0 2 1**

Course Objectives

- To develop the self-learning skills to utilize various technical resources available from multiple field.
- To promote the technical presentation and communication skills.
- To impart the knowledge on intonation, word and sentence stress for improving communicative competence, identifying and overcoming problem sounds.

Course Outcomes (COs)

1. Refer and utilize various technical resources available from multiple field.
2. Improve the technical presentation and communication skills.
3. Understand the importance of intonation, word and sentence stress for improving communicative competence, identifying and overcoming problem sounds.
4. Interact and share their technical knowledge to enhance the leadership skills.
5. Understand and adhere to deadlines and commitment to complete the assignments.

15FT610 MINI PROJECT IV **0 0 2 1**

Course Objectives

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Course Outcomes (COs)

1. Formulate a real world problem, identify the requirement and develop the design solutions.
2. Express the technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Prepare report and present the oral demonstrations.

15GE611 LIFE SKILLS: APTITUDE II **0 0 2 -**

Course Objectives

- To expose the undergraduate students to such methods and practices that help, develop and nurture qualities such as character, effective communication, aptitude and holding ethical values

Course Outcomes (COs)

1. Perform arithmetical operations with complex numbers
2. Explain the meanings of a relation defined on a set, an equivalent relation and a partition of a set
3. Calculate percentages in real life contexts , find any percentage of a given whole using their knowledge of fraction multiplication and increase / decrease a given whole by a percentage
4. Calculate the Ratio, Proportions and Variation
5. Identify the percentage gain or percentage loss
6. Differentiate Pipes and Cisterns
7. Demonstrate the situations like motion in as straight line , Boats and Streams , Trains, Races and clocks
8. Evaluate the Counting techniques, Permutation and Combination, Recursion and generating functions
9. Categorize the distributions of probability with respect to the random variables
10. Discuss the different cases of Mixtures and Alligation

3 Hours

NUMBER SYSTEMS

Introduction - definition- classification on Numbers -power cycles and remainders - short cut process - concept of highest common factor - concept of least common multiple - divisibility - number of zeros in an expression

3 Hours

PERCENTAGES

Introduction - definition and Utility of percentage - importance of base/denominator for percentage calculations - concept of percentage values through additions - fraction to percentage conversion table

3 Hours

AVERAGES

Introduction - average of different groups - addition or removal of items and change in average- replacement of some of the items

3 Hours

RATIO, PROPORTIONS AND VARIATION

Introduction- Ratio- properties-dividing a given number in the given ratio - comparison of ratios - proportions - useful results on proportion- continued proportion - relation among the quantities more than two - variation

3 Hours

PROFIT AND LOSS

Gain/Loss and percentage gain or percentage loss-multiplying equivalents to find sale price - relation among cost price, sale price, gain/loss and percentage gain or percentage loss - an article sold at two different selling price - two different articles sold at same selling price - percentage gain or percentage loss on selling price - percentage gain or percentage loss on whole property

3 Hours

TIME AND WORK

Introduction - Basic concepts -Concepts on working with different efficiency - Pipes and Cisterns - Work Equivalence (Man Days) -Alternative approach

3 Hours

TIME, SPEED AND DISTANCE

Definition - Basics of Time, Speed and Distance - Relative speed - Problems based on Trains? Problems based on Boats and Streams -Problems based on Races - time taken with two difference modes of transport - time and distance between two moving bodies

3 Hours

PERMUTATION AND COMBINATION

Definition - Fundamental rules - Theorems on Permutation - Theorems on Combination

3 Hours

PROBABILITY

Concept and importance of probability - underlying factors for Real- Life estimation of probability - Basic facts about probability - some important consideration while defining event.

3 Hours

MIXTURES AND ALLIGATION

Definition - alligation rule - mean value (cost price) of the mixture - some typical situations where allegation can be used.

Total: 30 Hours

Reference(s)

1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Fourth Edition, Tata McGraw-Hill Publishing Company Ltd, 2012
2. Arun Sharma, How to prepare for Data Interpretation for the CAT, First Edition, Tata McGraw-Hill Publishing Company Ltd, 2012
3. Dr.R S Aggarwal, Quantitative Aptitude, Seventh Revised Edition, S.Chand Publishing Company Ltd, 2013.
4. Edgar Thorpe , Course In Mental Ability And Quantitative Aptitude For Competitive Examinations, Third Edition, Tata McGraw-Hill Publishing Company Ltd, 2013
5. Arun Sharma, How to prepare for Quantitative Aptitude for the CAT, Fifth Edition, Tata McGraw-Hill Publishing Company Ltd, 2013

15GE701 ENGINEERING ECONOMICS

3 0 0 3

Course Objectives

- To provide the theoretical foundations in micro and macro analysis in terms of concepts and theories
- To emphasis the systematic evaluation of the costs and benefits associated with projects
- To enumerate the idea of Balance sheet and Balance of payments

Course Outcomes (COs)

1. Understand the micro economic environment for creating a favourable business environment.
2. Take decision by making use of the major concepts and techniques of engineering economic analysis.
3. Compare the cost of multiple projects by using the methods learned, and make a quantitative decision between alternate facilities and/or systems.

4. Apply the appropriate engineering economics analysis method(s) for problem solving: present worth, annual cost, rate-of-return, payback, break-even, benefit-cost ratio.
5. Examine and evaluate the issues in macro-economic analysis.

UNIT I **9 Hours**

INTRODUCTION

Introduction to Micro and Macro economics - Kinds of Economic Systems - Production Possibility Frontier - Opportunity Cost - Objective of Organizations - Kinds of Organization.

UNIT II **9 Hours**

DEMAND AND SUPPLY

Functions of Demand and Supply - Law of diminishing Marginal Utility - Law of Demand and Supply - Elasticity of Demand - Demand Forecasting Methods - Indifference curve.

UNIT III **9 Hours**

PRODUCTION AND COST

Production Function - Returns to Scale - Law of Variable Proportion - Cost and Revenue concepts and Cost Curves - Revenue curves - Economies and Dis-economies of scale - Break Even point.

UNIT IV **9 Hours**

MARKET STRUCTURE

Market Structure - Perfect Competition - Monopoly - Monopolistic - Oligopoly - Components of Pricing - Methods of Pricing - Capital Budgeting IRR - ARR - NPV - Return on Investment - Payback Period.

UNIT V **9 Hours**

INTRODUCTION TO MACRO ECONOMICS AND FINANCIAL ACCOUNTING

National Income - Calculation Methods - Problems - Inflation - Deflation - Business Cycle - Taxes - Direct and Indirect Taxes - Fiscal and monetary policies.

FOR FURTHER READING

Nature and characteristics of Indian Economy - Role and functions of Central bank - LPG - GATT - WTO.

Total: 45 Hours

Reference(s)

1. A Ramachandra Aryasri and V V Ramana Murthy, Engineering Economics and Financial Accounting, Tata McGraw Hill Publishing Company Limited, New Delhi, 2006.
2. V L Samuel Paul and G S Gupta, Managerial Economics Concepts and Cases, Tata McGraw Hill Publishing Company Limited, New Delhi, 1981.
3. R Kesavan, C Elanchezhian and T Sunder Selwyn, Engineering Economics and Financial Accounting, Laxmi Publication Ltd, New Delhi, 2005.
4. S N Maheswari, Financial and Management Accounting, Sultan Chand
5. V L Samuel Paul and G S Gupta, Managerial Economics-Concepts and Cases

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					2					8			6											18
2		2					2			8					6				4						22
3			2			2				8								4							16
4	2						2		8						6				4						22
5		2				2				8				6				4							22
																				Total					100

Assessment Questions

Remember

1. Define Economics
2. What is opportunity cost?
3. List the types of Demand.
4. State the law of Demand.
5. Define Elasticity of Demand.
6. State the different degrees of elasticity of Demand?
7. List the factors determining Elasticity of Demand?
8. State the Law Of Diminishing Marginal Utility.
9. Define Replacement Cost and Historic Cost
10. Define Monopoly.
11. Define Oligopoly
12. Name the two types of Oligopoly.
13. List the objectives of Pricing?
14. Define Accounting
15. Define inflation

Understand

1. Explain the nature and scope of Economics.
2. List and explain the focus areas of Managerial economics.
3. Give reasons why mangers aim to maximize sales even at the cost of a lower profit.
4. Explain the nature of Demand.
5. What are the assumptions made when talking about the Law of Diminishing Marginal Utility?
6. Explain the characteristics of the Indifference Curve with examples
7. Can Demand Forecasting principles be applied to Services? Substantiate your answer with an example
8. What are the characteristic features of an oligopoly industry?
9. What causes Oligopoly?
10. Explain the types and features of Cost Based Pricing.
11. Explain the types and features of Demand Based Pricing.
12. Under what conditions does a company go in for Cross Subsidization pricing?
13. What is the role of the Central bank in controlling inflation?

Apply

1. Explain decisions based on the degree of certainty of the outcome with examples.
2. Give examples of products falling under the various kinds of competition, and the reasons they are able to survive in the market.
3. Give six examples of products that fall under Monopolistic Competitive pricing.
4. Give six examples of products that fall under Oligopolistic pricing
5. Pick any six Consumer Items and based on your knowledge of the markets, explain the pricing method that you think is most likely to have been followed for each of these items.
6. Demonstrate the importance of comprehending the market structure before formulating policies
7. Predict the features of demand forecasting methods
8. Predict the impact of exogenous variables on demand forecasting
9. Carry out a budget planning for short term planning

Analyse / Create

1. Differentiate between Macro and Micro economics
2. Differentiate between Extension and Increase in Demand.
3. Distinguish between Cost and Price
4. Compare the merits and demerits of the Deductive Method and the Inductive Method of Investigation
5. The per-capita income of farmers in the country has to be raised by 20% this year to prevent their migration to cities. Discuss this statement from the point of view of Positive and Normative Economics.
6. Decision making improves with age and experience- Discuss.

7. Do a survey of the automotive (only cars) industry and analyze the reasons and timing for discounts offered from the point of view of elasticity of demand
8. How would you modify a sealed bid pricing system to take care of different technical approaches by different bidders for a project for which bids are called for, given that the cost varies depending on the technical approach?
9. Create a matrix consolidating the definitions of the word Economics as defined by the leading Economists in the prescribed textbook. Using this define economics the way you understand it, in less than 50 words.
10. Study the price of a commodity over a period of one year and explain the possible reasons for the fluctuations from an economist‘s point of view
11. You are in a job which is paying you adequately. You are called for an interview for a job that double your salary. Unfortunately you miss the only train that will take you in time for the interview. How will you justify the cost of taking a flight considering the cost concepts you have learnt.?
12. Due to cancellation of an export order, you are stuck with a huge stock of jeans of international quality. Device a pricing strategy for disposing this stock without incurring a loss, considering that it is a very competitive market.

15FT702 FASHION THEORY AND CULTURE 4 0 0 4

Course Objectives

- To enable Students understand and comprehend different fashion theories.
- To enable Students understand the social, cultural and emotional motivations of contemporary dress culture
- To enable Students interpret and mark gender roles in fashion.

Course Outcomes (COs)

1. Resolve and interpret different fashion theories
2. Predict the social, cultural, emotional, gender and self motivations of dressing culture.
3. Classify generational characteristics of age, personal space, time and place.

UNIT I **12 Hours**

ETYMOLOGY OF FASHION

Etymology of fashion - difference between dress, clothing, costume and fashion. Feminization of fashion, Fashion as a Concept and a Phenomenon, Proponents and Opponents of Fashion , Studies of Fashion in Social Science - use of visual materials as evidence.

UNIT II **12 Hours**

FASHION SYSTEMS AND MODELS

Fashion systems model - beginning of fashion system, fashion as a myth, concept. Different approaches to fashion, Institutionalization of French fashion, fashion adoption and consumption - trickle down, trickle across and trickle up theories. Characteristics of fashion - Social changes, Appearance and identity

UNIT III **12 Hours**

ANTHROPOLOGICAL STUDIES OF FASHION

Contemporary dress and culture, Anthropological approach to fashion studies - Social, cultural and emotional motivations. Consumer behavior, Process of fashion change and adoption. Fashion and social identity - role of dressing, social restrictions on clothing and relevant reactions.

UNIT IV **12 Hours**

GENDERING FASHION

Gendering fashion - Beyond binaries, soft assemblages, marking, unmarking and remarking gender, sex. Gender and style fashion dress, feminist deconstruction, theorizing body and style - fashion dress, menswear out of academic closet, Multiple masculinities.

UNIT V **12 Hours**

GENERATION CHARACTERISTICS

Bodies in motion through time and space - Age, generation and place, Time and space, Open intersectionalization, Selfhood and mind, Self image and Public image, Phenomenon of social media expressions, Generation Z.

FOR FURTHER READING

Prepare a fashion concept based on latest theme and mark appropriate traits and lifestyle values for it.
.

Total:60 Hours

Reference(s)

1. Malcom barnard, Fashion theory: An introduction, Routledge, 2014.
2. Diana Crane, Fashion and its social agenda: class, gender and identity in clothing, University of Chicago Press, 2012.
3. Susan B Kaiser, Fashion and cultural studies, Berg publishers, 2013.
4. Joanne B eicher and Sandra lee evenson, The visible self: Global perspectives on dress, culture and society, Bloomsbury, 2014.
5. Agnes rocamura and Anneke smelik, Thinking through fashion: a guide to key theorists, I.B. Tauris, 2015.
6. http://www.tandfonline.com

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	1			2	1				1	4				6			2							20
2		3			2	2				2	3				4				4						20
3	1	3			2	2					3			2	4			3							20
4	3	2			2	2				1	2				5				3						20
5	2	1			2	1				1	2				4				5						20
																								Total	100

Assessment Questions

Remember

1. List the synonyms of fashion
2. Name the proponents of fashion
3. Name the four fashion oriented consumer groups
4. Enlist the components of social identity theory
5. Label the different types of motivations in pursuing fashion
6. List few characteristics of generation X
7. Recall the concept of ethnicity.
8. Name few sources of symbolic dresses
9. List the different motivations of fashion cultural studies
10. Define fashion.

Understand

1. Define etymology of fashion
2. State forecasting
3. Illustrate the difference between dress, costume and fashion
4. Interpret the phenomenon of fashion
5. Elaborate on social identity theory
6. Discuss the process change and adoption
7. State ethnography
8. Discuss in detail contemporary dress and culture
9. State fashion theory
10. Interpret the cultural identity of your group

Apply

1. Demonstrate the phenomenon of fashion with reference to social studies
2. Predict the characteristics of generation
3. Show the relevance of trickle across and trickle down theories in contemporary fashion
4. Relate men's clothing to construction of masculine identities
5. Represent women's identity though fashion images
6. Demonstrate the similarities and differences of dress in expressing values and identity
7. Predict the relationship between age, time and personal space in mapping generational characteristics
8. Show the relationship between social media expressions and identity
9. Relate the social changes to nature of fashion today.
10. Elobrate on the process of consumer behaviour.

Analyse / Evaluate

1. Resolve the premise behind the investigation of beliefs and notions of fashion
2. Distinguish between the principles of tangible and intangible synonyms of fashion
3. Analyze the reason behind opposition shown towards fashion
4. Justify the concept of fashionology
5. Justify fashion as a sociological study
6. Critique the fashion look of thedisplayedstyle.
7. Justify theexistenceof aharmonybetweencontemporary dress and culture

15FT703 SUSTAINABLE AND ECO-FASHION 3 0 0 3

Course Objectives

- To have fundamental knowledge on sustaianblity.
- To acquire knowledge on sustainable tools & techniques / standards & lables.
- To understand the eco-design and recycling concepts.

Course Outcomes (COs)

1. Understand the significance and methods of sustainable production.
2. Apply the concepts of eco-design in the production of fashion products.
3. Create and evaluate the products from recycling

UNIT I 9 Hours

SUSTAINABILITY

Definition, Sustainable development and its goals, three dimensions of sustainability. Fashion vs. Sustainability, Significance in the present and future context, Phases of Sustainable techniques - Waste management, Recycling (downcycling and Upcycling), Energy conservation & Water conservation, Fair trade / ethical practices

UNIT II **9 Hours**

TOOLS

Tools & Techniques: 3 R method, Carbon foot print, Water foot print, Life Cycle Analysis (LCA), Recycling Potentiality Index(RPI).Standards & Labels: Environment: Eco-labels - EU flower, Oeko-tex, SAI, REACH, EMS: ISO 14000, EMAS, GOTS (Global Organic Textile Standards), GRS(Global Recycle Standard), Society & Economy: SA 8000, WRAP, Clean Clothes Campaign, Let's stitch together, Better Cotton Initiative

UNIT III **9 Hours**

ECO-TEXTILES

Eco-design, Natural fibers, Organic fibers, Best Available Techniques (BAT), eco-friendly practices in the manufacturing of apparel and entire supply chain, novel technologies like tandem wet-on-wet foam techniques, natural fibre resistant and absorbent materials, effluent treatment, zero discharge etc.

UNIT IV **9 Hours**

RECYCLING

Designing textile products easy to recycle, Recycling technologies - Mechanical, Chemical, Recycled textile products - Development of products from reclaimed fibres, Recycled yarns, Recycled home textiles, Applications of recycled in medical, acoustics etc. Apparel development from recycled yarns.

UNIT V **9 Hours**

CHALLENGES IN SUSTAINABILITY

Slow fashion, Community couture, Techno-chic, Patch work planet / DIY (Do It Yourself), Cradle-to-cradle techniques, Garments produced from alternate natural fibres, Zero waste garment, Seamless garments, Garment produced from single machine, Garment making without the operator etc.

FOR FURTHER READING

Levi's, H&M, Walmart, Eastman Exports, Madura Garments etc.

Total: 45 Hours

Reference(s)

1. Subramanian Senthilkannan Muthu, Handbook of sustainable apparel production, CRC Press, 2015.
2. Kate Fletcher, Sustainable Fashion and Textiles: Design Journey, Earthscan UK & USA, 2008.
3. Alison Gwilti, Timo Rissanen, Shaping sustainable fashion- changing the way we use and make clothes, Earthscan UK & USA, 2011.
4. Alison Gwilti, Timo Rissanen, Shaping sustainable fashion- changing the way we use and make clothes, Earthscan UK & USA, 2011.
5. I Toble, Rohrt, Handbook of sustainable textile production Marion, Woodhead publishing Ltd, 2011.
6. www.sustainablemeasures.com/

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	1			2	1				4	2				5			2				2			20
2	1	4			2	2					3				2			2	1			3			20
3	1	2				3				2	1				3			4	1			1	2		20
4	2	1			1	4					5				6				2			1			20
5	3	3				2				2	2				2				3				3		20
																								Total	100

Assessment Questions

Remember

1. Define “sustainabile development”.
2. Name the dimensions of a sustainable system.
3. What’s the significance of sustainability in the present context?
4. Name few fair trade practices.
5. State the techniques of “3R” methods.
6. What do you mean by “LCA”?
7. Name any six natural fibres.
8. Name any four regenerated fibres.
9. State the objectives of clean clothes campaign.
10. What do you mean by “Slow fashion”?

Understand

1. Compare sustainable and fashion.
2. Differentiate between Upcycling and downcycling?
3. Classify “LCA”.
4. Distinguish between carbon footprint and water footprint.
5. Compare and contrast mechanical and chemical recycling.
6. Summarize the various ways of making a garment sustainable one.
7. Formulate the requirements of eco-fashion.
8. Elaborate on “ISO 14001 Environmental Management System”.
9. Summarize the Best Available Techniques followed by European Union.
10. Discuss on the challenges in the production of sustainable textiles.

Apply

1. Demonstrate the sustainale practices in the production of apparel.
2. Compute the carbon foot print of a garment industry.
3. Elaborate on the process of garment produced from natural fibres.
4. Relate the social changes to nature of fashion today.
5. Show the relationship between sustainable and eco fashion.
6. Demonstrate the phenomenon of fashion with reference to sustainable eco fashion.
7. Predict the characteristics of organic fibres.
8. Represent women’s identity though fashion images
9. Relate the social changes to nature of fashion today.
10. Elobrate on the process of challenges in sustainability.

Analyse / Evaluate / Create

1. How a product can be analyzed for its sustainability? Elaborate them.
2. Critically analyze cradle to grave and cradle to cradle techniques in the development of apparel.
3. How can you assess a fibre for its recyclaibity?
4. Evaluate the sustainable practicses of Levi’s.
5. Is sustainability and fashion one and the same or different? Criticize.
6. Design and develop a cradle to cradle garment.
7. Create apparel that’s easy to recycle.

15FT704 RESEARCH METHODOLOGY 3 0 0 3

Course Objectives

- To impart knowledge on latest research on apparel technology and to utilize various research tools
- To induce to do research apparel technology
- To be able to do research on apparel technology

Course Outcomes (COs)

1. Distinguish different types of research and implement the appropriate research techniques in the field of fashion study
2. Devise suitable design of experiments for their research projects in fashion technology
3. Prepare research dissertation reports and present them

UNIT I **9 Hours**

TYPES OF RESEARCH

Types of research, exploratory research, conclusive research, modeling research, algorithmic research. Research Design- Quantitative and Qualitative design. Research process and steps. Data collection methods- Primary data -observation method, personal interview, telephonic interview, mail survey, questionnaire design. Secondary data-internal sources of data, external sources of data.

UNIT II **9 Hours**

SCALES AND SAMPLING.

Scales , measurement and types of scale, Conbrach alpha, Kendall's Coefficient of concordance. Sampling methods- Probability sampling methods - simple random sampling with replacement, simple random sampling without replacement, stratified sampling, cluster sampling.

UNIT III **9 Hours**

HYPOTHESIS TESTING AND ANOVA

Hypotheses testing - Testing of hypotheses concerning means (one mean and difference between two means -one tailed and two tailed tests), Concerning variance - one tailed Chi-square test. t- test and F test.ANOVA , One way, Two way ANOVA

UNIT IV **9 Hours**

DESIGN OF EXPERIMENTS

Design of experiments: Comparative, Screening / Characterization, Modeling, Optimization. Application of Factorial, Response surface, Taguchi method and Factor analysis.

UNIT V **9 Hours**

REPORT WRITING

Report writing- Types of report, guidelines to review report, typing instructions, oral presentation and References.

FOR FURTHER READING

Review of research papers from textile, apparel, and fashion related impact factor refereed journals

Total: 45 Hours

Reference(s)

1. Kothari, C.R., Research Methodology -Methods and techniques, New Age Publications, New Delhi, 2009.
2. Panneerselvam. R., Research Methodology, Prentice-Hall of India, New Delhi, 2004.
3. Jiju Antony, Design of Experiments for Engineers and Scientists, Butterworth-Heinemann, 2003

4. Lennart Eriksson, Design of Experiments: Principles and Applications, MKS Umetrics AB, 2008
5. https://www.minitab.com/
6. www.ibm.com/software/analytics/spss/

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					3					3			3				4					5		20
2		2				3					4			2					4				5		20
3		2			3						4				2				4				5		20
4		2				3	3				2				4			4					2		20
5		2				3					3				1			4					6		20
6																									0
																								Total	100

Assessment Questions

Remember

1. What are the characteristics of observation?
2. How do you differentiate observation from experiment?
3. State the formula for simple correlation coefficient.
4. State the properties of the correlation coefficient.
5. What is ‘rank correlation’?
6. State the formula for rank correlation coefficient.
7. State the formulae for the constant term and coefficient in the regression equation.
8. State the relationship between the regression coefficient and correlation coefficient.
9. What is sampling? Explain its main merits and demerits.
10. What are null and alternative hypothesis?

Understand

1. What are the techniques involved in defining a research problem?
2. What are the important concepts relating to research design? Explain.
3. What do you mean by ‘Sample Design’? What points should be taken into consideration by a researcher in sample design for any research project?
4. What are the important steps of data preparation process?
5. What are the classifications of measurement scales?
6. What is analysis of variance?
7. Give an example to illustrate the same.
8. What are the various methods of Linear Regression Analysis?
9. What is factor analysis?
10. What is cluster analysis?

Apply

1. Briefly describe the different steps involved in a research process.
2. Enumerate the different methods of collecting data giving one example each.
3. Explain how sampling and statistical inference are useful for any research work
4. Explain in detail.
5. Discuss about measures of central tendency and how they are useful in any research work.
6. Apply formal experimental design and control in apparel production
7. Demonstrate the concept of cronbach alpha in affirming the reliability of market study
8. Predict the risk involved in formulating a proposition by inductive reasoning.
9. Execute a market research strategy to identify customer behavior for a target segment.

Analyse / Evaluate / Create

1. Explain the difference between two group discriminant analysis and multiple discriminant analysis with examples.
2. Explain the difference between hierarchical clustering and non-hierarchical clustering
3. Distinguish between positive and negative correlation
4. How will you evaluate type i error and type ii error?
5. What is Chi-Square test? Explain the significance in statistical analysis of any research problem.
6. What is testing of hypothesis? Explain how it is useful for illustrating a research problem with two examples.
7. Create a complex factorial design for identifying the performance of polyester sewing thread.
8. Create a step by step procedure for normal equations in the context of regression analysis.

15FT707 FASHION COLLECTION AND PORTFOLIO LABORATORY

0 0 2 1

Course Objectives

- To enable students develop fashion designs for target segment
- To impart the knowledge of constructing real life fashion products for the corresponding design
- To impart the knowledge of developing catalogue for communicating the product values

Course Outcomes (COs)

1. Develop fashion designs for target segment
2. Translate the fashion design into products
3. Develop catalogue for communicating the product values

3 Hours

EXPERIMENT 1

Identify an inspiration, collect defined pictures of inspiration, arrange them in the form of a visual story in sequential manner. Minimum 11- 15 Page booklet condensed from 50 or more photos

3 Hours

EXPERIMENT 2

Develop characteristic shapes, curves and angles from the inspiration images. Prepare a sketch journal. Minimum 21-25 characteristic shapes, curves and angles.

3 Hours

EXPERIMENT 3

Develop silhouettes incorporating these characteristic shapes, curves and angles by manipulating their size, scale and proportion. Minimum 21-25 silhouettes in black and white only.

3 Hours

EXPERIMENT 4

Create a color palette (minimum 6-8 colors per mood X 3). Develop 11- 15 full illustrations (Pre-look board) rendered in oil pastels or pik pen or chisel marker or copic marker or water color medium.

3 Hours

EXPERIMENT 5

Map the Pre-look full illustrations to the clients profile and finalize the look board.

3 Hours

EXPERIMENT 6

Prepare full patterns for the best eight illustrations and determine the fabric requirements based on the draping behavior and functional requirements.

3 Hours

EXPERIMENT 7

Prepare mock samples of the chosen full Illustrations, verify drape lines and identify the constraints.

3 Hours

EXPERIMENT 8
Develop a fabric board for the design collection

3 Hours

EXPERIMENT 9
Prepare final mood board for the design collection

3 Hours

EXPERIMENT 10
Source fabrics and stitch 8 sample garments showing your full collection

Total: 30 Hours

15FT708 FASHION PRODUCT SOURCING, ANALYSIS AND DEVELOPMENT LABORATORY

0 0 2 1

Course Objectives

- To train the students in calculating material consumption for the fashion product.
- To impart the knowledge of executing sourcing activities for the materials identified in the fashion product
- To equip them develop technical specification for the fashion product

Course Outcomes (COs)

1. Calculate material consumption for the fashion product
2. Execute the sourcing activities for the materials identified in the fashion product
3. Develop samples and technical specification for the fashion product

3 Hours

EXPERIMENT 1
Analyze the chosen garment, calculate fabric consumption and prepare BOM.

3 Hours

EXPERIMENT 2
Develop material specification, work alternative options for materials and prepare costing sheet for three development options.

3 Hours

EXPERIMENT 3
Source materials, prepare patterns and construct proto sample in muslin / grey poplin fabric.

3 Hours

EXPERIMENT 4
Develop technical specification for stitch class and seams, color fastness, pilling, bond strength and appearance tests.

3 Hours

EXPERIMENT 5
Prepare fit samples in alternating sizes (minimum 3 sizes), verify grading rules and finalize measurement specification. (note: original fabric should be used)

3 Hours

EXPERIMENT 6
Develop specification for artworks. Formulate grade rules and placement options for artworks (print and embroidery)

3 Hours

EXPERIMENT 7
Prepare 3 sets of final sample (size set samples can be used) and perform garment performance test for appearance retention, pilling, color fastness - wet and dry, seam slippage, bond strength

3 Hours

EXPERIMENT 8
Compare the test results with developed technical specification and finalize the standards for production

3 Hours

EXPERIMENT 9
Prepare a fabric sourcing plan for bulk.

3 Hours

EXPERIMENT 10
Prepare an operation bulletin for the chosen garment.

Total: 30 Hours

15FT709 MINI PROJECT V **0 0 2 1**

Course Objectives

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Course Outcomes (COs)

1. Formulate a real world problem, identify the requirement and develop the design solutions.
2. Express the technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Prepare report and present the oral demonstrations

15GE710 LIFE SKILLS : COMPETITIVE EXAMS 0 0 2 -

Course Objectives

- To expose the undergraduate students to such methods and practices that help, develop and nurture qualities such as character, effective communication, aptitude and holding ethical values

Course Outcomes (COs)

1. Interpret the perspectives of visual contents present in the fashion images and art.
2. Use the knowledge of abstraction techniques and develop textures, shapes and forms.
3. Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions
4. Improve their performance in the verbal ability sections of different competitive examinations.
5. Listen, Read, Speak, and Write Business English to the level of becoming independent users

UNIT I **6 Hours**

FUNDAMENTALS ON DRAWING

Perspective drawing, Planar drawing, Abstracting & Color rendering, Rules of composition, Illustration & Accessories coordination

UNIT II **6 Hours**

INDIAN TRADITIONAL TEXTILES

Indian traditional textiles & Interpretation of visual images, elements and principles of design Fashion brands, Fashion icons, fashion innovators, store concepts & retail strategies

UNIT III **6 Hours**

INDIAN TRADITIONAL PRINTING TEXTILES

Indian traditional printing techniques & surface embellishment techniques

UNIT IV **6 Hours**

APTITUDES

Maths aptitude – ratios, percentages, plane geometry, work allocation, averages, proportions, time distance & speed and shares

UNIT V **6 Hours**

COMMUNICATION

English – comprehension and verbal reasoning

Total: 30 Hours

Reference(s)

1) NIFT, NID, IIFT Entrance Examination 2016 (English) 7th Edition
2) Success Master - NIFT / NID / IIFT Entrance Examination 2015 (English) 6th Edition (Paperback)
3) NIFT - 10 Practice Sets (English) 2nd Edition (Paperback)
4) NIFT/NID/IIFT Entrance Exam Guide (English) 01 Edition (Paperback)
5) NIFT: National Institute of Fashion Technology, Entrance Exam for Group A, B and C (English) 2nd Edition (Paperback)
6) Study Package for NIFT, NID & IIFT Entrance Exam 2012 (English) (Paperback)
7) Nift/Nid/Iift Entrance Exam 2016 (Paperback)
8) NIFT / NID and IIFT Entrance Exam 2014 {PB} (English) (Paperback)

15FT804 PROJECT WORK

- - - 9

Course Objectives

- To develop knowledge to formulate a real world problem and project's goals.
- To identify the various tasks of the project to determine standard procedures.
- To identify and learn new tools, algorithms and techniques.
- To understand the various procedures for validation of the product and analysis the cost effectiveness.
- To understand the guideline to Prepare report for oral demonstrations.

Course Outcomes (COs)

1. Formulate a real world problem, identify the requirement and develop the design solutions.
2. Express the technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Prepare report and present the oral demonstrations.

LANGUAGE ELECTIVES

15LE101 BASIC ENGLISH I 3 0 0 3

Course Objectives

- To offer students the basics of the English Language in a graded manner.
- To promote efficiency in English Language by offering extensive opportunities for the development of all the four language skills (LSRW) within the classroom.
- To focus on improving and increasing vocabulary.
- To improve spelling and pronunciation by offering students rigorous practice and exercises.

Course Outcome (COs)

The students will be able to

1. Converse in English with more confidence.

Unit I **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
1	Basic words- 12 most used words in English, usage and pronunciation	Starting a conversation and talking about what one does	Sentence construction bolstered by mother tongue
2	Basic words- 20 often used words, usage and pronunciation	Analysing an action plan	Creating and presenting one's own action plan
3	Basic words with a focus on spelling	Discriminative listening	Informal conversation
4	Basic words- 10 oft used words, usage and pronunciation	Content listening and Intonation	Reading comprehension
5	Unit Test I		

Unit II **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
6	Basic words + greetings to be used at different times of the day	Formal conversation	Intonation to be used in formal address
7	Last 28 of the 100 most used words	Informal conversation between equals	Reading practice and peer learning
8	Using the 14 target words to form bigger words	Informal dialogues using contracted forms	Guided speaking- talking to peers using contracted forms
9	Palindromes, greetings- good luck, festivals	Placing a word within its context- culling out meaning	Offering congratulations
10	Unit Test II		

Unit III **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
11	Homophones	Formal and informal methods of self-introduction	Let's Talk is a group activity that gives them some important pointers of speech
12	Homophone partners, matching words with their meanings	Contracted forms of the – be verbs, 've and 's	Translating English sentences to Tamil
13	Briefcase words- finding smaller words from a big word	Formal and informal ways of introducing others	Team work- speaking activity involving group work, soft skills
14	Compound words and pronunciation pointers	Giving personal details about oneself	Using the lexicon
15	Unit Test III		

Unit IV **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
16	Proper and common nouns	Asking for personal information and details	Pronunciation pointers- an informal introduction to the IPA
17	Pronouns	Telephone skills and etiquette	Reading aloud and comprehension
18	Abstract and common nouns	Dealing with a wrong number	Reading practice and comprehension
19	Group names of animals, adjectives	Taking and leaving messages on the telephone	Pronunciation pointers
20	Unit Test IV		

Unit V **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
21	Determiners	Interrupting a conversation politely- formal and informal	Pair work reading comprehension
22	Conjugation of the verb 'to be'- positive and negative forms	Thanking and responding to thanks	Comprehension questions that test scanning, skimming and deep reading
23	Am/is/are questions	Giving instructions and seeking clarifications	Small group activity that develops dialogue writing
24	Present continuous tense-form and usage	Making inquiries on the telephone	Finishing sentences with appropriate verbs
25	Unit Test V		

Unit VI **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
26	Words with silent 'b' Present continuous questions	Calling for help in an emergency	Dialogue writing
27	Words with silent 'c' Simple present tense- form and usage	Making requests and responding to them politely	Identifying elements of grammar in text extract
28	Simple present tense- rules	Describing people	Guided writing
29	Words with silent 'g' Questions in the simple present tense	Describing places	Filling in the blanks with correct markers of tense
30	Unit Test VI		

Total: 45 Hours

Reference(s)

1. Basic English Module, L&L Education Resources, Chennai, 2011.

15LE102 COMMUNICATIVE ENGLISH I 3 0 0 3

Course Objectives

- To acquire effective listening and reading skills
- To develop speaking and writing skills
- To improve their understanding of grammar, vocabulary and pronunciation

Course Outcomes (COs)

1. Develop their fluency and language competency in English

9 Hours

UNIT I: GRAMMAR

Content words- Structural words - Subject - Verbs and verb phrase - Subject - Verb agreement - Tenses - Active voice and passive voice - Sentence types (declarative, imperative, exclamatory & interrogative) - Framing questions - Comparative adjective

9 Hours

UNIT II: LISTENING

Listening for specific information: Short conversations / monologues - Gap filling - Telephone conversations - Note-taking - Listening for gist / interviews - Listening to songs and completing the lyrics - Clear individual sounds - Word stress - Telephone etiquette

9 Hours

UNIT III: READING

Prediction - Skimming for gist - Scanning for specific information - Understanding text and sentence structure

9 Hours

UNIT IV: WRITING

Short documents: E-mail - memo - note - message- notice -advertisement -Short reports / proposals - Principles of writing a good paragraph: Unity, cohesion and coherence -Identifying the topic sentence and controlling ideas - Paragraph writing (descriptive, narrative, expository & persuasive)

7 Hours

UNIT V: SPEAKING

Self-introduction -Giving personal and factual information - Talking about present circumstances, past experiences and future plans - Mini-presentation - Expressing opinions and justifying opinions - Agreement / disagreement - Likes and dislikes - Speculation - Tongue twisters

2 Hours

FOR FURTHER READING

Self-Study: Novel Reading -Book Review

Total: 45 Hours

Reference(s)

1. Murphy, Raymond. English Grammar in Use - A Self-Study Reference and Practice Book for Intermediate Learners of English .IVed. United Kingdom: Cambridge University Press. 2012.
2. Seely, John. Oxford Guide to Effective Writing and Speaking. Indian ed. New Delhi: Oxford University Press. 2005.
3. 3. Anderson, Kenneth etal. Study Speaking: A Course in Spoken English for Academic Purposes. United Kingdom: Cambridge University Press. 2004.

15LE201 BASIC ENGLISH II

3 0 0 3

Course Objectives (COs):

- To give room for a natural acquisition of Basic English Grammar through ample listening, reading and writing inputs
- To specifically focus on speaking and conversation skills with an aim to increase speaking ability
- To improve Spelling and Pronunciation by offering rigorous practice and exercises

Course Outcome (CO):

The students will be able to

1. Communicate better with improved fluency, vocabulary and pronunciation.

Unit I **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
31	Difference between Present Continuous and Simple Present tense.	Calling for help in an emergency	Reporting an event-journalistic style
32	Verbs ‘have’ and ‘have got’	Describing animals	Asking for and giving directions
33	Simple Past Tense	Inviting people, accepting and declining invitations	Self- enquiry and offering one’s opinion on a given topic.
34	Spelling rules & table of Irregular Verbs	Refusing an invitation	Reading and practicing pre-written dialogues
35	Unit Test I		

Unit II **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
36	Questions and the negative form of the simple past tense	Apologizing and responding to an apology	(Reading) conversation practice
37	Asking questions in the simple past tense	Reading comprehension	Seeking, granting and refusing permission
38	Past continuous tense	Paying compliments and responding to them	Pair work: writing dialogues and presenting them
39	Difference between simple past and past continuous- when and where to use each	Describing daily routines	Reading and comprehension skills
40	Unit Test II		

Unit III **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
41	Simple future tense	Talking about the weather	Making plans- applying grammar theory to written work
42	Simple future tense- more aspects, possessive pronouns	Talking about possessions	Opening up and expressing one's emotions
43	Future continuous tense	Talking about current activities	Listening comprehension
44	Revision of future tense- simple and continuous forms, prepositions used with time and date	Asking for the time and date	Discussion- analyzing and debating a given topic
45	Unit Test III		

Unit IV **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
46	Articles a/an	Writing, speaking and presentation skills	Transcribing dictation
47	Singular- Plural (usage of a/an)	Reading practice- independent and shared reading	Comprehension –logical analysis, process analysis and subjective expression
48	Countable and uncountable nouns- a/an and some	Listening comprehension	Vocabulary: using context tools to decipher meaning
49	Articles- the	Sequencing sentences in a paragraph	Listening to a poem being recited, answer questions on it and practice reciting the same
50	Unit Test IV		

Unit V **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
51	Articles- the: usage and avoidance	Speaking: sharing stories about family, village/town, childhood, etc. 10 students	Listening: comprehend and follow multiple step instructions read out by the teacher
52	Articles- the: usage and avoidance with like and hate	Speaking: sharing stories about family, village/town, childhood, etc. 10 students	Reading: make inferences from the story about the plot, setting and characters
53	Articles- the: usage and avoidance with names of places	Speaking: sharing stories about family, village/town, childhood, etc. 10 students	Comprehension passage
54	This/ that/ these and those	Writing a notice-announcement	Speaking: Debate
55	Unit Test V		

Unit VI **7.5 Hours**

Module	Vocabulary/ Grammar	Skills Sets	Skill Sets
56	One and ones	Collaborative learning- problem solving	Writing short answers to questions based on reading
57	Capitalization and punctuation	Controlled writing	Listen to a story and respond to its main elements
58	Syntax and sentence construction-rearrange jumbled sentences	Guided writing	Listen to a poem and discuss its elements
59	Cloze	Free writing	Frame simple yet purposeful questions about a given passage
60	Unit Test VI		

Total: 45 Hours

Reference(s)

1. Basic English Module, L&L Education Resources, Chennai, 2011.

15LE202 COMMUNICATIVE ENGLISH II 3 0 0 3

Course Objectives

- To acquire skills for using English in workplace effectively
- To communicate for essential business needs
- To prepare students for taking BEC Vantage level examination which is an International Benchmark for English language proficiency of Cambridge English Language Assessment (CELA)
- To enhance the communicative ability from Intermediate to Upper Intermediate level

Course Outcomes (COs)

1. To enable students to get International recognition for work and study.
2. To use English confidently in the International business environments.
3. To be able to take part in business discussion, read company literature, write formal and informal business correspondences and listen and understand business conversations.

UNIT I **9 Hours**

GRAMMAR AND VOCABULARY

Simple, compound and complex sentences - Direct and indirect speech - Conditionals - Business vocabulary - Collocations -Discourse markers

UNIT II **9 Hours**

LISTENING

Listening to identify topic, content, function - Sentence stress - Rhythm - Intonation

UNIT III **9 Hours**

READING

Reading graphs and charts - Skimming and scanning texts - Job advertisements - Read business articles for specific information - Understanding the structure of a text - Error identification

UNIT IV **9 Hours**

WRITING

Formal and Informal English - Longer Documents: writing individual paragraphs to longer text, Business Correspondence, Reports and Proposals - Transcoding

UNIT V **7 Hours**

SPEAKING

Collaborative task - Turn taking (initiating and responding appropriately) - Negotiating - Exchanging information - Language Functions: suggesting - comparing and contrasting - expressing - Finding out facts, attitudes and opinions - Commonly mispronounced words

UNIT VI **2 Hours**

FOR FURTHER READING

Reading Novels (The Monk Who Sold His Ferrari by Robin Sharma; Three Mistakes of my Life by Chetan Bhagat; The Fountainhead by Ayn Rand)

Total: 45 Hours

Reference(s)

1. Jeremy Comfort, Pamela Rogerson, Trish Stott, and Derek Utley, Speaking Effectively Developing Speaking Skills for Business English, Cambridge: Cambridge University Press, 2002.
2. Eric H. Glendinning and Beverly Holmstrom, Study Reading: A Course In Reading for Academic Purposes.United Kingdom: Cambridge University Press, 2004.

15LC203 CHINESE

3 0 0 3

Course Objectives

- To help students acquire the basics of Chinese language
- To teach them how to converse in Chinese in various occasions
- To teach the students the Chinese cultural facets and social etiquettes

Course Outcomes (COs)

1. An ability to communicate effectively
2. Improve fluency in Chinese
3. Clarity on the basic sounds of the Chinese Language

UNIT I **9 Hours**

Nǐ hǎ o 你好

Xuéhuì wènhòu de jīběn biǎodá yòngyǔ - 学会问候的基本表达用语 ; Xuéhuì jièshào zìjǐ de xìngmíng, guójí - 学会介绍自己的姓名，国际 ; Xuéhuì hànyǔ pīnyīn de shèngmǔ - 学会汉语拼音的圣母 ; yùnmǔ hé shēngdiào - 韵母和声调 ; Pīn dú hé shēngdiào liànxí - 拼 读 和声调 练习

UNIT II **9 Hours**

Xiànzài jǐ diǎ n 现在 几 点

Xuéhuì shíjiān, rìqí de biǎodá - 学会时间，日期的表达 ; Rèshēn - 热身 ; Shēngcí - 生词 ; Jùzi - 句子 ; Huìhuà - 会话 ;Huódòng - 活动 ; Kàn tú wánchéng huìhuà - 看 图 完成 会话 ; Xué cíyǔ shuō shíjiān ; Tìhuàn liànxí - 替换练习Dú yī dú ránhòu lián xiàn - 读一读然后连线 ; Bǎ xiàmiàn de cí àn zhèngquè de shùnxù páiliè chéngjù - 把下面的词 按 正确的 顺序排列成句

UNIT III **9 Hours**

Nà jiàn máoyī zěnme mài - 那件毛衣 怎 ▪ 卖

Xúnwèn jiàqián jí qián de biǎodá - 询问价钱及钱的表达 ; Tǎojiàhuánjià - 讨价还 价 ; Tíchū duì suǒ mǎi dōngxī dàxiǎo, yánsè děng děng jùtǐ yāoqiú - 提出 对所买 东西大小 ， 颜色 等等具体要求 ; Shēngcí Huódòng - 活动 ; Kàn tú wánchéng huìhuà - 看 图 完成 会话 ; Xué cíyǔ shuō shíjiān ;Dú yī dú ránhòu lián xiàn - 读一读然后连线 ;Tīng lùyīn xuǎnzé zhèngquè dá'àn - 听 录音选择正确答 案 ; Bǔchōng cíyǔ biǎo - 补充词语表

UNIT IV **9 Hours**

Xuéhuì xúnwèn jiātíng qíngkuàng, zhíyè hé niánlíng - 学会询问家庭情况， 职业和年龄

Xuéhuì diǎn cài tí yāoqiú jiézhàng - 学会点菜 提要求结账 ; Shēngcí - 生词 ; Jùzi - 句子 ; Huìhuà - 会话 ;Huódòng - 活动 ; Kàn tú wánchéng huìhuà - 看 图 完成 会话 ; Xué cíyǔ shuō shíjiān ;Dú yī dú ránhòu lián xiàn - 读一读然后连线 ;Tīng lùyīn xuǎnzé zhèngquè dá'àn - 听 录音选择正确答 案 ; Bǔchōng cíyǔ biǎo - 补充词语表Juésè bànyǎn - 角色 扮演 ; Tīng lùyīn pànduàn duì cuò - 听录音判断对错

UNIT V **9 Hours**

Nǐ zài nǎ 'er gōngzuò - 你在哪儿工作

Xuéhuì xúnwèn jiātíng qíngkuàng, zhíyè hé niánlíng - 学会询问家庭情况，职业和年龄 Shēngcí - 生词；Jùzi - 句子；Huìhuà - 会话；Huódòng - 活动；Kàn tú wánchéng huìhuà - 看图完成会话 ;Tīng lùyīn xuǎnzé zhèngquè dá'àn - 听录音选择正确答案；Bǔchōng cíyǔ biǎo - 补充词语表 - Tīng lùyīn xuǎnzé zhèngquè dá'àn - 听录音选择正确答案；Bǔchōng cíyǔ biǎo - 补充词语表

Total: 45 Hours

Textbooks:

1. Tiyan Hanyu Shenghuo Pian "*Experiencing Chinese*" Ying Yu Ban Di 1 Ban. Beijing: Higher Education Press: Gao deng jiao hu chu ban she. 2011

Reference books:

1. Mandarine Day - *Hancel Don :* Chinese learning Software
2. My Chinese Classroom - *David J. White*

Websites:

www.chinesexp.com.cn
www.yiwen.com.cn

15LF203 FRENCH 3 0 0 3

Course Objectives

- To help students acquire the basics of French language
- To teach them how to converse in French in various occasions

Course Outcomes (COs)

1. The students will become familiar with the basics of French language and start conversing in French.

6 Hours

UNIT 1

Alphabet Français (alphabets) - Les Accents Français (the accents in French) - aigu - grave - circonflexe - tréma cédille - écrire son nom dans le français (spellingone-sname in French) - Les noms de jours de la semaine (Days of the week)

6 Hours

UNIT 2

Les noms de mois de l'année (Months) - Numéro 1 à 100 (Numbers 1 to 100) GRAMMAIRE :Conjugaison

10 Hours

UNIT 3

Moyens de transport (Transport) - Noms de Professions (Professions) - Noms d'endroits communs (Places) - Nationalités (Nationalities) ECOUTER : (Listening) Écouter l- alphabet associéà des prénoms français - Écouter et répondre PARLER (Speaking) Présntation - même /Présentez - Vous (Introducingoneself) LIRE :Lireles phrases simples

12 Hours

UNIT 4

Pronoms (Pronouns) - Noms communs masculins et de femme (Common masculine and Femininenouns) - Verbes communs (Common verbs)COUTER :couter et crier les prnoms - Observer les dessins et couter les dialogues LIRE : Lire les profils d'utilisateurs d'interlingua (alter ego)PARLER :Parler de sa ville - Parler de sa profession

11 Hours

UNIT 5

Narration de son nom et l'endroit où on vit - Son âge et date de naissance - Numéro de téléphone et'dresse - Narration du temps - La France en Europe PARLER :Conversation entre deux amis - Jouer la scène ÉCOUTER :Ecouter les conversations (CD alter ego)ÉCRIRE :Écrireune carte postale

Total: 45 Hours

Reference(s)

1. Alter ego+ Niveau a1 ,Catherine Hugot,, HACHETTE LIVRE 2012
2. Cahier alter ego+
3. Grammaire Progressive du Français, CLE international, 2010
4. Collins Easy Learning French Verbs& Practice, Harpercollins, 2012
5. Barron's Learn French, 3rd edition
6. FrançaisLinguaphone, Linguaphone Institute Ltd., London, 2000. FrançaisI.Harrisonburg: The Rosetta Stone: Fairfield Language Technologies, 2001.

15LG203 GERMAN 3 0 0 3

Course Objectives

- To help students acquire the basics of German language
- To teach them how to converse in German in various occasions

Course Outcomes (COs)

1. An ability to communicate effectively with: (a) Clarity on the basic sounds of the German language (b) Improved fluency in German (c) Proper vocabulary

UNIT I **9 Hours**

GRAMMAR

Introduction to German language: Alphabets, Numbers - Nouns - Pronouns Verbs and Conjugations - definite and indefinite article - Negation - Working with Dictionary - Nominative - Accusative and dative case - propositions - adjectives - modal auxiliaries - Imperative case - Possessive articles.

UNI II **9 Hours**

LISTENING

Listening to CD supplied with the books, paying special attention to pronunciation: Includes all lessons in the book - Greetings - talking about name - country - studies - nationalities - ordering in restaurants - travel office - Interaction with correction of pronunciation.

UNIT III **9 Hours**

SPEAKING

Speaking about oneself - about family - studies - questions and answers - dialogue and group conversation on topics in textbooks - talks on chosen topics.

UNIT IV **9 Hours**

READING:

Reading lessons and exercises in the class - pronunciation exercises: Alphabet : name, country, people, profession, family, shopping, travel, numbers, friends, restaurant,studies - festivals

UNIT V **9 Hours**

WRITING

Alphabets, numbers - words and sentences - Exercises in the books - control exercises - writing on chosen topics such as one self, family,studies - country.

Total: 45 Hours

Reference(s)

1. Grundkurs DEUTSCH A Short Modern German Grammar Workbook and Glossary, VERLAG FUR DEUTSCH, Munichen, 2007.
2. Grundkurs, DEUTSCH Lehrbuch Hueber Munichen, 2007.
3. Cassel Language Guides - German: Christine Eckhard, Black & Ruth Whittle, Continuum, London / New York, 1992.

15LH203 HINDI 3 0 0 3

Course Objectives

- To help students to acquire the basics of Hindi
- To teach them how to converse in Hindi on various occasions
- To help learners acquire the ability to understand a simple technical text in Hindi

Course Outcomes (COs)

1. An ability to communicate effectively with: (a) Improved fluency in Hindi (b) Clarity on the basic sounds of the Hindi language (c) Proper vocabulary

UNIT I **9 Hours**

HINDI ALPHABET

Introduction - Vowels - Consonants - Plosives - Fricatives - Nasal sounds - Vowel Signs - Chandra Bindu&Visarg -Table of Alphabet -Vocabulary.

UNIT II **9 Hours**

NOUNS IN HINDI

Genders (Masculine & Feminine Nouns ending in a ,e,i,o, u,)- Masculine & Feminine - Reading Exercises.

UNIT III **9 Hours**

PRONOUNS AND TENSES

Categories of Pronouns - Personal Pronouns - Second person (you & honorific) - Definite & Indefinite pronouns - Relative pronouns - Present tense - Past tense - Future tense - Assertive & Negative Sentences - Interrogative Sentences.

UNIT IV **9 Hours**

CLASSIFIED VOCABULARY

Parts of body - Relatives - Spices- Eatables- Fruit & Vegetables - Clothes - Directions-Seasons - Professions.

UNIT V **9 Hours**

SPEAKING

Model Sentences - Speaking practice for various occasions.

Reference(s)

1. Syed, PrayojanMulak Hindi, RahamathullahVaniPrakasan, New Delhi, 2002.
2. Ramdev, VyakaranPradeep, SaraswathiPrakasan, Varanasi, 2004.
3. B. R. Kishore, Self Hindi Teacher for Non-Hindi Speaking People, Vee Kumar Publications Ltd., New Delhi, 2009.

15LJ203 JAPANESE **3 0 0 3**

Course Objectives

- To help students acquire the basics of Japanese language
- To teach them how to converse in Japanese in various occasions
- To teach the students the Japanese cultural facets and social etiquettes

Course Outcomes (COs)

1. An ability to communicate effectively with: (a) Improved fluency in Japanese (b) Clarity on the basic sounds of the Japanese language (c) Proper vocabulary

UNIT I **9 Hours**

Introduction to Japanese - Japanese script - Pronunciation of Japanese(Hiragana) - Long vowels - Pronunciation of in,tsu,ga - Letters combined with ya,yu,yo - Daily Greetings and Expressions - Numerals. N1 wa N2 des - N1 wa N2 ja arimasen - S ka - N1mo - N1 no N2 - .san - Kanji - Technical Japanese Vocabulary (25 Numbers) - Phonetic and semantic resemblances between Tamil and Japanese

UNIT II **9 Hours**

Introduction - Kore - Sore - are - Kono N1 - Sono N1 - ano N1 - so des - so ja arimasen - S1 ka - S2 ka - N1 no N1 - so des ka ' koko - soko - asoko - kochira - sochira - achira - N1 wa N2 (Place) des - dhoko-N1 no N2 - Kanji-10 - ima-.ji-fun des - Introduction of verb - V mas - V masen - V mashitha - V masen deshitha - N1(Time) ne V - N1 kara N2 des - N1 tho N2 / S ne Kanji-10 - Technical Japanese Vocabulary (25 Numbers) - Dictionary Usage.

UNIT III **9 Hours**

- N1(Place) ye ikimas - ki mas - kayerimasu - Dhoko ye mo ikimasen - ikimasendheshitha - N1(vehicle) de ikimasu - kimasu - kayerimasu - N1(Personal or Animal) tho V ithsu - S yo. - N1 wo V (Transitive) - N1 wo shimus - Nani wo shimasu ka - Nan & Nani - N1(Place) de V - V masen ka - V masho - Oo. Kanji-10 , N1(tool - means) de V - Word / Sentence wa go nan des ka - N1(Person) ne agemus - N1(Person) ne moraimus - mo V shimashitha - , Kanji-10 - Japanese Typewriting using JWPCE Software, Technical Japanese Vocabulary (25 Numbers)

UNIT IV **9 Hours**

Introduction to Adjectives - N1wanaadj des. N1 wa ii adj des - naadjna N1 - ii adj ii N1 - Thothemo - amari - N1 wadho des ka - N1 wadhonna N2 des ka - S1 ka S2 - dhore - N1 gaarimasu - wakarimasu - N1 ga suki masu - N1 gakiraimasu - jozu des - hetha des - dhonna N1 - Usages of yoku - dhaithai - thakusan - sukoshi - amari - zenzen - S1 kara S2 - dhoshithe, N1 gaarimasu - imasu - N1(Place) ne N2 gaarimasu - iimasu - N1 wa N2(Place) ne arimasu - iimasu - N1(Person,Place,or Thing) no N2 (Position) - N1 ya N2, Kanji-10 - Japanese Dictionary usage using JWPCE Software, Technical Japanese Vocabulary (25 Numbers)

Total: 45 Hours

UNIT V **9 Hours**

Saying Numbers , Counter Suffixes , Usages of Quantifiers -Interrogatives - Dhonokurai - gurai - Quantifier-(Period) ne -.kai V - Quantifier dhake / N1 dhake Kanji - Past tense of Noun sentences and na Adjective sentences - Past tense of ii-adj sentences - N1 wa N2 yoriadj des - N1 tho N2 tho Dhochiragaadj des ka and its answering method - N1 [no naka] de {nani/dhoko/dhare/ithsu} ga ichiban adj des ka - answering -N1 gahoshi des - V1 mas form dhake mas - N1 (Place) ye V masu form ne ikimasu/kimasu/kayerimasu - N1 ne V/N1 wo V - Dhokoka - Nanika - gojumo - Technical Japanese Vocabulary (25 Numbers)

Total: 45 Hours

.

Reference(s)

1. Japanese for Everyone: Elementary Main Textbook1-1, Goyal Publishers and Distributors Pvt. Ltd., Delhi, 2007.
2. 2. Japanese for Everyone: Elementary Main Textbook 1-2, Goyal Publishers and Distributors Pvt. Ltd., Delhi, 2007Software 1. Nihongo Shogo-1 2. Nihongo Shogo-2 3. JWPCE Software
3. www.japaneselifestyle.com
4. www.learn-japanese.info/
5. www.kanjisite.com/
6. www.learn-hiragana-katakana.com/typing-hiragana-characters/

PHYSICS ELECTIVES

15PH201 PHYSICS OF MATERIALS 3 0 2 4

Course Objectives

- To understand the physical properties of conductors, semiconductors and superconductors
- To recognize the basic principles of interaction of light with matter and working of optical devices
- To classify the types of dielectric, magnetic materials and polarization mechanisms with their properties

Course Outcomes (COs)

1. Exemplify the physical properties of conductors, superconductors and semiconductors with applications
2. Identify the suitable semiconducting material for solar cell applications
3. Select the suitable materials for insulating and dielectric applications
4. Compare the optical properties of display devices
5. Analyze the properties of magnetic materials for practical applications

UNIT I **9 Hours**

CONDUCTING AND SUPERCONDUCTING MATERIALS

Electrical and thermal conductivity of metals - Wiedemann Franz law - band theory of metals - density of states. Superconductors: properties - types - High Tc superconductors- applications.

UNIT II **10 Hours**

SEMICONDUCTORS

Elemental and compound semiconductors - intrinsic semiconductors: carrier concentration - electrical conductivity- band gap. Extrinsic semiconductors: carrier concentration - variation of Fermi level. Hall effect: theory and experimental determination -applications:Solar cells

UNIT III **9 Hours**

DIELECTRIC MATERIALS

Types of polarization: electronic, ionic, orientation and space charge polarization mechanisms - Langevin-Debye equation - frequency and temperature effects on polarization - dielectric strength and loss -dielectric breakdown mechanisms - active dielectric materials: pizo, pyro and ferroelectricity - applications.

UNIT IV **9 Hours**

OPTICAL MATERIALS

Interaction of light with materials - optical absorption - transmission - Luminescence in solids - Fluorescence and Phosphorescence - Optical band gap - LED ,LCD.

UNIT V **8 Hours**

MAGNETIC MATERIALS

Classification and properties - domain theory - hard and soft magnetic materials - anti-ferro and ferri magnetic materials - applications: magnetic recording and memories.

FOR FURTHER READING

Photonic crystals - LIFI

2 Hours

INTRODUCTION
Exposure to Engineering Physics Laboratory and precautionary measures

4 Hours

EXPERIMENT 1
Using Lees disc apparatus, determine the coefficient of thermal conductivity of a bad conductor.

4 Hours

EXPERIMENT 2
Find the band gap value of the given semiconductor diode. Based on the band gap value, identify the given semiconductor.

4 Hours

EXPERIMENT 3
With the aid of travelling microscope, find the refractive index of a transparent solid and liquid material.

4 Hours

EXPERIMENT 4
Determine the wavelength of polychromatic source in the visible region using spectrometer.

4 Hours

EXPERIMENT 5
Based on Hall effect, calculate the charge carrier density of a given semiconductor and identify the nature of the semiconductor.

4 Hours

EXPERIMENT 6
Draw the B-H curve of a ferromagnetic material subjected to external magnetic field and hence identify the nature of the material.

4 Hours

EXPERIMENT 7
Determine the V-I characteristics of a solar cell.

Total: 75 Hours

Reference(s)

1. Saxena, Gupta, Saxena, Mandal, Solid State Physics, Pragati Prakashan Educational Publishers, 13th revised edition, Meerut, India, 2013.
2. M.N. Avadhanulu and P.G. Kshirsagar, A Text Book of Engineering Physics, S. Chand & Company Ltd., New Delhi, 2011.
3. S. O. Pillai, Solid State Physics, New Age International Publications, New Delhi, 2010.
4. M.A. Wahab, N.K. Mehta, Solid state physics-structure and properties of materials, Narosa publishing house Pvt. Ltd, 6th edition, 2010.
5. Semiconductor Physics and Devices, Donald A. Neamen , Mc Graw-Hill, 2011.
6. P.K. Palanisamy, Materials Science, Scitech Publications India Pvt. Ltd, 2014.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	4	2		1	4	2		1	2			1	1											20
2	2		2		2		4		5	3			4												22
3	1	2	1		3	4			3	4			2												20
4	2	2			2	5			2	5			2												20
5	1	3			3	2	3		3	1			2												18
																								Total	100

Assessment Questions

Remember

1. State Meissner effect
2. List six properties of superconducting materials
3. Define photovoltaic effect
4. List the six common applications of dielectric materials
5. Retrieve optical absorption in metals
6. Reproduce the principle of LCD in display devices
7. Recall the term hysteresis in ferromagnetic materials
8. List four applications of magnetic materials
9. Recognize the need of optical band gap in differentiating the materials
10. Reproduce five applications of hard magnetic materials in day to day life

Understand

1. Explain the principle, construction and working of LED
2. Classify the three types of materials based on band gap energy
3. Interpret the working mechanism and characteristics of a solar cell
4. Illustrate Hall effect experiment used to find the concentration of charge carriers in n- type semiconductors and hence explain the necessary theory
5. Summarize the various dielectric breakdown mechanisms observed in dielectric materials
6. Infer the principle involved in working of magnetic levitation
7. Classify the two types of luminescence in solids with appropriate energy level diagrams
8. Subsume the four types of polarization mechanisms involved in dielectric materials
9. Illustrate the V-I characteristics of a solar cell
10. Extrapolate the Clausius Mosotti equation for the dielectric material which is subjected to external electric field

Apply

1. Free electron density of aluminum is 18.10x1028 m-3. Calculate its Fermi energy at 0K. Planck's constant and mass of free electron are 6.62x10-34 Js and 9.1x10-31 Kg
2. Compute the relation between Remanence and Coercivity
3. Demonstrate the domain theory of ferromagnetism
4. Derive the expressions for electrical and thermal conductivity of metals and hence compute the Wiedemann Frantz law
5. Compute the carrier concentration in intrinsic and extrinsic semiconductors
6. Calculate the number of free electrons per unit volume in a metal in terms of Fermi energy
7. Assess the Magnetic levitation and SQUIDS in day to day life
8. Show the importance of dielectric breakdown mechanisms in dielectrics
9. Implement the applications of dielectric materials in real world problems
10. Compute the relation between polarization vector and electric field (E)

Analyse

1. Differentiate Phosphorescence and Fluorescence
2. Can we increase the orientation polarization with increase in temperature? Justify
3. Justify the principle, construction, working, advantages and disadvantages of LCD
4. Compare hard and soft magnetic materials
5. Differentiate the ferromagnetic and anti-ferromagnetic materials with examples
6. Compare dia, para and ferromagnetic materials
7. Distinguish between polarization and polarizability
8. Differentiate elemental and compound semiconductors
9. Compare type I and type II superconductors
10. Compare LED and LCD

15PH202 APPLIED PHYSICS 3 0 2 4

Course Objectives

- To understand conducting, semiconducting, dielectric and magnetic properties of materials and exemplify their applications
- To analyze the basic concepts of thermodynamics and heat transfer with illustrations
- To gain knowledge about acoustical standards of buildings

Course Outcomes (COs)

1. Differentiate the materials based on their properties and suit them for appropriate applications
2. Select the suitable materials for insulating and dielectric applications
3. Investigate the working mechanisms and efficiency of heat engines by applying the laws of thermodynamics
4. Compare the different heat transfer mechanisms and its applications
5. Choose the proper acoustic materials for the construction of buildings

UNIT I **11 Hours**

CONDUCTORS AND SEMICONDUCTORS

Conductors: Classical free electron theory - electrical and thermal conductivity- Wiedemann - Franz law - merits and demerits of classical free electron theory - band theory - density of states. Semiconductors: Elemental and compound semiconductors - intrinsic semiconductors -Fermi level and electrical conductivity - band gap energy - extrinsic semiconductors - n-type and p-type semiconductors: variation of Fermi level with temperature (qualitative) - Hall effect - applications.

UNIT II **9 Hours**

DIELECTRIC AND MAGNETIC MATERIALS

Dielectrics: Fundamental terminologies - electronic and ionic polarizations - orientation polarization mechanism (qualitative) - space charge polarization - Langevin -Debye equation - dielectric loss - applications of dielectric and insulating materials.
Magnetic Materials: Properties of dia, para and ferromagnetic materials - domain theory of ferromagnetism - hysteresis curve - hard and soft magnetic materials - applications

UNIT III **9 Hours**

THERMODYNAMICS

Zeroth law of thermodynamics - Heat - equilibrium and quasistatic process - path functions - comparison between heat and work - internal energy - first law of thermodynamics - isothermal and adiabatic process - work done - reversible and irreversible process - second law of thermodynamics - entropy - enthalpy - Carnot ideal engine and its efficiency - Carnot's theorem-actual heat engine: Diesel engine and its efficiency

UNIT IV **9 Hours**

HEAT TRANSFER

Modes of heat transfer - thermal conductivity - heat capacity and diffusivity - rectilinear flow of heat - conduction through bodies in series and parallel - determination of thermal conductivity: good conductor: Searle's method - bad conductor: Lee's disc method - applications of heat transfer: formation of ice in ponds - conductivity of earth's crust and age of earth - practical applications

UNIT V **7 Hours**

ACOUSTICS

Classification of sound based on frequency - characteristics of audible sound - reverberation time: Sabine's formula - determination of absorption coefficient - Erying's formula (qualitative). Sound insulation - sound absorbing materials - factors affecting the acoustics of building - remedies

FOR FURTHER READING
Nanomaterials and its applications

2 Hours

INTRODUCTION
Exposure to Engineering Physics Laboratory and precautionary measures

4 Hours

EXPERIMENT 1
Using Lees disc apparatus, determine the coefficient of thermal conductivity of a bad conductor.

4 Hours

EXPERIMENT 2
Find the band gap value of the given semiconductor diode. Based on the band gap value, identify the given semiconductor.

4 Hours

EXPERIMENT 3
With the aid of traveling microscope, find the refractive index of a transparent solid and liquid material

4 Hours

EXPERIMENT 4
Determine the wavelength of polychromatic source in the visible region using spectrometer

4 Hours

EXPERIMENT 5
Based on Hall effect, calculate the charge carrier density of a given semiconductor and identify the nature of the semiconductor.

4 Hours

EXPERIMENT 6
Draw the B-H curve of a ferromagnetic material subjected to external magnetic field and hence identify the nature of the material.

4 Hours

EXPERIMENT 7
Determine the V-I characteristics of a solar cell.

Total: 75 Hours

Reference(s)

1. William D. Callister, Materials Science and Engineering an Introduction, John Wiley and Sons,Inc, 2010
2. BrijLal, N. Subrahmanyam and P. S. Hemne, Heat, Thermodynamics & Statistical Physics, S. Chand & Company Ltd., New Delhi, 2012
3. Saxena, Gupta, Saxena, Mandal, Solid State Physics, Pragati Prakashan Educational Publishers, 13threvised edition, Meerut, India, 2013
4. P.K. Mittal, Applied Physics, I.K. International Publishing House Pvt. Ltd, 2008
5. Donald A. Neamen, Semiconductor Physics and Devices,McGraw-Hill, 2011

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	4				3				4	4			2					4						24
2	2	2				4	2			2	4			4											20
3	2	4				4	2			4	2			2											20
4	2	2				4	2			2	4			4											20
5	2	2				2	2			4					4										16
																								Total	100

Assessment Questions

Remember

1. State Ohm's law.
2. Define drift velocity.
3. List the two drawbacks of classical free electron theory.
4. State Wiedemann-Franz law.
5. Mention the practical unit used for electron's magnetic moment.
6. Recall the term hysteresis in ferromagnetic materials.
7. List the four uses of magnetic materials.
8. State Zeroth law of thermodynamics.
9. State the Kelvin's statement of second law of thermodynamics.
10. Name the three modes of heat transfer.
11. State Echelon effect.

Understand

1. Illustrate the significance of Fermi energy.
2. Why indirect gap semiconductors are preferred in fabricating transistors?
3. Classify the types of magnetic materials.
4. Outline the term retentivity and coercivity.
5. Compare dia, para and ferro magnetic materials.
6. Point out the ideal conditions required for diesel cycle.
7. Sketch the isothermal and adiabatic processes in P-V diagram.
8. Is it possible for a practical engine to have 100% efficiency? Justify.
9. Ice kept in saw dust or wrapper in a blanket will not melt. Why?
10. Classify the types of sound waves.
11. Explain the three characteristics of musical sound.

Apply

1. The average energy of a conduction electron in copper at 300 K is 4.23 eV. Calculate the Fermi energy of copper at 300 K.
2. Determine the carrier concentration of *p*-type semiconductor whose hall coefficient is 3.6610-4 m3/C.
3. Compute the efficiency of Carnot's engine operating between the temperatures 3270C and 270C.
4. Point out practical applications of heat conduction.
5. Compute the efficiency of Carnot's engine working the steam point and the ice point.
6. Assess the reason for the formation ice on pond surface.
7. The intensity of sound produced by thunder is 0.1 Wm-2.Calculate the intensity level in decibels.
8. Calculate Sabine's mathematical relation for reverberation time of the hall.
9. Compute the minimum wavelength of audible sound at zero degree centigrade.

Analyse

1. Distinguish between relaxation time and collision time.
2. Differentiate between electrical and thermal conductivity.
3. List the various applications of soft and hard magnetic materials for day to day life.

4. Analysis the six properties of hard and soft magnetic materials.
5. If the system and surrounding are in thermal equilibrium, is it necessary they are in same state? Comment the statement.
6. Differentiate isothermal and adiabatic process.
7. Entropy remains constant in an adiabatic process. Justify the statement.
8. Compare Carnot's cycle and diesel cycle.
9. Distinguish between loudness and intensity of sound.
10. Compare reverberation and echo.
11. How do you maintain optimum reverberation in a hall? Justify.

15PH203 MATERIALS SCIENCE 3 0 2 4

Course Objectives

- To explain the properties of conducting, semiconducting and dielectric materials
- To impart fundamental knowledge in optical materials
- To understand the nature and applications of different magnetic materials

Course Outcomes (COs)

1. Distinguish electrical properties of different kinds of conducting materials
2. Identify the different types of semiconductors and its applications
3. Categorize the various polarization mechanisms in dielectrics
4. Choose the suitable material for the construction of display devices
5. Select appropriate magnetic materials for magnetic storage devices

UNIT I **8 Hours**

ELECTRICAL PROPERTIES OF METALS

Quantum free electron theory: Fermi-Dirac distribution function - Fermi energy and its variation with temperature - density of energy states - calculation of density of electrons and fermi energy at 0K - mean energy of electrons at 0K - problems.

UNIT II **10 Hours**

SEMICONDUCTING MATERIALS

Introduction - elemental and compound semiconductors - intrinsic semiconductors: expressions for number of electrons and holes - determination of carrier concentration and position of Fermi energy - electrical conductivity - band gap energy determination - carrier concentration in extrinsic semiconductors. Hall effect: theory and experimental determination - uses - problems.

UNIT III **9 Hours**

DIELECTRICS

Introduction - fundamental definitions in dielectrics - expressions for electronic and ionic polarizations - orientation polarization (qualitative) - space charge polarization - Langevin - Debye equation - frequency and temperature effects on polarization - internal field - expression for internal field (cubic structure) - Clausius-Mosotti equation and its importance - applications of dielectric materials - problems.

UNIT IV **9 Hours**

OPTICAL MATERIALS

Introduction - optical absorption in metals, semiconductors and insulators. Fluorescence and phosphorescence. Light emitting diode: principle, construction, working and applications. Liquid crystal display: general properties - dynamic scattering display - twisted nematic display - applications - comparison between LED and LCD. Blue ray disc - principle - working.

UNIT V **9 Hours**

MAGNETIC MATERIALS

Introduction - orbital and spin magnetic moments - Bohr magneton - basic definitions - classification of magnetic materials - domain theory of ferromagnetism - process of domain magnetization - explanation of hysteresis curve based on domain theory - hard and soft magnetic materials.

FOR FURTHER READING

Optical data storage and Giant magnetoresistance

2 Hours

INTRODUCTION

Exposure to Engineering Physics Laboratory and precautionary measures

4 Hours

EXPERIMENT 1

Using Lees disc apparatus, determine the coefficient of thermal conductivity of a bad conductor.

4 Hours

EXPERIMENT 2

Find the band gap value of the given semiconductor diode. Based on the band gap value, identify the given semiconductor.

4 Hours

EXPERIMENT 3

With the aid of traveling microscope, find the refractive index of a transparent solid and liquid material.

4 Hours

EXPERIMENT 4

Determine the wavelength of polychromatic source in the visible region using spectrometer.

4 Hours

EXPERIMENT 5

Based on Hall effect, calculate the charge carrier density of a given semiconductor and identify the nature of the semiconductor.

4 Hours

EXPERIMENT 6

Draw the B-H curve of a ferromagnetic material subjected to external magnetic field and hence identify the nature of the material.

4 Hours

EXPERIMENT 7

Determine the V-I characteristics of a solar cell.

Total: 75 Hours

Reference(s)

1. William D. Callister, Materials Science and Engineering an Introduction, John Wiley and Sons, Inc, 2010.
2. S.O. Pillai, Solid State Physics, New Age International Publications, New Delhi, 2014.
3. M.N. Avadhanulu and P.G. Kshirsagar, A Text Book of Engineering Physics, S. Chand & Company Ltd., New Delhi, 2011.
4. P.K. Palanisamy, Physics For Engineers, Scitech Publications (India) Pvt. Ltd., Chennai, 2010.
5. V. Raghavan, Materials Science and Engineering, Prentice Hall of India, New Delhi, 2010.
6. R.K.Gaur and S.L.Gupta, Engineering Physics, Dhanpat Rai publications, New Delhi, 2010.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	5	2		1	5	2		1																18
2	2		2		2	3	2		5		2		4												22
3	1	2	1		3	3			3	5			2												20
4	2	3			3	3			2	5			2												20
5	1	3			3	2	5		3	1			2												20
																								Total	100

Assessment Questions

Remember

1. Define density of electron energy states in metals.
2. Recall Fermi energy.
3. State Hall Effect.
4. List out the four advantages of semiconductors.
5. Define dielectric constant
6. Recall electric polarization.
7. Define Fluorescence.
8. Recognize hard and soft magnetic materials.
9. State the working principle of LED.
10. Define Bohr magnetron.

Understand

1. Classify three types of free electron theory
2. Represent the variation of Fermi level with temperature
3. Explain Clausius-Mosotti relation.
4. Compare element and compound type semiconductors.
5. Illustrate the variation of Fermi level with temperature in n-type semiconductors.
6. Distinguish between a dielectric and insulator.
7. Mention the technique to increase the emission time in phosphorescence.
8. Exemplify hysteresis on the basis of domain theory of ferromagnetism.
9. Identify four examples for hard magnetic materials.
10. Identify four properties of ferromagnetic materials.

Apply

1. Compute the Fermi direc function for energy kT above the Fermi energy.
2. Asses the Fermi-Dirac distribution function.
3. Energy level of p-type and n-type semiconductors and justify the results
4. Compute the carrier concentration of intrinsic semiconductors
5. Explain the principle, construction and working of Hall Effect
6. Show that electronic and ionic polarizabilities are independent of temperature.
7. Calculate the polarization of an atom above value five.
8. Differentiate the dia, para and ferromagnetic materials.
9. Compute the B-H Hysteresis curve on the basis of domain theory.

Analyse

1. Discriminate drift velocity and thermal velocity of an electron
2. Difference between p-type and n-type semiconductors.
3. Obtain the expression for concentration of charge carriers in p-type semiconductor.
4. In practical dielectrics, the current does not exactly lead the voltage by 90?. Justify.
5. Local field is the space and time average of the electric field acting on a particular molecule Justify the result.
6. Justify the special features of magnetic blue ray disks.
7. Analyze the role of energies in the domain growth.
8. Describe the working of twisted pneumatic display device.
9. Compare LED and LCD.

15PH204 PHYSICS OF ENGINEERING MATERIALS 3 0 2 4

Course Objectives

- To familiarize with the physical properties of materials
- To gain practical applications of modern spectroscopy and microscopy techniques
- To understand the preparation of bio and nanomaterials

Course Outcomes (COs)

1. Identify the electrical and thermal properties of conducting and semiconducting materials
2. Analyze the various polarization mechanisms in dielectrics
3. Choose specific materials for optical and magnetic data storage devices
4. Investigate the specimen with the aid of suitable spectroscopic techniques
5. Realize the methods adopted for preparing nano materials

UNIT I **10 Hours**

CONDUCTING AND SEMICONDUCTING PROPERTIES

Quantum free electron theory - Fermi-Dirac distribution function - effect of temperature on Fermi function - density of energy states - calculation of density of electrons and Fermi energy at 0 K. Intrinsic semiconductors: expressions for density of electrons and holes - intrinsic carrier concentration - band gap energy. Extrinsic semiconductors: carrier concentration in n-type and p-type semiconductors - variation of Fermi level with temperature and impurity concentration - problems.

UNIT II **9 Hours**

DIELECTRIC PROPERTIES

Introduction: fundamental definitions in dielectrics - types of polarization - expressions for electronic and ionic polarization mechanisms - orientation polarization (qualitative) - Langevin-Debye equation - frequency and temperature effects on polarization - dielectric loss - dielectric breakdown mechanisms - active dielectric materials - applications of dielectric materials - problems.

UNIT III **10 Hours**

OPTICAL AND MAGNETIC PROPERTIES

Optical properties: introduction - light interaction with solids - atomic and electronic interactions - optical properties of metals, semiconductors and insulators - reflection - refraction - absorption - transmission - luminescence and photoconductivity. Magnetic properties: introduction - origin of magnetic moment - properties of dia, para and ferro magnetic materials - domain theory and hysteresis effect - hard and soft magnetic materials - problems.

UNIT IV **8 Hours**

SPECTROSCOPY AND MICROSCOPY TECHNIQUES

Introduction: different types of spectroscopy techniques - basic principle of FTIR spectroscopy and X-ray Photoelectron Spectroscopy (XPS). Basic principle and working mechanisms of Scanning Electron Microscope (SEM) - Transmission Electron Microscope (TEM) - Atomic Force Microscope (AFM).

UNIT V **8 Hours**

BIO AND NANO MATERIALS

Biomaterials: classification of biomaterials - development of biomaterials - applications. Nanomaterials: properties - synthesis of nanomaterials - top-down approach: ball milling technique - bottom-up approach: Chemical Vapour Deposition (CVD) - uses of nanomaterials. Carbon nanotubes: properties and applications.

FOR FURTHER READING
Health and environmental impacts

2 Hours

INTRODUCTION
Exposure to Engineering Physics Laboratory and precautionary measures

4 Hours

EXPERIMENT 1
Using Lees disc apparatus, determine the coefficient of thermal conductivity of a bad conductor.

4 Hours

EXPERIMENT 2
Find the band gap value of the given semiconductor diode. Based on the band gap value, identify the given semiconductor.

4 Hours

EXPERIMENT 3
With the aid of traveling microscope, find the refractive index of a transparent solid and liquid material.

4 Hours

EXPERIMENT 4
Determine the wavelength of polychromatic source in the visible region using spectrometer.

4 Hours

EXPERIMENT 5
Based on Hall effect, calculate the charge carrier density of a given semiconductor and identify the nature of the semiconductor.

4 Hours

EXPERIMENT 6
Draw the B-H curve of a ferromagnetic material subjected to external magnetic field and hence identify the nature of the material.

4 Hours

EXPERIMENT 7
Determine the V-I characteristics of a solar cell.

Total: 75 Hours

Reference(s)

1. William D. Callister, Materials Science and Engineering An Introduction, John Wiley and Sons, Inc, 2010.
2. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011.
3. Jacob Milliman, Christos Halkias, Satyabrata JIT, Electronic Devices and Circuits, McGraw Hill Education (India) Private Limited, New Delhi, 2014.
4. S. O. Pillai, Solid State Physics, New Age International Publications, New Delhi, 2010.
5. Subbiah Pillai, Nanobiotechnology, MJP Publishers, 2010.
6. Yang Leng, Materials Characterization: Introduction to Microscopic and Spectroscopic Methods, Wiley-VCH, 2013.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	4	2		2	5	2		2	2			1	1											22
2	2		2		2		2		5	3			4												20
3	2		2		3	3	2		3	3			2	2											22
4	1	2	1		3	3			3	3			2												18
5	2	2			3	2	3		2				2	2											18
																								Total	100

Assessment Questions

Remember

1. Recall the merits of quantum free electron theory over classical free electron theory
2. Define carrier concentration
3. Recall Fermi energy
4. List the four types of polarization mechanisms.
5. Recognize polar and non-polar molecules
6. Define Bohr magneton
7. Recall coercivity and retentivity
8. Point out the four salient features of biomaterials
9. Define bioactive materials
10. State the working principle of FTIR spectroscopy

Understand

1. Classify three types of materials based on bandgap energy
2. Explain fermi-distribution function and effect of temperature on Fermi function
3. Represent the variation of Fermi level with temperature
4. Explain intrinsic and thermal breakdown mechanisms
5. Infer the importance of Fermi level in a semiconductor
6. Illustrate the phenomenon of B-H hysteresis on the basis of domain theory
7. Classify four types of biomaterials
8. Represent the scanning electron microscope to determine the grain size of the nanomaterials
9. Explain the principle, construction and working of Scanning electron microscope
10. Explain the principle and working mechanism of X – ray photoelectron spectroscopy (XPS)

Apply

1. Find the variation of Fermi level with temperature and impurity concentration in n-type semiconductors
2. Show that electronic and ionic polarizabilities are independent of temperature
3. Show that the position of Fermi level is exactly at the midpoint of forbidden energy gap in intrinsic semiconductor
4. Compute the relationship between polarizability and electric flux density.
5. Assess the properties of dia, para and ferromagnetic materials
6. Show that top down method is inferior to bottom up method
7. Construct B-H Hysteresis curve on the basis of domain theory
8. Design the principle, construction and working of chemical vapour deposition.
9. Show that the electronic polarizability is directly propotional to the volume of an atom
10. Compute the expression for carrier concentration in intrinsic semiconductors

Analyse

1. Extrinsic semiconductors possess high electrical conductivity than intrinsic semiconductors. Justify
2. Silver is the best conductor of electricity. But gold is used in high-end electronic connectors. Justify.

3. Identify the role of impurity concentration in the variation of Fermi level in the case of p-type semiconductors.
4. Compare polar dielectrics with non-polar dielectrics.
5. Analyse the features of hard and soft magnetic materials.
6. Compare the six properties of dia, para and ferro magnetic materials
7. Differentiate top down approach from bottom up approach.
8. Select the four important features of TEM
9. Justify the electronic polarizability of Argon is much greater than that of Helium.
10. Intrinsic semiconductors are insulators at 0K. Justify.

15PH205 SOLID STATE PHYSICS 3 0 2 4

Course Objectives

- To explain the properties of conducting, semiconducting and dielectric materials
- To understand the working mechanism of junction diodes
- To impart knowledge in optical and magnetic materials

Course Outcomes (COs)

1. Identify different types of emission of electrons and significance of Fermi function
2. Explore the carrier concentration and its variation with temperature of different semiconducting materials
3. Analyze the I-V characteristics of a junction diode
4. Investigate the various polarization mechanisms in dielectrics
5. Select appropriate optical and magnetic materials for data storage devices

UNIT I **10 Hours**

EMISSION PROPERTIES AND QUANTUM THEORY OF SOLIDS

Emission of electrons: types thermionic emission-principle- Richardson equation- secondary emission- principle- work function- Fermi-Dirac distribution function and its temperature dependence significance of Fermi energy- density of energy states- calculation of density of electrons and Fermi energy at 0K- average energy of electrons at 0K problems.

UNIT II **9 Hours**

SEMICONDUCTOR PHYSICS

Intrinsic semiconductors: the law of mass action - expressions for density of electrons and holes - determination of carrier concentration - band gap energy. Extrinsic semiconductors: carrier concentration in p-type and n-type semiconductors. Hall effect: theory - experimental determination of Hall voltage - applications - problems.

UNIT III **9 Hours**

JUNCTION DIODE CHARACTERISTICS

Introduction - pn junction diode - volt-ampere characteristics - diode current equation - static and dynamic resistances - space charge - diffusion capacitance - junction diode switching times. Diode circuit with DC voltage source. Applications: full wave rectifier - capacitor filters - clamper circuits.

UNIT IV **9 Hours**

DIELECTRICS

Introduction: fundamental definitions in dielectrics - expressions for electronic and ionic polarizations - orientation polarization (qualitative) - space charge polarization - Langevin Debye equation - frequency and temperature effects on polarization - expression for internal field (cubic structure) - Clausius-Mosotti equation - dielectric loss - applications of dielectrics - problems.

UNIT V **8 Hours**

OPTOELECTRONICS AND MAGNETIC MATERIALS

Principle, working and characteristics of LED and LCD - blue ray disc. Magnetic materials: basic definitions - properties of dia, para and ferro magnetic materials - explanation of hysteresis curve based on domain theory - hard and soft magnetic materials. Magnetic storage device: principle - working - giant magnetoresistance.

FOR FURTHER READING

Motion of an electron in uniform and non-uniform magnetic fields - electric and magnetic fields in a crossed configuration.

2 Hours

INTRODUCTION

Exposure to Engineering Physics Laboratory and precautionary measures

4 Hours

EXPERIMENT 1

Using Lees disc apparatus, determine the coefficient of thermal conductivity of a bad conductor.

4 Hours

EXPERIMENT 2

Find the band gap value of the given semiconductor diode. Based on the band gap value, identify the given semiconductor.

4 Hours

EXPERIMENT 3

With the aid of traveling microscope, find the refractive index of a transparent solid and liquid material.

4 Hours

EXPERIMENT 4

Determine the wavelength of polychromatic source in the visible region using spectrometer.

4 Hours

EXPERIMENT 5

Based on Hall effect, calculate the charge carrier density of a given semiconductor and identify the nature of the semiconductor.

4 Hours

EXPERIMENT 6

Draw the B-H curve of a ferromagnetic material subjected to external magnetic field and hence identify the nature of the material.

4 Hours

EXPERIMENT 7

Determine the V-I characteristics of a solar cell.

Total: 75 Hours

Reference(s)

1. Jacob Millman, Christos Halkias and Satyabrata JIT, Electronic Devices and Circuits, McGraw Hill Education (India) Private Limited, New Delhi, 2014.
2. William D. Callister, Materials Science and Engineering an Introduction, John Wiley and sons, Inc, 2010.
3. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011.

4. R. S. Sedha, A textbook of Applied Electronics, S. Chand & Company Ltd., New Delhi, 2010.
5. S. O. Pillai, Solid State Physics, New Age International Publications, New Delhi, 2010
6. M. N. Avadhanulu and P.G. Kshirsagar, A Text Book of Engineering Physics, S. Chand & Company Ltd., New Delhi, 2011.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2	2		2	4	2		2	5			2												22
2	2	2			2		3		2	3					6										20
3	2		1		3		2		5				2	2				3							20
4	2	2	2		2	3			2	5			2												20
5	2	2			3	2	2		2				5												18
																								Total	100

Assessment Questions

Remember

1. Recall the Richardson equation.
2. Define dynamic resistance.
3. State the law of mass action.
4. Define Hall Effect.
5. List the three practical applications of p-n junction diode.
6. List the three practical applications of p-n junction diode.
7. List the four types of polarizations in dielectrics
8. Reproduce the expressions for electronic and ionic polarization.
9. State the working principle of LED.
10. Define retentivity and coercivity.

Understand

1. Explain the variation of Fermi-Dirac distribution function with temperature.
2. Indicate the importance of Fermi level.
3. Indicate the reason for preferring extrinsic semiconductors over intrinsic semiconductors.
4. Represent four applications of Hall Effect.
5. Represent the switching action of a diode.
6. Interpret the relation between polarization and polarisability in dielectrics.
7. All the dielectrics are insulators but all the insulators are not dielectrics. Illustrate with examples.
8. Interpret the relation between the dielectric constant and electric susceptibility.
9. Explain the phenomenon of electroluminescence in LED.
10. Summarize the working principle of giant magnetoresistance.

Apply

1. Find the expression for density of electrons and Fermi energy at 0 K.
2. Using the Fermi function, compute the temperature at which there is 1% probability that an electron in a solid will have energy 0.5 eV above EF of 5 eV.
3. Explain how phosphorous atoms donate electrons to the conduction band.
4. Apply the law of mass action to determine the carrier concentration of intrinsic semiconductors.
5. Construct a circuit using p-n junction diode and execute its V-I characteristics.
6. Construct a diode circuit with DC voltage source and demonstrate its working conditions.
7. Show that electronic polarizability is independent of temperature.
8. Explain frequency dependence of dielectrics with a neat sketch.
9. Apply the domain theory to the hysteresis effect observed in ferromagnetic materials.
10. Compute the wavelength of light emitted by an LED with band gap energy of 1.8 eV.

Analyse

1. The average energy of electrons at 0 K depends on Fermi level. Justify.
2. Differentiate p-type and n-type semiconductors.
3. Outline the working principle of full wave bridge rectifier.
4. At optical frequencies the total polarization is less. Justify.
5. Outline the causes for dielectric loss in dielectric materials.
6. Analyze the magnetic behavior of dia, para and ferromagnetic materials.
7. Compare the properties of LED and LCD.
8. Outline the difference between hard and soft magnetic materials.

Evaluate

1. Evaluate the resistance value using V-I characteristics of a p-n junction diode.
2. Evaluate the value of Fermi distribution function for an energy kT above the Fermi energy at that temperature and comment on the answer.

CHEMISTRY ELECTIVES

15CH201 ENGINEERING CHEMISTRY 3 0 2 4

Course Objectives

- To recall the terminologies of electrochemistry and explain the function of batteries and fuel cellswith its electrochemical reactionsl
- To understand the fundamentals of corrosion its types andpolymers with its applications
- To choose appropriate instrumentation technique for interpreting analytical data

Course Outcomes (COs)

1. Construct anelectrochemical cell and measure its potential.
2. Identify the components and processess in batteries and infer the selection criteria for commercial battery systems with respect to different applications.
3. Utilize electrochemical data to formulate an electrochemical half-cell and cell reactions for corrosion control processes.
4. Differentiate the polymers used in day to day life based on its source, properties and applications.
5. Identify the applications of analytical methods for the estimation of elements in aqueous media

UNIT I **10 Hours**

INTRODUCTION TO ELECTROCHEMISTRY

Types of electrodes - electrode potential - salt bridge - cell reaction - cell representation - silver-silver chloride electrode - calomel electrode - determination of single electrode potential - electrochemical series and its importance. Ion-selective electrode: glass electrode - measurement of pH using glass electrode. Concentration cells (electrode and electrolyte). Potentiometry - potentiometric titrations (redox titration). difference between electrochemical and electrolytic cells

UNIT II **9 Hours**

ENERGY STORAGE DEVICES

Batteries - characteristics of battery - types of batteries. construction, working and applications: Primary (alkaline) and secondary (lead-acid and nickel-cadmium) - Modern batteries (zinc air battery and lithium batteries) - precautions for battery maintenance. Comparison with conventional galvanic cells. Fuel cells - Types of fuel cells: solid polymer electrolyte fuel cell - solid oxide fuel cells - microbial fuel cell. Hydrogen-oxygen fuel cell - construction, working, advantages and limitations

UNIT III **8 Hours**

CORROSION SCIENCE

Corrosion: definition - types of corrosion: chemical and electrochemical corrosion - Pilling-Bedworth ratio - types of oxide layer (stable, unstable, volatile, porous) - hydrogen evolution and oxygen absorption mechanism for electrochemical corrosion - mechanism for rusting of iron. Types of electrochemical corrosion: Galvanic corrosion - differential aeration corrosion (pitting, waterline and pipeline). Galvanic series - applications. Factors influencing corrosion: nature of metal and environment. Corrosion control methods: sacrificial anode method - impressed current cathodic protection method - electroplating - electroless plating

UNIT IV **10 Hours**

POLYMERS AND ITS PROCESSING

Advantages of polymers over metals. Monomers - polymers - polymerization - functionality - degree of polymerization - classification of polymers based on source and applications - Molecular weight determination. Types of polymerization: addition, condensation and copolymerization - mechanism of free radical polymerization. Preparation, properties and applications of thermosetting (epoxy resin and bakelite) and thermoplastics (polyvinyl chloride and polytetrafluoroethylene). Compounding of plastics - injection and extrusion moulding methods

UNIT V **8 Hours**

INSTRUMENTATION TECHNIQUES FOR CHEMICAL ANALYSIS

Beer - Lamberts law. Principle, instrumentation (block diagram only) and applications: Ultra violet spectroscopy - Atomic absorption spectroscopy - Colorimetry (estimation of a transition metal) - Flame photometry (estimation of an alkali metal).

FOR FURTHER READING

Nobel prize winners in chemistry over past 5 years

2 Hours

EXPERIMENT 1

General instructions to students - Handling reagents and safety precautions

4 Hours

EXPERIMENT 2

Determination of amount of hydrochloric acid present in the given sample using pH meter

4 Hours

EXPERIMENT 3

Determination of strength of a commercial mineral acid by conductometric titration.

4 Hours

EXPERIMENT 4

Conductometric titration of mixture of acids

4 Hours

EXPERIMENT 5

Electro analytical determination of strength of iron in the given sample by potentiometric method using saturated calomel electrode.

4 Hours

EXPERIMENT 6

Measurement of rate of corrosion on zinc/mild steel in aerated neutral/acidic/alkaline solution by weight loss measurements / Tafel polarization method

4 Hours

EXPERIMENT 7

Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.

4 Hours

EXPERIMENT 8

Estimation of iron (thiocyanate method) in the given solution by spectrophotometric method

Total: 75 Hours

Reference(s)

1. M. Munjal and S.M. Gupta, Wiley Engineering Chemistry, Second edition, Wiley India Pvt. Ltd, New Delhi, 2013.
2. A. Pahari and B.Chauhan, Engineering Chemistry, Infinity Science press LLC, New Delhi, 2010.
3. P.H. Rieger, Electrochemistry, Springer, Netherland, Second Edition (Reprint) 2012.
4. Fred W. Billmeyer JR, Textbook of polymer science, John Wiley & sons, Third edition, 2008.
5. Willard Merritt and Dean Settle, Instrumental methods of analysis, CBS publishers, Seventh edition, 2012.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	1	1		3	4	2			4	4				1			1							23
2	1	1	1		4	4	3		1	2					2										20
3	1	1	1		2	2	1			2	2			2	1			1				1			17
4	5	3	2		3	1	1		1				1	2	1		1	1							23
5	1					3					3				7			2				1			17
																							Total		100

Assessment Questions

Remember

1. List any four significances of EMF series.
2. Define the term single electrode potential.
3. Recall the four advantages of H2-O2 fuel cell.
4. Define the term functionality of a monomer.
5. State Pilling-Bedworth rule.
6. Name two monomers used for the preparation of epoxy resin.
7. Label the parts and electrodes sign of electrochemical and electrolytic cells.
8. List any two significances of monomer functionality.
9. State Beer - Lamberts law.
10. Define concentration cell.

Understand

1. Classify two types of polymers based on source.
2. Compare electrochemical cell and electrolytic cell with suitable diagrams.
3. Exemplify the mechanism involved in electrochemical corrosion.
4. Explain the principle and five components of UV-visible spectrophotometer.
5. Formulate a mechanism for the synthesis of –(CF2-CF2)n– polymer.
6. Identify any two analytical methods to estimate sodium present in aqueous media.
7. Illustrate the injection molding process with a necessary explanation and two advantages.
8. Indicate any two importance of salt bridge in an electrochemical cell.
9. Formulate a route to synthesis epoxy resin from its two monomers.
10. Summarize any four advantages of polymers over metals in everyday life.

Apply

1. Calculate the single electrode potential value zinc half-cell dipped in a 0.01M ZnSO4 solution at 25°C? E° Zn/Zn 2+ = 0.763 V, R=8.314 JK -1 Mol -1 , F= 96500 Coulombs.
2. Identify two advantages of degree of polymerization.
3. Find the concentration of given solution using spectrophotometer, if %T, bath length and molar adsorption coefficient are 18, 1 cm and 6000 L/mol. cm.
4. Derive an equation for determination pH of unknown solution using glass electrode.
5. Elaborate the six applications of electrochemical series.
6. Select and explain suitable potentiometric titration to estimate the amount of ferrous ion in the given solution.
7. Discuss the construction and working of electrolyte concentration cell with suitable example.
8. Assess the significances of monomer functionality in the properties and structure of polymer.

Analyse / Evaluate / Create

1. Outline any two methods for preventing chemical and electrochemical corrosion.
2. Compare the advantages and limitations of electro and electroless plating of nickel.
3. The statement “prevention is better than cure” is not suitable for corrosion science and engineering-Justify the answer in your own words.
4. Differentiate the synthesis method of addition and condensation polymers.
5. Arrange the following polymer based on the increasing order of resistance towards chemical
   1. poly (ethylene) 2. Starch 3.Baklite 4.Teflon
6. Calculate the electrode potential of zinc metal if EMF of the cell is 1.10 V (Sat. Calomel electrode was used for complete cell formation.
7. Electrode potentials of A and B are E 0 A/A+ = +0.76 V and E 0 B/B+ = -0.34 V respectively. Choose the appropriate anode half-cell and cathode half-cell by giving the cell representation
8. A ship hull in ocean is safe against corrosion under any circumstance - Argue.
9. Derive the probable reason and possible solution for the following:
   i. Stainless steel should not be used to build ship hull.
   ii. Small anodic area results in intense corrosion.
   iii. Metal under water drop undergoes accelerated corrosion.

15CH202 APPLIED CHEMISTRY 3 0 2 4

Course Objectives

- To understand the necessity of water softening processes.
- To recognize the fundamentals of corrosion, alloys, phase rule and fuels with its applications.
- To characterize the chemical compounds using analytical techniques.

Course Outcomes (COs)

1. Attribute the internal and external treatment methods for the removal of hardness in water for domestic and industrial applications.
2. Exemplify the type of corrosion and its mechanism which will help to develop the corrosion control methods.
3. Apply the applications of alloying and phase rule in the field of metallurgy.
4. Analyse the three types of fuels based on calorific value for selected applications.
5. Recognize the applications of analytical methods in characterizing the chemical compounds.

UNIT I **10 Hours**

WATER PURIFICATION

Hardness of water - classification of hardness (temporary and permanent) - units of hardness (ppm, mg/l, degree Clark, degree French) - expression of hardness in terms of calcium carbonate equivalence - estimation of hardness by EDTA Method - Uses of water for industrial purpose - requirements of boiler feed water - disadvantages of using hard water in industrial boilers: scale - sludge - priming - foaming - caustic embrittlement. Removal of dissolved salts from hard water: Internal conditioning (phosphate, carbonate, calgon and colloidal methods) - external conditioning: ion exchange process, reverse osmosis, electrodialysis. Uses of water for domestic purpose - municipal water purification (screening, aeration, coagulation, sedimentation, filtration and disinfection of water- break point chlorination).

UNIT II **8 Hours**

CORROSION SCIENCE

Corrosion - chemical and electro chemical corrosion -Pilling Bedworth rule - Mechanism (type of oxide layer, oxygen absorption - hydrogen evolution) - Galvanic series - types of electrochemical corrosion: galvanic corrosion - differential aeration corrosion (pitting, pipeline and waterline corrosion) - Factors influencing corrosion (nature of metal & environment). Corrosion control: sacrificial anode - impressed current method. Protective coatings - paints - constituents and functions.

UNIT III **9 Hours**

ALLOYS AND PHASE RULE

Alloys: purpose of alloying - function and effects of alloying elements -properties of alloys - classification of alloys. Ferrous alloys: nichrome and stainless steel. Non-ferrous alloys: brass and bronze. Heat treatment of steel (Annealing, hardening, tempering, normalising, carburizing and nitriding).Phase rule: Phase - component - degree of freedom - phase rule - phase diagram - Applications - one component system (water system). Reduced phase rule - two component system (lead and silver system).

UNIT IV **10 Hours**

FUELS

Classification - characteristics - calorific value - solid fuel - coal - types - analysis of coal (proximate and ultimate analysis) - processing of coal to coke - carbonization - types (low temperature and high temperature carbonization) - manufacture of metallurgical coke (Otto Hoffmann method). Liquid fuels - petroleum - refining of crude oil - knocking - octane number - cetane number. Liquid fuel from coal (Bergius process). Gaseous fuels - natural gas (CNG) - coal gas - producer gas - syn gas - shale gas.

UNIT V **8 Hours**

INSTRUMENTAL METHODS

Beer - Lamberts law. Principle, instrumentation (block diagram only) and applications: Ultra violet spectroscopy - Infrared spectroscopy - Atomic absorption spectroscopy - Colorimetry (estimation of transition metal) - Flame photometry (estimation of alkali metal).

FOR FURTHER READING

Synthesis and applications of bio-fuels.

2 Hours

EXPERIMENT 1

General instructions to students - Handling reagents and safety precautions

4 Hours

EXPERIMENT 2

Water quality of BIT campus - River - Bore well water with respect to hardness, TDS and pH.

4 Hours

EXPERIMENT 3
Conductometric titration of mixture of acids.

4 Hours

EXPERIMENT 4
Determination of strength of hydrochloric acid in a given solution using pH meter.

4 Hours

EXPERIMENT 5
Determination of the strength of Fe(II) in the given sample by potentiometric method.

4 Hours

EXPERIMENT 6
Measurement of rate of corrosion on mild steel in aerated, neutral, acidic and alkaline medium by Tafel polarization method/ weight loss method.

4 Hours

EXPERIMENT 7
Estimation of copper content in brass by EDTA method.

4 Hours

EXPERIMENT 8
Estimation of iron (thiocyanate method) in the given solution by spectrophotometric method.

Total: 75 Hours

Reference(s)

1. A. Pahari and B.Chauhan, Engineering Chemistry, Infinity Science press LLC, New Delhi, 2010.
2. M. Munjal et.al., Wiley Engineering Chemistry, Second edition, Wiley India Pvt. Ltd, New Delhi, 2013.
3. Willard Merritt and Dean Settle, Instrumental methods of analysis, CBS publishers, Seventh edition, 2012.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	1	1		3	4	2			4	4				1			1				1			23
2	1	1	1		2	2	1			2	2			2	1			1				1			17
3	1	1	1		4	4	3		1	2					2							1			20
4	5	3	2		3	1	1		1				1	2	1		1	1				1			23
5	1					3					3				7			2				1			17
																								Total	100

Assessment Questions

Remember

1. Define the term hardness of water and classify its two types.
2. List any two internal conditioning methods to convert hard water to soft water.
3. List the two types of electrochemical corrosion taking place in an iron rod when it is exposed to moisture.
4. Recall any two reasons for galvanic corrosion.
5. List the four major objectives of alloying steel.
6. State Gibbs phase rule
7. Define octane number.
8. State Beer-Lambert’s law.

9. Recall any four applications of colorimetry.

Understand

1. Compare temporary and permanent hardness of water.
2. Illustrate the estimation of carbonate, non-carbonate and total hardness by EDTA method.
3. Identify the needs of corrosion control and explain any two methods with suitable examples.
4. Indicate the two suitable conditions to occur electrochemical corrosion.
5. Classify the three types of alloys based on metal composition.
6. For one component water system, the triple point is an invariant point. Reason out.
7. Distinguish between syn gas and coal gas.
8. With a neat diagram, explain the processes involved in Bergius process to get synthetic petrol.
9. Differentiate chromophore from auxochrome.
10. Infer the role of ammonium thiocyanate in the colorimetric estimation of iron.

Apply

1. Illustrate the five necessary steps to get treated and sterilized municipal drinking water.
2. Suggest a suitable laboratory method to estimate carbonate, non-carbonate and total hardness of water.
3. Sketch a suitable protection method to prevent ship's hull made of iron from corrosion.
4. Assess the effects of alloying elements.
5. Apply Gibbs phase rule for one component water system with a neat diagram.
6. Find the combusted products of the following components.
   (i) 2H2 (ii) CH4
7. Find the application of colorimetry for the estimation of iron.
8. Calculate the number of the modes of vibrations for the following molecules.
   (i) C6H6 (ii) CO2

Analyse

1. How can theeffect of caustic embrittlement in boilerbe resolved?
2. Identifythe problems created in boilers if priming and foaming takes place.
3. Increase in temperature increasescorrosionrate.Justify.
4. Zinc is more corroded when coupled with copper than lead – Reason out.
5. Distinguish ferrous and non-ferrous alloys with examples.
6. Arrange the following materials based on their increasing calorific value.
   peat, lignite, bituminous, wood, anthracite and sub-bituminous.

Evaluate / Create

1. Bolt and nut made of the same metal is preferred in practice. Give reason
2. Support the statement "Coke is better fuel than coal".
3. Calculate the absorbance if 10% of light is transmitted.
4. Determine the effect of pH of the conducting medium on corrosion.
5. Determine the number of phases present in the following systems.
   (i) Two miscible liquids (alcohol & water)
   (ii) Two immiscible liquids (benzene & water)
6. Derive the probable reason and possible solution for the following:
   i) Stainless steel should not be used to build ship hull.ii) Small anodic area results in intense corrosion.iii) Metal under water drop undergoes accelerated corrosion.
7. AAS is a better method for environmental analysis thancalorimetric analysis.Justify..

15CH203 APPLIED ELECTROCHEMISTRY 3 0 2 4

Course Objectives

- To understand the basic concepts of electrochemistry and their application
- To expand knowledge about corrosion and methods of control
- To gain information regarding principle, working and application of batteries and fuel cells

Course Outcomes (COs)

1. Construct an electrochemical cell and measure its potential.
2. Measure the emf of a cell using different electrodes.
3. Identify the components and processes in batteries and infer the selection criteria for commercial battery systems with respect to different applications.
4. Differentiate types of corrosion and its prevention by suitable techniques.
5. Recognize the importance of fuel cells and solar battery.

UNIT I **9 Hours**

FUNDAMENTALS OF ELECTROCHEMISTRY

Introduction - electrical conductance in solution - electrical double layer - electrode potential - importance of electrode potential. Electrochemical cell - standard cell: Weston cadmium cell - Concentration cell: electrode and electrolyte - applications. Applications of electrolytic cells: electrolysis of water, electrolysis of brine and electroplating of copper and gold

UNIT II **9 Hours**

REFERENCE ELECTRODES

Primary and secondary reference electrodes - metal-metal ion electrode, metal-metal insoluble salt electrodes: silver-silver chloride electrode, calomel electrode - ion-selective electrode: glass electrode - measurement of pH of a solution using glass electrode. Quinhydrone electrode: construction - advantages - limitations. Applications of EMF measurements: Potentiometric titrations: acid-base titration - oxidation-reduction titration - precipitation titration

UNIT III **10 Hours**

ENERGY STORING DEVICES

Types of batteries - alkaline, lead-acid, nickel-cadmium and lithium batteries - construction, working and commercial applications. Electrochemical sensors. Decomposition potential: variation of decomposition potential for different metals - importance of decomposition potential. Over voltage: factors affecting over voltage value. Maintenance and precautions in battery handling

UNIT IV **10 Hours**

CORROSION SCIENCE

Corrosion - causes - dry and wet corrosion - Pilling-Bedworth rule - mechanism (hydrogen evolution and oxygen absorption) - rusting of iron. Galvanic series - applications. Galvanic corrosion - differential aeration corrosion (pitting, waterline and stress) - factors influencing corrosion. Corrosion control - sacrificial anode and impressed current cathodic protection methods - Metallic coatings: chromium plating - nickel plating - galvanizing and tinning

UNIT V **7 Hours**

FUEL CELL AND SOLAR BATTERY

Introduction - types of fuel cell: low, medium and high temperature fuel cell. Hydrogen-Oxygen fuel cell - advantages. Solid polymer electrolyte fuel cell, solid oxide fuel cells, biochemical fuel cell. Solar battery - domestic, industrial and commercial applications. Environmental and safety issues

FOR FURTHER READING

Document the various batteries with its characteristics used in mobile phones and laptops Maintenance free batteries, Battery recycling

2 Hours

EXPERIMENT 1

General instructions to students - Handling reagents and safety precautions.

4 Hours

EXPERIMENT 2

Determination of strength of a commercial mineral acid by conductometric titration.

4 Hours

EXPERIMENT 3

Electroplating of copper onto a stainless steel object.

4 Hours

EXPERIMENT 4

Determination of strength of iron in a given solution by potentiometric method.

4 Hours

EXPERIMENT 5

Determination of amount of hydrochloric acid present in the given sample using pH meter.

4 Hours

EXPERIMENT 6

Conductometric titration of mixture of acids.

4 Hours

EXPERIMENT 7

Determination of corrosion inhibition on mild steel using natural inhibitors.

4 Hours

EXPERIMENT 8

Estimation of barium by precipitation titration.

Total: 75 Hours

Reference(s)

1. J. C. Kuriacose and J. Rajaram, Chemistry in Engineering & Technology, Vol. 1&2, Tata McGraw-Hill, New Delhi, 2010.
2. B. S. Chauhan, Engineering Chemistry, 3rd Edition, Laxmi Publication Ltd, New Delhi, 2010.
3. B. R. Puri, L. R. Sharma and Madan S Pathania, Principles of physical chemistry, 46th Edition, Vishal publishing Ltd, New Delhi, 2013.
4. B. S. Bahl, G. D. Tuli and Arun Bahl, Essentials of Physical Chemistry, 5th Edition, S. Chand & Company, New Delhi, 2012.
5. S. Vairam, Engineering Chemistry, 1st Edition, John -Willy, India private limited, New Delhi, 2014.
6. Sashi Chawla, Text Book of Engineering Chemistry, Dhanpat Rai Publications, New Delhi, 2010.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	2			2	1	1			2	1		1	1	2			2	1			1	1		20
2	1	4			2	4	1			2			1	2				1	2						20
3		1	1		4	5			2	4			2	1			1	2							23
4	2	1			2	5	1			3				2			2	2				2			22
5	2	2			1	4			2	1			1	1				1							15
																								Total	100

Assessment Questions

Remember

1. List any two advantages of hydrogen oxygen fuel cells.
2. Name any two secondary batteries used in electronic appliances.
3. State pilling bedworth rule.
4. List any two applications of lithium battery.
5. Define overvoltage.
6. Recall the two limitations of quinhydrone electrode.
7. List the three major applications of galvanic series.
8. Recall the term redox reaction.
9. Define standard electrode potential.

Understand

1. Identify any two factors affecting the rate of corrosion based on the nature of metal.
2. Compare solar battery with lead acid-battery with respect to cell reactions, advantages and limitations.
3. Explain the working of hydrogen-oxygen fuel cell with necessary diagram and cell reactions. Mention its two advantages and limitations.
4. Identify the four advantages of electroless plating over electroplating.
5. Explain the difference between galvanic and differential aeration corrosion with an example each.
6. Summarize any five factors that affect overvoltage value of a cell.
7. Differentiate cell from battery.
8. Sketch and explain the construction and working of saturated calomel electrode with necessary cell reactions.
9. With a neat sketch explain the working of a silver – silver chloride electrode.
10. Elucidate the working principle of Weston cadmium cell with suitable cell reactions.
11. Distinguish galvanic and electrolytic cells based on cell reactions.

Apply

1. Assess the six advantages of solid polymer electrolyte fuel cell.
2. Many metals form oxide layer when exposed to atmospheric conditions due to corrosion. Predict the four types of metal oxide layers formed with two examples each.
3. An iron pipe line buried under soil is used to carry natural gas, suggest any two corrosion control techniques that can be employed to minimize/control corrosion.
4. Predict the type of corrosion taking place when a piece of iron rod is exposed to moisture and explain the mechanism of rust formation.
5. Illustrate the construction of 6V lead-acid battery and explain its functioning during discharging and charging process.
6. Select a suitable secondary storage battery used in mobile phones. Explain its reactions during charging and discharging process.
7. Find the electrode potential of zinc rod using saturated calomel electrode as reference electrode (Ecell value is 1.10 V).
8. Apply the principle of ion selective electrode to find the pH of HCl solution using glass electrode with necessary equations.

9. Can we use KCl salt bridge to construct a cell using Ag and Pb half-cell. Give reason.
10. Identify a suitable technique to achieve copper coating onstainless steel object with a neat diagram.

Analyse

1. Can you store zinc sulphate solution in a copper container? Give reason if your answer is yes/no.
2. Predict why copper cannot displace hydrogen from mineral acid solution.
3. Compare a deep cycle battery and a starting battery based on its application.
4. Zinc corrodes at a faster rate when coupled with copper than lead. Give reason.
5. Does the water exhaust from hydrogen - oxygen fuel cell is drinkable? Give reasons if Yes/No.

Evaluate / Create

1. Electrode potentials of A and B are E0A/A+ = +0.76 V and E0B/B+ = -0.34 V respectively. Choose the appropriate anode half-cell and cathode half-cell by giving the cell representation.
2. Glass electrode cannot be used in solutions having pH greater than 9.0. Give reason.
3. Represent diagrammatically an electrochemical cell that produces 1.1 volt as an output.
4. The standard reduction potentials of metals Ag, Fe, Cu and Zn are +0.80v,-0.44v, +0.34v and -0.76v respectively. Arrange the metals in the increasing order of their ability to undergo corrosion.
5. Identify any two advantages of microbial fuel cell over lead acid battery.
6. Derive the probable reason and possible solution for the following:
   i) Stainless steel should not be used to build ship hull.
   ii) Small anodic area results in intense corrosion.
   iii) Metal under water drop undergoes accelerated corrosion.
7. As an engineer, which type of metal oxide forming metal you will choose for your design?Reason out.

15CH204 INDUSTRIAL CHEMISTRY 3 0 2 4

Course Objectives

- To impart knowledge on the principles of water characterization, treatment methods and industrial applications
- To understand the principles and application of electrochemistry, fuel and combustion
- To recognizing the fundamentals of polymers, nano chemistry and analytical techniques

Course Outcomes (COs)

1. Attribute the internal and external treatment methods for the removal of hardness in water for domestic and industrial applications.
2. Utilize the concepts of electrochemistry in real time applications.
3. Realise the importance of fuel chemistry in day to day life.
4. Differentiate the polymers used in day to day life based on its source, properties and applications
5. Familiarize with the synthesis and characterization techniques of nanomaterials.

UNIT I **10 Hours**

WATER PURIFICATION TECHNOLOGY: SOFTENING AND DESALINATION

Hardness of water: Equivalents of calcium carbonate - Units of hardness - Degree of hardness and estimation (EDTA method). Use of water for industrial purposes: Boiler feed water-scale-sludge - priming and foaming -caustic embrittlement. Softening of hard water: External conditioning - ion exchange methods - Internal conditioning - trisodium, dihydrogen, trihydrogen phosphate and sodium hexameta phosphate- carbonate- colloidal methods. Desalination: Reverse osmosis - electrodialysis. Domestic water treatment - Disinfection of water - break point chlorination

UNIT II **10 Hours**

ELECTROCHEMISTRY

Introduction - EMF - Single electrode potential -Calomel electrode - Glass electrode -pH measurement using glass electrode - Electrochemical series. Cells: Electrochemical cells - Cell reactions- Reversible cells and irreversible cells. Batteries - characteristics of battery - types of batteries, construction, working and applications: Primary (alkaline) and secondary (lead-acid and nickel-cadmium) - Modern batteries (zinc air battery and lithium batteries) - precautions for battery maintenance. Fuel cell: Hydrogen - Oxygen fuel cell.Electroplating of copper and electroless plating of nickel

UNIT III **8 Hours**

FUELS AND COMBUSTION

Fuel: Introduction - classification of fuels - calorific value - higher and lower calorific values - analysis of coal (proximate and ultimate) - carbonization - manufacture of synthetic petrol (Bergius process) - knocking - octane number - cetane number - natural gas - Compressed Natural Gas (CNG)- Liquefied Petroleum Gases (LPG) - producer gas - water gas. Combustion of fuels: introduction- theoretical calculation of calorific value - calculation of stoichiometry of fuel and air ratio - ignition temperature

UNIT IV **9 Hours**

POLYMER AND COMPOSITES

Monomers - functionality - degree of polymerizations - classification of polymers based on source and applications; porosity - tortuosity - molecular weight determination by Ostwald method - polymerization methods: addition, condensation and copolymerization - mechanism of free radical polymerization -thermosetting and thermoplastics. Polymer blends - composites, significance, blending-miscible and immiscible blends, phase morphology, fibre reinforced plastics, long and short fibre reinforced composites

UNIT V **8 Hours**

NANOMATERIALS

Types of Nanomaterials - Nano particles - nanoclusters - nano rod - nanowire -nano tube. Synthesis: Top down process: laser ablation - electrodeposition - chemical vapor deposition. Bottom up process: Precipitation - thermolysis - hydrothermal - solvothermal process. Carbon nanotubes: Types - production - properties - applications. Working principle and applications - Scanning Electron Microscope (SEM) - Transmission Electron Microscope (TEM) - UV-Visible spectrophotometer

FOR FURTHER READING

Application of nanomaterials in medicine, environment, energy, information and communication sectors

2 Hours

EXPERIMENT 1

General instructions to students - Handling reagents and safety precautions

4 Hours

EXPERIMENT 2
Water quality of BIT campus - River - Bore well water with respect to hardness, TDS and pH

4 Hours

EXPERIMENT 3
Determination of strength of hydrochloric acid in a given solution using pH meter

4 Hours

EXPERIMENT 4
Determination of strength of a commercial mineral acid by conductometric titration

4 Hours

EXPERIMENT 5
Conductometric titration of mixture of acids

4 Hours

EXPERIMENT 6
Determination of the strength of iron in the given sample by potentiometric method

4 Hours

EXPERIMENT 7
Determination of molecular weight of polyvinyl alcohol by Ostwald viscometry method

4 Hours

EXPERIMENT 8
Estimation of iron (thiocyanate method) in the given solution by spectrophotometric method

Total: 75 Hours

Reference(s)

1. M. Munjal and S.M. Gupta, Wiley Engineering Chemistry, Second edition, Wiley India Pvt. Ltd, New Delhi, 2013
2. A. Pahari and B.Chauhan, Engineering Chemistry, Infinity Science press LLC, New Delhi, 2010
3. P.H. Rieger, Electrochemistry, Springer, Netherland, Second Edition (Reprint) 2012
4. Fred W. Billmeyer JR, Textbook of polymer science, John Wiley & sons, Third edition, 2008
5. G. Cao, Ying Wang, Nanostructures and Nanomaterials: Synthesis, Properties, and Applications, World Scientific, New Jersey, 2011
6. S. Sarkar, Fuels and combustion, 3rd edition, Orient Longman Ltd. New Delhi, 2010

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	1	1		2	4	3			1	3		1		3				1						21
2	2	1	2		2	5	2		1	1	3				1				1						21
3	1	2	2		1	3	3			2	2			1	1				1						19
4	1	1	1		3	4	1		1	1	3			1	2				1						20
5	1	1	1		1	2	2			2	3			2	2				2						19
																							Total		100

Assessment Questions

Remember

1. Define the term break point chlorination.
2. Name a method to prevent the scale formation in the industrial boilers.
3. Recall the cell representation of silver-silver ion electrode.
4. Define single electrode potential of an electrode.
5. List any two advantages of H2-O2 fuel cell.
6. Define functionality of a monomer.

7. Name any two thermoplastic and thermosetting polymers.
8. List any four advantages of CNG.
9. List any two applications of SEM.
10. Recall any two application of X-Ray diffractometer.

Understand

1. Identify the role of calgon conditioning in water treatment.
2. Distinguish between alkaline and non alkaline hardness.
3. Indicate two significances of RO method in water treatment.
4. Explain any three applications of electrochemical series.
5. Enlighten any three factors which affect electrode potential.
6. Indicate any two advantages of free radical polymerization.
7. Identify the reasons for change of properties of materials at nanoscale.
8. Enumerate the various zones in the synthesis of producer gas.
9. Summarize any four applications of calorimeter.
10. With a neat sketch explain the components of TEM.
11. Differentiate bottom up approach of nanoparticle synthesis from and top down approach.

Apply

1. A water sample contains 204 mgs of $CaSO_4$ and 73 mgs of $Mg(HCO_3)_2$ per litre. Calculate the total hardness in terms of $CaCO_3$ equivalence.
2. 100 ml of sample water has hardness equivalent to 12.5ml of 0.08N $MgSO_4$. Calculate hardness in ppm.
3. Find out the single electrode potential of a half cell of zinc electrode dipped in a 0.01M $ZnSO_4$ solution at 25°C? $E°\ Zn/Zn^{2+} = 0.763$ V, R=8.314 JK-1Mol-1, F= 96500 Coulombs.
4. Calculate the reduction potential of Cu^{2+}/Cu=0.5M at 25°C. $E°\ Cu^{2+}/Cu = +0.337$V.
5. Find out the weight and volume of air required for the complete combustion of 1 kg of coke.
6. Predict the incombustible matter of a fuel containing C=84%, S=1.5%, H= 5.5 % & O=8.4%.
7. A sample of coal containing 60% C, 6% H, 33% O, 0.5 % S, 0.2% N and 0.3% of ash. Find the gross and net calorific value of coal.
8. Assess any two advantages of water gas over producer gas.
9. Calculate the degree of polymerization of polypropylene having molecular weight of 25200.
10. Implement the ion selective electrode principle to find the pH of HCl solution using glass electrode with necessary equations.

Analyse / Evaluate

1. Calgon conditioning is advantageous over phosphate conditioning- reason out.
2. Soft water is not demineralized water whereas demineralized water is a soft water- Jusify.
3. Why ammonia buffer is added in EDTA titration for the determination of water hardness?
4. Differentiate between thermoplastic and thermosetting plastics.
5. Hydrogen electrode is not generally used in pH measurements – Why?
6. Zinc reacts with dil.H_2SO_4 to give hydrogen but silver doesn't liberate hydrogen. Give reasons.
7. Good fuel should have low ash content- Give reasons.
8. Sugar is an example of non-electrolyte -Reason out.
9. Differentiate between nanocluster and nanocrystal.
10. Why copper cannot displace hydrogen from mineral acid solution?
11. Hydrogen fuel is an ideal fuel for the future among all other fuels- Justify.
12. Generate a best method for water purification and explain the components.

15CH205 WATER TECHNOLOGY AND GREEN CHEMISTRY

3 0 2 4

Course Objectives

- To impart the knowledge on the principles of water technology and green chemistry
- To understand the principles and applications of green technology in water treatments
- To infer the engineering applications of green chemistry in dyes, corrosion engineering and nanotechnology

Course Outcomes (COs)

1. Understand the importance of green chemistry with its emergence and development.
2. Realize the designing of safer methodologies for green technology to meet the objectives of green engineering.
3. Exemplify the type of corrosion and its mechanism which will help to develop the corrosion control methods.
4. Apply suitable technique to extract natural dye from its source.
5. Familiarize with the synthesis and characterization techniques of nanomaterials.

UNIT I **9 Hours**

WATER TREATMENT

Water quality parameters - Hardness of water - Disadvantages of hard water - Degree of hardness and its estimation (EDTA method) - Boiler feed water - Boiler troubles: Priming, foaming and caustic embrittlement - Softening of hard water: Internal conditioning: Sodium hexameta phosphate - Phosphate methods; External conditioning: Ion exchange method - Desalination: Reverse osmosis - Electrodialysis. Domestic water treatment - Disinfection of water - Break point chlorination.

UNIT II **8 Hours**

WASTE WATER ANALYSIS

Basic principles and concept of green chemistry - Need of green chemistry in day-to-day life - Scientific areas for practical applications of green chemistry - Industrial effluents - Waste water analysis: Concept of chemical oxygen demand (COD) and biological oxygen demand (BOD) - Removal of trace pollutants in waste water: Membrane Bioreactor (MBR) technology - Wet oxidation method.

UNIT III **10 Hours**

CHEMISTRY OF CORROSION

Corrosion: Mechanism of corrosion - chemical and electrochemical - Pilling-Bedworth rule - oxygen absorption - hydrogen evolution - galvanic series. Types of corrosion: Galvanic corrosion - differential aeration corrosion (pitting, pipeline, water line and wire fence corrosion) - factors influencing corrosion. Methods of corrosion control: choice of metals and alloys - proper designing - cathodic protection (Sacrificial anode method, impressed current method)-modifying the environment. Protective coatings: Concept of electroplating: electroplating (gold and copper) - electroless plating (nickel and copper).

UNIT IV **9 Hours**

NATURAL DYES

Introduction - definition - classification of natural dyes - concept of chromophores and auxochromes - Extraction process of colour component from natural dyes: Aqueous extraction, non-aqueous extraction - Purification of natural dyes: Chromatography techniques - Types - Column chromatography - thin layer chromatography - Qualitative analysis: UV-Visible spectroscopic study - Mordant: Metallic and non-metallic mordant - advantages and disadvantages of natural dyes.

UNIT V **9 Hours**

NANOMATERIALS

Types of Nanomaterials - Nano particles - nanoclusters - nano rod - nanowire - nano tube. Synthesis: Top down process: laser ablation - electrodeposition - chemical vapor deposition. Bottom up process: Precipitation - thermolysis - hydrothermal - solvothermal process. Carbon nanotubes: Types - production - properties - applications. Working principle and applications: Scanning Electron Microscope (SEM) - Transmission Electron Microscope (TEM) - UV- Visible spectrophotometer. Synthesis of Au and Ag nanoparticles using plant extract - Advantages.

FOR FURTHER READING

Protection of metals in concrete against corrosion; Microwave technology on green chemistry

2 Hours

EXPERIMENT 1

General instructions to students - Handling reagents and safety precautions

4 Hours

EXPERIMENT 2

Water quality- river/bore well water with respect to hardness and TDS

4 Hours

EXPERIMENT 3

Determination of strength of hydrochloric acid in a given solution using pH meter

4 Hours

EXPERIMENT 4

Estimation of strength of iron by potentiometric method using calomel electrode

4 Hours

EXPERIMENT 5

Extraction of a natural dye by aqueous extraction method

4 Hours

EXPERIMENT 6

Measurement of rate of corrosion of mild steel in aerated neutral/acidic/alkaline solution by weight loss measurements/Tafel polarization method

4 Hours

EXPERIMENT 7

Determination of dye concentration in a given sample by using UV-Visible spectroscopic method

4 Hours

EXPERIMENT 8

Estimation of iron (thiocyanate method) in the given solution by spectrophotometric method

Total: 75 Hours

Reference(s)

1. M. Munjal and S.M. Gupta, Wiley Engineering Chemistry, Second edition, Wiley India Pvt. Ltd, New Delhi, 2013
2. V K Ahluwalia, Green Chemistry - Environmentally Benign Reactions, Ane Books Pvt. Ltd., New Delhi, 2nd Edition, 2012
3. Giusy Lofrano, Green Technologies for Wastewater Treatment - Energy Recovery and Emerging Compounds Removal, Springer Dordrecht Heidelberg, New York, London, 2012
4. Ashis Kumar Samanta and Adwaita Konar, Natural Dyes - Dyeing of Textiles with Natural Dyes, Dr.Emriye Akcakoca Kumbasar (Ed.), InTech Publisher, New Delhi, 2011
5. J. C. Kuriacose and J. Rajaram, Chemistry in Engineering & Technology, Vol. 1&2, Tata McGraw-Hill, New Delhi, 2010
6. David Pozo perez, Nanotechnology and Nanomaterials, InTech Publishers, NewDelhi, 2010

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	2			3	3				3	3			2	2										20
2	2				3	4				2	2			2	2										17
3	1	2	1		4	3	3				3			1	2			2				1			23
4	1	2			6	6				3												2			20
5	3	2	2		3	6	2		2																20
																								Total	100

Assessment Questions

Remember

1. List out any four water quality parameters.
2. Name the salts responsible for temporary hardness of water.
3. Recall any two practical applications of green chemistry.
4. Define wet oxidation in waste water treatment.
5. State Pilling Bed-worth′s rule.
6. Recall any two examples for differential aeration corrosion.
7. Name any two natural dyes.
8. Recall the role of auxochromes in dyes.
9. Name the four methods of nanomaterial synthesis.
10. Name any two plant extracts used in silver nanoparticles synthesis.

Understand

1. Hardness of water is always expressed in terms of CaCO3 equivalent. Reason out.
2. Soft water is not demineralized water whereas demineralized water is soft water - Justify.
3. Represent the need of green chemistry in waste water treatment.
4. Indicate the importance of MBR technology in waste water treatment.
5. Express the mechanism of wet corrosion.
6. Bolt and nut made from same metal is preferred in practice. Reason out.
7. Classify the types of natural dyes based on their chemical structure.
8. Compare the properties of metallic and non-metallic mordents.
9. Infer any two important needs of green chemistry in nanotechnology sector.
10. Identify the physicochemical and engineering properties of nanomaterials.

Apply

1. Hardness of water is always expressed in terms of CaCO3 equivalent.Reason out.
2. Calculate the non-carbonate hardness of a sample of water containing the dissolved salts as given below in mg/l Mg(HCO3)2 = 7.3; Ca(HCO3)2 = 40.5 and NaCl =50.
3. Select the scientific areas for the practical applications of green chemistry.
4. Predict the significance of sacrificial anode in the prevention of corrosion.
5. Execute the principle of electro-deposition to achieve copper coating on stainless steel object with a neat diagram.
6. Select a suitable technique used for the purification of natural dye.
7. Implement the aqueous extraction process to get colored compound from natural dyes.

Analyse

1. Distinguish between scale and sludge.
2. Parse the four reasons for boiler troubles.
3. Differentiate between BOD and COD.
4. The rate of corrosion increases with increase in temperature. Give reason.
5. Outline the effect of pH of the conducting medium on corrosion.
6. Differentiate chromophores & auxochromes in dyes.
7. Conclude the three applications of UV-spectroscopy in quantitate and qualitative analysis.
8. Distinguish between nanotubes and nanorods.

Evaluate / Create

1. The temporary hardness of water is 150 ppm and the permanent hardness is 200 ppm. Calculate the total harness in mg/L.
2. Deduce any two methods to improve the quality of waste water.
3. Substantiate the statement that nature of the environment affects corrosion.
4. Critique the importance of natural dyes.
5. Choose any two best methods to synthesis nanoparticles.
6. Plan and execute a method to get pure water from waste water using available low coast material in your area.
7. Argue the characteristic properties of natural and synthetic dyes.

DISCIPLINE ELECTIVES

15FT001 PROTECTIVE CLOTHING 3 0 0 3

Course Objectives

- To understand the concept of protective textiles and garments.
- To comprehend the various principles and methods used to produce protective textiles and garments

Course Outcomes (COs)

1. Differentiate between various protective textiles and garments
2. Exemplify protective textile principles and the methods
3. Identify suitable knitting machines to produce various types of knitted fabric structures

UNIT I **9 Hours**

FUNDAMENTALS OF PROTECTIVE CLOTHING

Classification of protective textiles - Options of materials and technologies - Factors influencing design and use of protective clothing - Clothing system and functionality - Selection of materials. fibres and fabrics for protective textiles

UNIT II **9 Hours**

EVALUATION CONCEPTS OF PROTECTIVE CLOTHING

Surface treatments for protective textiles: Processes and applications - Evaluation of protective clothing: Manikin tests - Fabric tests - Protection Vs comfort - Description of specification: activity - movement - impact.

UNIT III **9 Hours**

PROTECTION AGAINST COLD, BIOLOGICAL HAZARDS

Textiles and garments for protection - Cold protection: Requirements - Material selection - performance measurement. Biological hazard protection - Microbiology of skin-Clothing interface - Bacterial and liquid transmission through fabrics - Effective decontamination - Disinfection - Sterilization

UNIT IV **9 Hours**

PROTECTION OF CIVILIAN AND MILITARY PERSONNEL

Civilian protection clothing: Garment types and design features - Performance measurements. UV protection: Classification of skin and UVR - UPF Vs SPF - Factors influencing UPF in textiles and garments - Assessment methods and standards. Military protection: General requirements - Combat clothing system

UNIT V **9 Hours**

PROTECTION FOR INDUSTRIAL PERSONNEL

Electrostatic protection: Hazards - Measurement and remedial techniques. Chemical protection: Materials - Particulate hazards - liquid hazards - Toxic fumes and gases - Barrier effectiveness: Permeation - Diffusion - Test methods.

FOR FURTHER READING

Organic and inorganic Fibres, Thermal evalution, Design and requirements of gowns and drapes - Test methods, Ballistic protection - Camouflages, Concealment and deception, Protective clothing for oil and gas industries.

Total: 45 Hours

Reference(s)

1. R. A. Scott, Textiles for Protection, Woodhead Publishing Limited, England, 2005
2. M. Raheel, Protective Clothing Systems and Materials, Marcel Dekker Publication, New York, 1994
3. A. R. Horrocks and S. C. Andrew, Handbook of Technical Textiles, Woodhead Publishing Limited, England, 2006
4. S. Adanur, Wellington Sears Handbook of Industrial Textiles, Technomic Publication, UK, 1995
5. www.technicaltextile.net/protective-textile
6. www.slideshare.net/muhundhanmurugasen/protective-textiles

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1		3			3						4				4				3					3	20
2			3			4				3				3				3						4	20
3		3	3			3					2				3				2					4	20
4					2	2				3	1			2	2			2	3					3	20
5		3			2	2				3	1			2	2			2	2					1	20
																							Total		100

Assessment Questions

Remember

1. Classify protective textiles
2. What is thermal evaluation?
3. What are the requirements for clod protection?
4. List the factors influencing UV Protection in textiles.
5. Differentiate comfort verses protection.
6. What do you mean by electrostatic protection?
7. Name the toxic fumes and gases.
8. What do you understand by UV protection?
9. Differentiate organic and inorganic fibres.
10. List the clothing used for oil and gas industries.

Understand

1. What are the factors influencing while designing protective clothing?
2. Why do you require surface treatments for protective textiles?
3. How the cold protection performance can be measured?
4. Explain about electrostatic protection.
5. Differentiate between civilian and military protection.
6. Compare particulate hazards and liquid hazards.
7. Explain the factors which influence UPF in textile and garments.
8. Elaborate the working of sterilization.
9. Ennumerate the general requirements for military protection.
10. What is the principle behind barrier protection?

Apply

1. List the factors to be considered in selection of materials for protective clothing.
2. What kind of properties can be tested by using manikin tests?
3. How sterilization is carried out for cotton fabrics?
4. Give a suitable example for Ballistic protection.
5. Explain how diffusion is used in application of protective coatings?
6. Asses the function of toxic fumes and gases.
7. Give a suitable example for electrostatic protection.
8. Explain how Camouflages lays a role in ballistic protection.
9. Give a suitable example of garments used in oil and factory industries.
10. Give the general requirements for combat clothing system.

Analyse / Evaluate / Create

1. Distinguish between various types protective textiles
2. Distinguish between various types Electrostatic Protection
3. Differentiate between civilian and military protective textiles for their performance assessment methods
4. Evaluate the test method to measuring military protective textilesmaterials.
5. Evaluate the test method to measuring Chemical Protection textiles materials
6. Design the protective textile material by using various natural textile materials.
7. Select the raw material to produce the EMI shielding protective textiles.

15FT002 INTELLIGENT TEXTILES 3 0 0 3

Course Objectives

- To understand intelligent textiles
- To comprehend various principles and methods applied to produce intelligent textiles
- To identify the suitable textile materials for intelligent textiles

Course Outcomes (COs)

1. Differentiate between the various intelligent textiles
2. Exemplify the intelligent textile principles and the methods
3. Select the suitable textile materials for intelligent textiles

UNIT I 9 Hours

SMART MATERIALS

Classification and need for intelligent textiles - Smart materials and properties: Smart fibres- Nano fibres, Photo adaptive fibres, chameleon fibres, conductive fibres. Phase change materials, Shape memory materials. Intelligent polymers, Applications of intelligent textiles.

UNIT II **9 Hours**

INTERACTIVE TEXTILES

Thermo wear, sweater with thermal insulation, Smart trouser and t-shirts, Aesthetic interactive applications, Mood changing textiles for smart ambience, Chromic textiles - Photochromic, Thermo chromic andElectrochromic textiles and applications; Solar textiles - production and distribution of electricity from solar radiation; Conductive textiles - definition, formation of electrical circuits in textile structures.

UNIT III **9 Hours**

ACTIVE WEAR

Breathable thermo wear, anti sweat apparel, sports underwear, anti drag-swim wear, athletics wear with pressure receptors, temperature controlled garment, liquid insulated garment, high tech cooling vest, energy expenditure wear

UNIT IV **9 Hours**

TEXTILES FOR BIO-MEDICAL APPLICATIONS

Intelligent textiles for medical and monitoring applications, Wearable bio-feedback systems. textiles for wearable health assistants, tailor-made intelligent polymers for biomedical applications, textile scaffolds in tissue engineering, pre-hospital emergency care garments

UNIT V **9 Hours**

WEARABLE ELECTRONICS

Multifunctional and multi-use intelligent textiles; Smart textile composites integrated with fibre optic sensors; Hollow fibre membranes for gas separation; Adaptive and responsive textile structures; Embroidery and smart textiles; Wearable technology for snow clothing.

FOR FURTHER READING

Encapsulation technique in production of intelligent fibres, Properties of conductive polymer fibres, Futuristic jogging suit, Intelligent textiles in work wear; children wear.

Total: 45 Hours

Reference(s)

1. H.Mattila (ed), Intelligent Textiles and Clothing, Woodhead Publishing Ltd., England, 2006.
2. X.M.Tao (ed), Smart Fibres, Fabrics and Clothing: Fundamentals and Applications, Woodhead Publishing Ltd., England, 2001.
3. Jinlian Hu, Shape Memory Polymers and Textiles, 1st edition, CRC, USA, 2007.
4. William D.Armstrong, Smart Structures and Materials 2005: Active Materials Behaviour and Mechanics, Society of Photooptics, USA, 2005
5. Hipler, Biofunctional Textiles and the Skin, 1st edition, S.Karger Ag, Switzerland, 2006.
6. www.advancedtextilescouce.com

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2				2					3					3				4				2	4	20
2		2				3					4				3				3				2	3	20
3	1	1				2				2	2				2			1	3				3	3	20
4	2					2				1	2			2	2			1	2				2	4	20
5	1	1			1	2				1	2				2			3	2				2	3	20
																								Total	100

Assessment Questions

Remember

1. Define “Intelligent Apparel”.
2. Classify intelligent apparel.
3. State the functions of intelligent apparel.
4. What are the characteristics of a PCM material?
5. Name any six PCM materials along with their phase change temperature.
6. What do you understand by chameleon fibres?
7. Name the fibers used in the preparation of tissue engineering.
8. What do you understand by chameleon fibres?
9. Enlist the applications of fibre optic sensors.
10. What do you mean by conductive textiles?
11. Name the conductive materials.

Understand

1. Compare traditional textiles and smart textiles..
2. How can a textile / apparel can be made intelligent.
3. How a feedback system can be implemented in bio-medical applications?
4. What’s the principle behind photochromism?.
5. Compare Photochromic and Thermochromic materials.
6. Differentiate between Thermo chromic andElectrochromic textiles.
7. Explain the factors which influence breathable thermo wear.
8. Elaborate the working principle of high tech cooling vest
9. Ennumerate the working principle of energy expenditure wear.
10. Differentiate between adaptive and responsive textile structures.

Apply

1. How active wear can be made thermally regulated?
2. How solar panels can be attached to textiles?
3. Application of conductive fibres in the field of wearable electronic.
4. Mention any six quality standards that are applicable to apparel.
5. How will you determine assure quality in pattern making, cutting, stitching, pressing and packaging departments?
6. Application of intelligent textile in the field of bio medical.
7. Asses the function of intelligent textile in work wear.
8. Give a suitable example for smart textiles.
9. Explain Wearable technology for snow clothing.
10. Give a suitable example of garments used in chromic textiles.

Analyse / Evaluate / Create

1. Critically Analyze the applicability of conductive fibers in the field of e-wearable textiles.
2. Distinguish between various types of breathable textiles.
3. Critically analyze the properties and characteristics of a smart / intelligent material.
4. How snow clothing can be made intelligent?
5. Evaluate the role of various encapsulation techniques in intelligent textiles.
6. Design various ways and means of creating breathable garments.
7. Create smart ambience using intelligent materials.

15FT003 HOME FURNISHINGS 3 0 0 3

Course Objectives

- To have fundamental knowledge on home furnishings.
- To know the various designs / styles of bed linen, bath linen, kitchen linen, table linen and living room furnishings.
- To acquire knowledge on various window treatments.

Course Outcomes (COs)

1. Understand the raw materials and value added finishes used in home furnishgns.
2. Understand the designs / styles of bed linen, bath linen, kitchen linen, table linen and living room furnishings and window treatments.
3. Understand the care and maintenance of home furnishings.

UNIT I **9 Hours**

INTRODUCTION

Introduction to home furnishing, Definition, Classification, Raw materials used in various home furnishing: woven, knitted, nonwoven, printed, embroidered, stitched and hand made. Factors affecting selection of home furnishing: fibre, fabric, value added finishing (water repellent/prooft, soil repellent, antimicrobial, flame retardant, mosquito repellant) and price.

UNIT II **9 Hours**

BED LINEN

Types- Bed Skirt, Bed Cover, Bed Sheet, Bed Spread, Mattress, Mattress Pad, Mattress Protector, Throw (Small blanket), Duvet, Duvet Cover, Comforter, Comforter Cover, Quilt, Quilt Cover, Blanket, Blanket Cover, Pillow , Pillow Cover, Sham , Mosquito Net. Care and maintenance of bed linen.

UNIT III **9 Hours**

BATH LINEN AND KITCHEN LINEN

Bath linen: Types, Shower Curtain, Bath Robe, Bath Towels, Bath Mats, Bath Rugs, Face Towels and Hand Towels. Kitchen Linen: Apron, Mitten, Napkin, Dish Cloth, Pot Holder, Place Mat, Kitchen Towel, Coaster, Tea Coyz, Placemat. Care and maintenance of bath and kitchen linen.

UNIT IV **9 Hours**

TABLE LINEN AND LIVING ROOM FURNISHING

Table Pad, Table Protector, Table Cloth, Table Runner, Table Skirt, Table Mat, Chair Cover, Chair Mat, Chair Pad, Sofa Cover, Cushion, Cushion Cover, Teapoy cover, Bolster, Wall coverings. Floor covering: Classification, Hard floor covering Resilient, Manamade and natural stone flooring, Soft floor covering carpets and rugs. Care and maintenance of table linen and living room furnishings.

UNIT V **9 Hours**

WINDOW TREATMENT

Types of doors and windows. Window treatment: Hard treatments, Soft treatments, Top treatments, Glass treatments. Curtains and draperies: Types, Elements, Accessories, Construction and selection criterion.`

FOR FURTHER READING

National & International home furnishing assocaitions, trade organizations and trade fairs. Quality standards and Perfromance assessment of home furnishings.

Total: 45 Hours

Reference(s)

1. Subrata Das, Performance of Home Textiles, Woodhead Publishing Pvt. Ltd, 2010
2. T Rowe, Interior textiles- Design and Developments, Woodhead Publishing Pvt. Ltd, 2009
3. Jay Diamond and Ellen Diamond, Fashion Apparel, Accessories, Home Furnishings, Pearson Prentice Hall, New Jersey, 2007.
4. Elsasser and Virginia Hencken, Know Your Home Furnishings, Fairchild Books & Visuals, September, 2003
5. Hamlym, Bed and Table linen, Octopus Publishing Group Ltd, Newyork 2001
6. Cargill and Katrin, Home Furnishing Workbook: Featuring 32 Step-by-step Textile Furnishing Projects, Rayland Peters and Small, USA, 2001.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	1			1	1				1	2				2			1	3				2	4	20
2	1	1				2				1	3			1	3			1	2				1	4	20
3	2	1			1	1				1	3			1	3			3	1				1	2	20
4		2				3					2			1	2			2	3				1	4	20
5	2	1			1	1				1	3			1	2			1	2				1	4	20
																							Total		100

Assessment Questions

Remember

1. Define home furnishing.
2. List out the factors to be considered while selecting materials for home furnishing.
3. What are placemats?
4. State the characteristics of a blanket.
5. Why pot holders are used?
6. State the advantages of “foam mattress”.
7. List the fibres used as padding in pillows.
8. Name the finishes that can be applied for Kitchen furnishings.

Understand

1. Why do we require a “tea coyz”?
2. How do you specify the quality of an apron?
3. What types of materials are used for the manufacture of apron?
4. Classify “home furnishings”
5. Explain the essential features of bed throws through neat sketching.
6. With the help of a neat sketch describe the special features of “Duvets”.
7. Summarize various techniques that are adopted for the manufacture of home furnishings.
8. With neat sketches, summarize the various styles / designs of pillow.
9. Summarize the various styles / designs of bed sheets, bed cover and bed skirt.
10. Summarize various techniques that are adopted for the manufacture of home furnishings.
11. Discuss on the various types of door and windows for their materials, design and styles.

Apply

1. Assess the role of fibre properties in the purchasing of furnishing items.
2. Select the suitable fibres for various window treatments.
3. Compute the fabric requirement for the manufacturing of various types of curtains.
4. Demosntrate the properties of pile fabrics
5. Predict the life cycle of upholsteries used in Automobile with reference to their construction type.
6. Demonstrate a color palette for table linens that shall be used for rain forest theme restaurant.

7. Predict the role of inerior design trends in design development of home furnishings
8. Carry out a strategy to revamp finishing specifications of towels as per Oeko tex norms.
9. Demosntrate the aesthetics of cushions in contemporary interior styling
10. Predict the sound absorbing characteristics of acoustic fabrics.

Analyse / Evaluate / Create

1. Compare and contrast bed sheet and bed spread
2. Curtains are truly called as “utility products” Justify.
3. “Selection of mattress is not an easy job”. Justify the statement with relevant examples.
4. Differentiate between “Quilt and Duvet”.
5. Compare and contrast “pillow” and “bolster”.
6. Identify the suitable finishing treatment for curtains.
7. Determine the amount of fabric required for a valence.
8. Identify the fibre properties required for bed linen, bath linen, kitchen linen and table linen.
9. Design an aesthetically appealing curtain for the hall.
10. Create a tablemat with hand embroidery design.

15FT004 CLOTHING COMFORT 3 0 0 3

Course Objectives

- To understand fiber, yarn and fabric properties that influence the fabric comfort
- To enrich the knowledge on testing, analyzing and predicting the comfort properties of textiles.
- To exemplify thermal comfort, sensorial comfort and movement comfort

Course Outcomes (COs)

1. Comprehend thermal comfort, sensorial comfort and movement comfort mechanisms
2. Differentiate between thermal comfort, sensorial comfort and movement comfort
3. Select the suitable woven and knitted fabrics for thermal comfort, sensorial comfort and movement comfort

UNIT I 9 Hours

HUMAN PHYSIOLOGY AND THE ROLE OF CLOTHING

Definition of comfort, Human physiological aspect of comfort, Energy metabolism and physical work, Human heat balance, Clothing as near environment, Various aspects of clothing comfort, Comfort variables, Effective temperature and comfort chart, Response to extreme temperature, Development of heat stress and its control, Protective clothing.

UNIT II 9 Hours

PROPERTIES OF FIBERS AND FABRICS THAT CONTRIBUTE TO HUMAN COMFORT

Comfort properties of fibers, Physical modification of fibers, Comfort properties of yarns, Comfort properties of fabric structures. Improving moisture management in apparel: Transport of perspiration, Fundamentals of moisture transfer between human body and environment, Factors influencing moisture transport, Improving moisture transport, Clothing requirements for different environmental conditions.

UNIT III **9 Hours**

TESTING, ANALYZING AND PREDICTING THE COMFORT PROPERTIES OF TEXTILES

Measurement of thermo-physiological comfort: Thermo-physiological comfort, Thermal resistance, Water vapour transport, Air permeability, Wicking, buffering and absorbency.Characterization of comfort, Testing, analyzing and predicting neurophysiologic comfort, Testing, analyzing and predicting thermo physiological comfort, Design-oriented comfort model.

UNIT IV **9 Hours**

IMPROVING TACTILE COMFORT IN FABRICS AND CLOTHING

Comfort and neurophysiology, Human tactile sensation, Fabric mechanical properties and tactile, pressure sensations, Warmth or coolness to the touch of fabrics, Improving the textile surface properties for tactile sensation, Predictability of sensory comfort. Improving body movement comfort in apparel: Fundamental principles of movement in apparel, fashion and functional apparel: aesthetics, protection, performance and movement, Materials and design strategies to provide appropriate movement performance, Movement and garment, stretch/pressure/compression.

UNIT V **9 Hours**

ACHIEVING COMFORT IN INTIMATE APPAREL

Sensorial comfort for intimate apparel, Thermal comfort for intimate apparel, Motion comfort for intimate apparel, Aesthetical comfort for intimate apparel, Hygienic comfort for intimate apparel. `

FOR FURTHER READING

Comfort parameters, Comfort properties of defense fabrics, Recent testing methods, New engineering techniques to increase tactile comfort in fabrics, Medical comfort with functional properties

Total: 45 Hours

Reference(s)

1. Guowen Song, Improving comfort in clothing, The Textile Institute and Woodhead Publishing, UK, 2011.
2. Apurba Das, R. Alagirusamy, Science in Clothing Comfort, Woodhead Publishing Limited, Abington Hall, Granta Park, Great Abington,Cambridge, UK,2010
3. Radostina A. Angelova,Textiles and Human Thermophysiological Comfort in the Indoor Environment,CRC Press,Taylor & Francis Group,2015
4. P. Elsner and K. L. Hatch, Textiles and the Skin, Karger Publications, UK, 2003.
5. Y. Li, The Science of Clothing Comfort, Textile Progress, Vol.31, Textile Institute, 2001.
6. nptel.ac.in/syllabus/116106041

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2			1	2				1	3			1	2			1	3					3	20
2		1				1				1	1			2	2			3	4				1	4	20
3	1	1				2				2				1	2			2	4				1	4	20
4	1	1			1	1				1	1			1	2			2	4				1	4	20
5	1	1			1	1				1	2			1	2			2	3				2	3	20
																							Total		100

Assessment Questions

Remember

1. Define comfort.
2. What are the aspects of clothing comfort?
3. List out the comfort properties of various fabric structures.
4. What is Energy metabolism?
5. What are the clothing requirements for different environmental conditions?
6. List out the low stress mechanical properties which aid comfort.
7. What is sensorial comfort for intimate apparel?
8. What is hygienic comfort for intimate apparel?
9. What are the different components of comfort?
10. What is Metabolic activity of body?
11. State the role of peripheral blood vessels
12. What is Acclimatisation?

Understand

1. How can heat stress be developed and controlled?
2. How important is the role of comfort for human psychology in clothing?
3. How does the physical modification of fibres contribute to human clothing comfort?
4. How significant is to improve the moisture transport for clothing comfort?
5. Why Twill pattern is smoother than plain pattern?
6. How do you measure the Water vapour resistance?
7. How do you improve the wicking rate of inner layer of fabric to human body?
8. How do you determine the scratchiness?
9. Why high modulus and good recovery fabrics are used in modern athletic apparel?

Apply

1. How do you determine the fabric softness?
2. How do you determine the Fabric roughness?
3. How do you determine the Fabric stiffness?
4. How to apply the fundamental principles of fabric engineering to bring clothing comfort?
5. Predict the role of thermal comfort in engineering fabric quality for winter seasons
6. Demosntrate the impact of moisture adsorption features in polyester fabrics
7. Execute a strategy to engineer water proof fabrics by applying finishes
8. Demonstrate the role of tactile comfort in fabrics used for intimate apparels
9. Predict the applications where high wickability is a necessary feature
10. Demosntrate the process of accomplishing ergonomic comfort by making pattern changes.

Analyse

1. Compare wicking, buffering and absorbency.
2. Compare and contrast thermal comfort, tactile comfort and movement comfort.
3. Distinguish between psychological and physiological comfort.
4. Differentiate between air permeability and relative water vapor permeability.
5. Distinguish between subjective and objective measurement of fabric hand value
6. Analyse the Neurophysiological (tactile or sensory) comfort
7. Enumerate the measuring fabric tactile properties
8. Criticaly Analyze Human physiological aspect of comfort
9. Criticaly Analyse in detail the significance of effective temperature and the comfort chart.
10. CriticalyanalyseHow to achieve the comfort for an intimate apparel?

Evaluate / Create

1. Relate Comfort and neurophysiology in clothing.
2. How to evaluate a Design-oriented comfort model?
3. Develop a clothing with necessary requirements for specific environmental conditions.
4. Formulate a comfort clothing for children's.
5. Develop a comfort garment that suit for all age group peoples
6. Develop a comfort garment for pregnant women
7. Develop a garment for physically challenged peoples.

15FT005 FASHION COMMUNICATION 3 0 0 3

Course Objectives

- To impart knowledge on clothing culture and style
- To know about fashion modernity

Course Outcomes (COs)

1. Understand the basics of fashion communication and clothing terms.
2. Gain knowledge about functions of fashion clothing.
3. Evaluate the link between fashion clothing and society

UNIT I **9 Hours**

INTRODUCTION TO FASHION COMMUNICATION

Definition - Communication, Fashion - means of communication, Fashion Journalism, Methods of visual communication- Fashion photography, Fashion magazines, The Catalogue.

UNIT II **9 Hours**

FASHION AND CLOTHING TERMS

Fashion, Style, Clothing and Dress. Fashion and Anti fashion, Fashion clothing and Deception, Fashion clothing and Communication, Fashion clothing and culture

UNIT III **9 Hours**

FUNCTION OF FASHION CLOTHING

Material function - protection, modesty and concealment, immodesty and attraction. Cultural functions -communication, individuality expressions, social status, social role, economic status, political status, religious status, social rituals.

UNIT IV **9 Hours**

FASHION CLOTHING AND MEANING

Meaning as external to the garment / image / ensemble -meaning as internal to the garment/image/ensemble - semi-logical accounts of meaning

UNIT V **9 Hours**

FASHION CLOTHING AND SOCIETY

Fashion clothing and class, fashion clothing, sex and gender. Fashion clothing and revolution: revolution and resistance, passive and active consumption.

FOR FURTHER READING

Fashion and modernity, fashion and post modernity, fashion art, performance, masquerade fashion and allegory, fashion and un-decidability, fashion and pastiche, fashion and bricolage.

Total: 45 Hours

Reference(s)

1. Malcolm Barnard, Fashion Theory: An Introduction, Taylor & Francis Books Ltd.,2014
2. Fortunati and Katz, Riccini, Mediating the Human Body Technology, Communication, and Fashion, Lawrence Erlbaum Associates Publishers, USA, 2003.
3. Greene and Burleson, Handbook of Communication and Social Interaction Skills, Lawrence Erlbaum Associates Publisher, 2003.
4. Malcolm Barnard, Fashion as Communication, Taylor & Francis Books Ltd., UK, 2002.
5. Shepherd and Rothenbuhler, Communication and Community, Lawrence Erlbaum Associates, USA, 2001.
6. Fred Davis, Fashion, Culture, and Identity, University of Chicago Press, USA, 1994.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2			1	1				1	1			1	3			1	3				1	4	20
2	1	2			2	1				2	1			1	3				2				2	3	20
3	2	1			1	1				1	2			2	3			2	1				1	3	20
4	1	2			2	2					2				3			1	2				2	3	20
5	1	2			1	2					2			1	3			1	3				1	3	20
																								Total	100

Assessment Questions

Remember

1. Define the term fashion communication.
2. List out the various sources from which social status is accrued?
3. Who gives the external meaning to the garment?
4. Define anti-fashions
5. State the importance of evolution of modernity in 19th century.
6. What is the idea behind ‘Men act and women appear’?
7. What is the meaning of SEMIOLOGY?
8. What is the myth and ideology behind denotation and connotation?

Understand

1. What do you understand by the term modesty?
2. How culture influences the fashion clothing?
3. Why post-modernism is highly linked with cultural influences?
4. What do you understand the fashion reversal and refusal?
5. How did anti-fashion give a clear differentiation from fashion?
6. How gender influences the fashion?
7. Interrelate capitalism and feudalism.
8. Explain in brief the ‘Women as active spectators’
9. Explain the term signifier-signified with reference to any garment.
10. How social status and economic status influence fashion clothing?

Apply

1. Deliberate fashion and post modernity.
2. Demonstrate the features of allegory and pastiche
3. Predict the role of color in fashion communication
4. Show the impact of art styles in fashion communication
5. Demosntrate the concept of bricolage.
6. Execute a strategy to implement bricolage principles in design and development of sustainable fashion
7. Demonstrate the features of androgynous look
8. Predict the importance of capitalism in sustaining fashion culture
9. Implement a strategy to transevolve the look of Indian ethnic styles
10. Demosntrate the role of feminism in fashion diffusion

Analyse / Evaluate / Create

1. Differentiate between style & design.
2. Compare and contrast the terms mordernity and post-modernity
3. Differentiate between fashion and clothing.
4. Analyze the meaning of garment express internally.
5. With the help of a neat diagram elaborate the meaning of SYNTAGAM and PARADIGAM.
6. Analyze the contribution of revolution and resistance in developing fashion clothing.
7. Men look -Women appear. Discuss.
8. Relate the connection between clothing styles and fashion changes.
9. Relate the influence of political status and religious status of individuals on fashion clothing.

15FT006 FASHION STYLING AND MODELING 2 0 2 3

Course Objectives

- To enable the Students identify fashion ideas and styling trends
- To impart the knowledge of formulating different looks.
- To enable the Students derive fashion show presentation concepts.

Course Outcomes (COs)

1. Interpret fashion styling trends and categorize them.
2. Formulate different fashion looks.
3. Conceptualize new fashion show themes and organize presentations.

UNIT I **6 Hours**

INTRODUCTION TO FASHION DESIGN HISTORY

Review of notable fashion icons - 20 designers and fashion Innovators - 20 designers. Fashion categories and Clothing genres Active wear, swimwear, sportswear separates, dresses, suits, evening wear, outerwear. Core visual fashion concepts ethnic, postmodern, avant-garde, historic, modernity, sexuality and sporty.

UNIT II **6 Hours**

FASHION SUBCULTURES

Styles from the street subculture and aesthetics: The Dandy, Hiphop, Skater, Grunge, Punk, Fetish, Goth, steam punk, Japanese style tribes, Minimalist, Classic, romantic, sporty, urban, postmodern, Deconstructivist.

UNIT III **6 Hours**

FASHION CHOREOGRAPHY

Fashion choreography concept development, Create visual art plans and presentation themes, Design briefing and content development, Photo shooting, Choosing models, Selection criteria for make up concept.

UNIT IV **6 Hours**

FASHION MODELING

Modeling Editorial modeling, Fit model, Showroom models, runway models, retail models, Catalog / fashion print models. Fashion model size requirements, working on expression and pose, art of posing, posing styles

UNIT V **6 Hours**

GENERATION ANALYSIS

Catwalk analysis report interpretation, Info graphics, Tagging of attributes color, shape, print, material, looks, necklines. Generation analysis Generation X, Gen Y, Gen Z.(Prints and patterns, must haves, textile & trims, key look)

FOR FURTHER READING

Looks floated in current Paris, Milan, London and Newyork fashion week. Content writing for luxury fashion brands.

3 Hours

EXPERIMENT 1
Develop a avantegarde concept and show supporting illustrations

4 Hours

EXPERIMENT 2
Survey retail collections (any one category) and summarize them

4 Hours

EXPERIMENT 3
Analyze the contemporary visual core concepts and forecast a new concept

3 Hours

EXPERIMENT 4
Prepare a style plan for the new visual concept

4 Hours

EXPERIMENT 5
Choose the trendy hair styles (any four) and improvise them for next season.

3 Hours

EXPERIMENT 6
Choreograph a fashion show theme for showing a seasonal full collection.

3 Hours

EXPERIMENT 7
Compile the generational characteristics of the current generation.

3 Hours

EXPERIMENT 8
Compare catwalk analysis reports and summarize them.

3 Hours

EXPERIMENT 9
Develop a fashion photoshoot make up theme.

Total: 60 Hours

Reference(s)

1. Alicia Kennedy, Emily stoehrer, Jay calderin, Fashion design referenced, Rockport publsihers, 2013.
2. Frank Doorhof, Mastering the Photoshoot, Peachpitpress, 2013.
3. Beverly Massachusetts, Fashion details 1000 ideas from neckine to waistline, pockets to pleats, Mao mao, 2011.
4. Chris gatcum, Light and shoot: 50 fashion photos, Illex, 2011.
5. Nishant baxi, Farout fashion, NKBs publishing, 2015.
6. www.wgsn.com

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1		1			2					2	2			1	3			1	2				2	4	20
2	2					2					3			2	2			2	3				1	3	20
3	1	1			2	2				1	2			1	2			1	3				1	3	20
4	2					2					3			2	3			2	2				1	3	20
5		1			2					2	2			1	2			1	3				3	3	20
																								Total	100

Assessment Questions

Remember

1. List few fashion innovators in contemporary fashion industry
2. Name few fashion icons
3. Indicate the different types of modeling
4. List the characteristics of generation Z
5. Recall the aesthetic components of style
6. Recall the aesthetic components of style
7. Name few popular fashion models
8. Label the components of look
9. Enlist the follow on activities susbsequent to fashion photoshoot
10. Name the criteria required for fashion photoshoot
11. Label the details of a visual core concept in fashion
12. Recall the technical settings involved in fashion show

Understand

1. Define modeling
2. Interpret the concept of photoshoot
3. Illustrate the features of chick look
4. Compare the accessories used for bohemian look and sporty look
5. Identify the fabrics suitable for Bridal wear
6. Define look
7. State fashion choreography
8. Define subculture
9. Identify the key features of Gen X
10. Define style.

Apply

1. Demonstrate the characteristics of different models
2. Compare the features of outerwear and innerwear
3. Predict the specifications of fashion models
4. Show the functional needs of sportswear
5. Demonstrate a visual art plan for projecting and promoting classical look
6. Predict the model requirements for men’s casual clothing
7. Construct a fashion show theme with relevant visual concept
8. Show the salient features of fashion show presentation
9. Demonstrate the specifications of fashion make up concept.
10. Compare the features of fit model and showroom model.

Analyse / Evaluate

1. Resolve the attributes observed in catwalk analysis
2. Analyze the role of choreograph process in organizing fashion show
3. Differentiate the characteristics of gen X and Gen Y
4. Compile the attributes of fashion clothing observed in catwalk report
5. Justify the requirements of clothing and accessories to complement classical look

Create

1. Plan a scheme for fashion photoshoot of sportswear
2. Derive a fashion concept combining sporty look and chick look
3. Design a scheme of fashion styling developed by Nicolaus Ghesquire
4. Create a fashion show theme based on ethical concepts.
5. Develop a style plan projecting niche casual wear look.

15FT007 INTIMATE FASHION 3 0 0 3

Course Objectives

- To elucidate the basics of human structure and measurements.
- To develop knowledge about fabric selection and styles for intimate apparels.
- To impart technical knowledge about fabric properties that deals with the functional aspect of intimate apparels.

Course Outcomes (COs)

1. Determine the importance of skin health and physical support from intimate apparel
2. Determine the effect of womens contour shape
3. Determine the comfort properties of intimate apparels.

UNIT I **9 Hours**

BREAST MEASUREMENT AND SIZING

Breast measurement and sizing- measurement of breast dimensions-Control of posture and clothing-Body landmarks-Manual measurements-2D measurements.Latest technologies for breast measurements, breast sizing systems.

UNIT II **9 Hours**

BRA PATTERN TECHNOLOGY

Bra pattern technology - introduction -Basic block of bra pattern -Direct drafting of flat pattern - Direct drafting of soft bra - Direct drafting of wired bra-Direct drafting of push-up bra-Tracing from the sample-Three- dimensional modeling on the mannequin. Computerised 3D Intimate Pattern Design.

UNIT III **9 Hours**

INNOVATIONS OF GIRDLES

Historical development of girdles - classification of modern girdles - innovations of shape-up girdles-inventions of health promoting girdles -new materials for girdles - considerations of fabric properties in girdle design.

UNIT IV **9 Hours**

PRESSURE EVALUATION OF BODY SHAPERS

Physiological effects resulting from clothing pressure - Studies using direct pressure sensing systems - Indirect pressure prediction -Factors affecting girdle pressure absorption . Intimate apparel with special functions - Sports Bra -Pantyhose - Swimwear - Mastectomy Bras - Maternity Underwear.

UNIT V **9 Hours**

KNITTED AND SEAMLESS INTIMATE APPAREL

Functional requirements of knitted underwear -Engineering of knitted underwear fabrics - Performance evaluation of knitted underwear - Properties of commercial knitted underwear fabrics. Process innovation in seamless intimate apparel -Lamination - Moulding - Seamless knitting technology.Intimate apparels for men.

FOR FURTHER READING

Assessment of womens body beauty, Innovation in Bras, Physical and Physiological health effects of Intimate Apparel, Range of comfortable and tolerable pressure, Recent developments in knitted underwear fabrics.

Total: 45 Hours

Reference(s)

1. W YuandJ Fan, Innovation and Technology of Women's Intimate Apparel,Woodhead Publishing Limited, England,2014.
2. Lynn Nottage,Intimate Apparel, Nick Hern Books,USA,2014
3. Lynn Nottage,Intimate Apparel Dramatists Play Service, Incorporated,USA,2005
4. Marry Mathew, Practical Clothing Construction Part I, Basic Sewing Process, Cosmic Press, Chennai, 1999.
5. StokesTerry,Intimate Apparel,Brooklyn Release Press,USA,1980.
6. http://www.enotes.com/topics/intimate-apparel

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	1			1	2				1	2			1	2				4				1	4	20
2	1	1			1	2				1	2			1	3			1	2				2	3	20
3	1	2			1	1				1	2			1	2			3	1				1	4	20
4	1	1			1	2				1	3			1	2			1	2				2	3	20
5	1	2			2	1				1	2			1	2			2	2				1	3	20
																								Total	100

Assessment Questions

Remember

1. Define Intimate Apparel.
2. Label the comfort properties of Intimate apparel
3. List any four technologies used for measuring breast.
4. State the technology behind brainnovations
5. Define direct drafting of flat patterning.
6. State the role of leather in lingerie
7. List any five types of elastomeric threads used along with microfibers in girdles
8. List three types of girdles
9. Reproduce the term warp knitted shape – up girdle.
10. State Hip training bottom

Understand

1. Identify the suitable Intimate apparel for special functions.
2. State the significance of sportsbra.
3. Identify different types of bra
4. Identify the type of measuring devices used in measuring breast size
5. Illustrate girdles
6. Select the suitable technique used in 3D modeling of bra patterning
7. Represent eight steps in cloake’s modeling technique
8. Indicate the types of technology involved in bra patterning.
9. Illustrate push up bra
10. Illustrate Maternity Underwear

Apply

1. Construct basic block for bra
2. Assess the functions of a smartbra
3. Find the way in which shape-up girdles are made
4. Assess clothing influence bodycathexis
5. Choose a style of girdle for person suffering from knee pain
6. Construct sports bra with specification.
7. Assess the functions of Computerised 3D Intimate Pattern Design.

8. Show the functional needs of seamless intimate apparel.
9. Predict the model requirements for push up bra.
10. Demonstrate the characteristics of different models

Analyse / Evaluate / Create

1. Justify the comfort properties of intimateapparel
2. Compare the performance of knitted underwear with woven.
3. Compare technobra and bioformbra.
4. Determine the basic bra pattern technology for Melliar's Method
5. Criticise the lingerie design on the mannequin.
6. Create bio-sensory intimate apparel
7. Create seamless intimate apparel.

3 0 0 3

15FT008 FASHION ACCESSORIES

Course Objectives

- To impart knowledge about Fashion accessories and their uses in enhancing the personality of the wearer.
- To develop students knowledge on selection of suitable accessories.

Course Outcomes (COs)

1. Understand the importance of Fashion accessories and Selection of appropriate raw materials for various Fashion accessories.
2. Understand the various end uses of Fashion accessories
3. Demonstrate the beauty and aesthetics of each Fashion accessory by appropriate sketches.

UNIT I **9 Hours**

INTRODUCTION TO ACCESSORIES

Definition and importance of accessories in fashion design, classification, accessory design; Sketching accessories -sketching of basic shapes of various accessories, the concept of three-dimensional sketching and relation to accessories design.

UNIT II **9 Hours**

GARMENT ACCESSORIES

Selection of materials, design, functional and aesthetic performance, advantages - Ribbons, Braids, Laces, Appliques, Buttons, Zippers, Snap fasteners, Hooks and Eyes, Hook and loop tape (Velcro), Eyelets, Tie, Scarves, Stoles, Umbrella, Socks, Stockings, Veils.

UNIT III **9 Hours**

LEATHER ACCESSORIES

Selection of materials, design, functional and aesthetic performance, advantages and various styles - footwear, belts, gloves, hand bags, hats, wallets, and other personal leather goods. Concepts of pattern making techniques, basic machinery and equipment used for these accessories.

UNIT IV **9 Hours**

ORNAMENTAL ACCESSORIES

Selection of materials, design, functional and aesthetic performance, advantages and various styles - Pendants, Waist Bands, Wrist Bands, Necklaces, Head Bands, Neck Ties, Bows, Key Chain, Sunglass, Wrist watches, Rings, Ear rings, Bangles, Bracelets, Anklets, Pony Tail Holder, Pen.

UNIT V **9 Hours**

SPECIAL ACCESSORIES

Tie clips, walking sticks, wigs, mask, handkerchiefs, Hand fans, Electronic gadgets, Torch lights.

FOR FURTHER READING

Sketching of objects in a 3D view, Designing of any one accessory mentioned above with suitable materials, Designing of a small leather accessory, Designing of a single piece of a jewelry using various non precious stones and metals.

Total: 45 Hours

Reference(s)

1. Stacy LoAlbo, Vintage Fashion Accessories, Krause Publications, China,2009
2. Lannoo,Fashion and Accessories(Fashion),LannooInternational,Belgium,2007.
3. Ritu Bhargav,Design Ideas and Accessories, Om Books International,2004.
4. Patty Brown and JanettRice, Ready-To-Wear Apparel Analysis, PrenticeHall, NewDelhi, 2000.
5. Phyllis Tortora, Encyclopedia of Fashion Accessories, OmBooksInternational, NewDelhi, 2003.
6. LucyPratt and LindaWoolley, Shoes (V&AFashionAccessories), Victoria and AlbertMuseum, UK, 1999.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	1				2	1			1	2			1	3			2	3				1	3	20
2	2				1	1				1	1			2	2			1	4				1	4	20
3	1	2				1				1	2			2	2			1	3				2	3	20
4	1	1			1	1				1	3			1	2			1	2				2	4	20
5	2	2			1	1				2	1			1	2			1	3				1	3	20
																								Total	100

Assessment Questions

Remember

1. Define the term accessories.
2. State the term“vel-cro”
3. List any three methods of tanning leather.
4. List any three methods of tanning leather.
5. Label parasol
6. List four different types of shoes.
7. State the use ofjewelsinwristwatches
8. State the use of hand fans
9. Label the types of handkerchiefs
10. List any five ornamental accessories

Understand

1. Indicate the basic principles involved in 3D sketching
2. Formulate the accessories required for sketching.
3. Select the criteria for garment accessories.
4. Illustrate the special finishes that are applied on leather
5. Represent the aesthetic value of an individual improves by wearing jewelry
6. Illustrate ponytail holder
7. Identify the functions of hooks
8. Select a suitable leather accessorie for men during party
9. Indicate the role of zipper in handbags
10. Illustrate pendant

Apply

1. Assess the way ofcalculating the Button number
2. Find the method to obtain soft finish on leather
3. Predict the importance ofcomputer in designing accessories.
4. Demonstrate the requirements for a quality presentation medium.
5. Assess the way ofcalculating the Button number
6. Summarize the process of leather accessories creation
7. Compare short term leather and ornamental accessories.
8. Predict the weakness of garment accessories.
9. Summarize the process of 3 dimensional sketching.
10. Assess the way of designing leather accessories.

Analyse / Evaluate / Create

1. Justify tanning of leather
2. How the degree of hardness of natural gem expressed?
3. Compare appliqués and patch work
4. Compare carrot and karat.
5. Determine the concepts of pattern making in leather footwear.
6. Choose the right material for garment accessories
7. Combine the ornamental accessories and special accessories to develop paportfolio
8. Create a single piece of a jewelry using various non precious stones and metals.

15FT009 TREND ANALYSIS AND FORECASTING 3 0 0 3

Course Objectives

- To enable Students conduct fashion scans and surveys
- To impart the knowledge of formulating trend capsules.
- To enable Students create color palettes.

Course Outcomes (COs)

1. Interpret fashion trends and analyze them.
2. Formulate concepts and develop color story.
3. Resolve the integral constituents of color palette creation and chart color matrix.

UNIT I **9 Hours**

FASHION TRENDS

Discovering Zeitgeist, fashion scans, media scans, fashion trends, Consumer segmentation values, attitudes and Lifestyle (VALS), Fashion culture and direction of fashion change.

UNIT II **9 Hours**

FORECASTING PROCESS

Long term forecasting process and Short term forecasting process, Trend spotting, Study of Factors affecting forecasting process, Research strategies for Media scan, Interviewing focus groups, Observation of consumer behavior patterns, shopping profiles.

UNIT III **9 Hours**

FORECASTING THE FUTURE

Looking into Future - Scenario writing, surprise free scenario, Best case, Worst view. Color forecasting Dimensions of color story, Color cycles, color relationship areas across product categories, Sources of color ideas and palettes

UNIT IV **9 Hours**

TREND ANALYSIS TECHNIQUES

Techniques of trend analysis and synthesis, Analysis of current trends, Colors and product life cycle, fashion cycle FAD, Classic and fashion. production cycle, Product sensitivity, sales history, report preparation, fashion map

UNIT V **9 Hours**

DEVELOPING A TREND REPORT

Color palettes types of color palettes, Analogous concepts and Integral parts of color palette creation process. Trend labeling color cycles, textiles, look design and semiotics. Analysis of forecast traps - Excessive Optimism, Generation gap, Overlapping trends- sectors.

FOR FURTHER READING

Color palette preparation for a fashion segment 8-10 colors per mood and 4 moods per report.

Total: 45 Hours

Reference(s)

1. Evelyn L. Brannon & Lorynn R. Divita, Fashion forecasting, Fairchild books, 2015.
2. Tsan-Ming Choi, Chi-Leung Hui & Yong YuK, Intelligent Fashion Forecasting Systems: Models, Springer, 2014.
3. Eundeok kim & Ann marie fiore, Fashion Trends: Analysis and Forecasting, Berg publications, 2011.
4. Chelsea rousso, Fashion Forward: A Guide to Fashion Forecasting, Bloomsbury academic, 2012.
5. Tracy Diane and Tom Cassidy, Color forecasting, John wiley and sons, 2009.
6. www.wgsn.com

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2			1	2				1	2			1	2			1	2				1	4	20
2	2	1			2					1	2			1	3			1	2				1	4	20
3	1	2				2				1	3			1	2			1	3				1	3	20
4	2	1			1	2				1	2			1	3			1	2				1	3	20
5	1	2			2					2	3			1	2			1	3				1	2	20
																								Total	100

Assessment Questions

Remember

1. Name the different types of forecasting
2. What does VALS stand for?
3. Identify the psychological primary colors
4. Indicate the number of colors present in single report
5. List the different types of visual core concepts
6. Indicate the sources of color ideas and palettes
7. Label the constituents integral to a color palette
8. Indicate the components of media scan report
9. Name the types of forecasting
10. List the trend alerts created and identify their life span

Understand

1. Define forecasting
2. State trend alert
3. Expound on the dimensions of color story
4. State color perception theory
5. Define color cycle
6. Elaborate on the ethnographic research techniques
7. Identify the patterns suitable for Woman's prom wear
8. Interpret the textures used in swimwear
9. Discuss in detail color cycles and evolution of color
10. Interpret the features of product lifecycle

Apply

1. Demonstrate the process of long term forecasting
2. Demonstrate the color relationship across product categories namely color of interiors and cosmetics
3. Predict the logical sequence of color evolution
4. Show the pronounced effects of Art and photography on color forecasting
5. Summarize the process of color palette creation
6. Compare short term forecasting and long term forecasting
7. Demonstrate the interrelationship between values, traits and attitude
8. Show how ANN model is more suitable for short term forecasting
9. Predict the weakness of grey model.
10. Predict the colour forecasting methods.

Analyse

1. Differentiate between forecasting and trend
2. Resolve the factors affecting the forecasting process
3. Analyze the womens outerwear image file and resolve the style difference between 2014 and 2015 collections.
4. Determine the product life cycle time of classic dress shirts
5. Differentiate between macro trend and micro trend

Create

1. Generate a scenario report looking into future for forecasting fashion
2. Generate a media scan report for women's casual tops
3. Derive the integral parts of color palette creation with respect to men's formal wear
4. Suggest a fashion map for forecasting mens shirts
5. Derive a methodology for formulating interview questions pertaining to a micro trend
6. Forecast a scheme expressing both technological breakthroughs and negative emotions similar to the likes of Alexander Mcqueen

15FT010 FASHION PHOTOGRAPHY 3 0 0 3

Course Objectives

- To develop knowledge on photographic techniques
- To be able to exhibit the aesthetic appeal of fashion

Course Outcomes (COs)

1. Gain knowledge on color and lighting arrangements.
2. Develop the ability to shoot on different occasions
3. Work closely with the various marketing personnel for projecting their products.

UNIT I **9 Hours**

INTRODUCTION TO COLOUR

History of colour and photography, Time chart - Colour pertaining to slide photography, The colours of light, The balance of colour, forming of images, Colour vision, Colour description - Colour temperature, wave lengths, focusing distances.

UNIT II **9 Hours**

MOODS OF NATURAL LIGHT

Sun, Skies, Water, Backlighting in direct light, Indirect and reflected light, Diffused light, Early morning, Mid-day, Dusk, Night, Spring, Summer, Autumn, Winter. Adverse Conditions - Taking advantages of poor light, Mist and fog, Rain, Storms, Snow and cold, Heat, Underwater photography. Artificial Light - Tungsten, Flash, Mixing tungsten and flash, Mixing flash and daylight, Mixing daylight and tungsten with flash, Tungsten and flash as complete sources, Florescent, mercury vapour, sodium vapour and mixed sources.

UNIT III **9 Hours**

HANDLING COLOUR IN SLIDE PHOTOGRAPHY

Using the changing light, Exploring the light and angle, Angle of view, Light and shade, Monochromatic colour, Dominant colour, A touch of colour, Harmonic and discordant colour, Contrasting colour, Composition and line, Balance, position and scale, Point of interest, Shape and silhouette, Form and modeling, Tone and hue, Texture, Pattern, Perspective, Framing, Existing backgrounds, Planned backgrounds, Movement, High speed photography, Colour in close-ups, Macro-photography, Photographing through microscopes using reflected images.

UNIT IV **9 Hours**

SUBJECT LIGHTING

Portraits, Groups, Nudes, Fashion and beauty, Children, Still life, Architecture, Architecture detail, Interiors, Animals, Indoor sports, Outdoor sports, Copying slides. Colour Materials and Methods - colour process, choosing colour slide films - Daylight, Tungsten 3200 & 3400 degrees, Infrared, Slide copy film, Selecting the exposure

UNIT V **9 Hours**

EQUIPMENT AND DARKROOM TECHNIQUES

Cameras, system camera, lenses, filters, light meters, care and maintenance, supports and lights, lights, darkroom layout and equipment- wet areas, dry areas; timers-interval, accumulative; processors- small tank, large tank, drum, automatic. Chemicals - Kodak, Beseler, Unicolour, Ilford; processes - E-4, E-6, commercial, processing slides, mounting slides, printing slides, projectors and viewing - slide critique, slide presentations, audio visual designs.

FOR FURTHER READING

Colour psychology- Oil lamps, torchlight and matches, alternative lighting- Colour as abstract design, Mixed images and media- Exposure variations- Identifying and correcting faults, slide storage, terms and identifications.

Total: 45 Hours

Reference(s)

1. D.David. Busch, Canon EOS 40D Guide to Digital Photography, Course Technology PTR, 2007.
2. John Hedge, Photography Course, John Hedge Co, 1992.
3. Michael Freeman, Manual of Outdoor Photography, Ziff Davis World, August 1983.
4. Michael Freeman, Manual of Indoor Photography, Ziff Davis World, August 1983

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					2					4				3			2	3				1	3	20
2		3				2					3			2	3				2				2	3	20
3		2				2					4				2			2	3				1	4	20
4		2				2					3				3			2	3				2	3	20
5	2					2					2			2	2			2	3				1	4	20
																								Total	100

Assessment Questions

Remember

1. Name the various theories of colours.
2. Define colour vision.
3. List the various texture patterns used in Photography.
4. Give the application of light sources.
5. State the critiques of textiles.
6. List the function of time chart.
7. Name cool, warm and neutral colors.
8. What do you mean by artificial light?
9. Define portraits.
10. What do you mean by filters?

Understand

1. Discuss on the application on the uses of various chemicals used in photography.
2. Compare the advantages of Mixing flash and day light.
3. Differentiate the Day light and Artificial lights.
4. Discuss the various processors used in photography.
5. How reflected light and Diffused light influence the photography?
6. Elaborate on the modifications of light.
7. Discuss the working principle of stil camera.
8. Compare indoor and outdoor sports.
9. Elaborate on macro photography.
10. Discuss the various process used for selecting the exposure.

Apply

1. Articulate the harmonic and confliction of colours.
2. How day light affects the photography?
3. How day light affects the photography?
4. How Tungsten 3200 & 3400 degrees used in subject lightning.
5. Predict the weakness of underwater photography.
6. Demonstrate the process of macro photography.
7. Summarize the process of colour psychology.
8. Show how subject lightning is more suitable in fashion photography
9. Compare the process of natural light with artificial light.
10. Demonstrate the process of time chart used in colour.

Analyse / Evaluate / Create

1. Analyze the various techniques used in photography.
2. Determine the process of poor light in the moods of natural light.
3. Analyze the role of handling colour in slide photography.
4. Differentiate between artificial and natural light.
5. Determine the various light sources used for a wedding ceremony.
6. Create a time chart for colour pertaining to slide photography.
7. Create a backlighting effect in direct light.

15FT011 PSYCHOLOGY OF COLOR 3 0 0 3

Course Objectives

- To know about psychological aspects of colour
- To understand the the significance and impact of colour on human being.

Course Outcomes (COs)

1. Understand color psychology for various environments.
2. Gain knowledge on the impact of colour for different moods.
3. Gain knowledge on various theories of color.

UNIT I 9 Hours

COLOUR PSYCHOLOGY AND PSYCHOLOGICAL PERCEPTION OF INDIVIDUAL COLOURS

Definition - Introduction from the psychological view - characteristics and effects of major hues - Etymology - Stylistic and cultural origins. Colour sense - definition, inside view of ability to perceive variations in colour - Luminosity and saturation. Colour aids impression - External causes of colour in sensation - reflections, transmission, and selective absorption - Colour perceptions - Colour blindness - Colour impression - Mood and emotions - Colour and appetite - Colour and flavour - Symbolisms of warm and cool colours,Transmittance measurement- solution colorimetry

UNIT II 9 Hours

SOCIO-ECONOMIC ASPECTS OF COLOUR AND COLOUR IN NATURE AND ART

Economic status, towards imgination, Colour function and cognitions - Bathroom, Bed room, Kitchen, Drawing and Dining rooms, Store room, Work room, Office premises.The hues of plants, animals and insects - Colours of inorganic substances - Colour expresses moods of nature - Use of colour in painting - three typical methods in oil painting - Experiments with effects of oil paints - The representation of sun lights.

UNIT III 9 Hours

COLOUR AND PSYCHOANALYSIS

Preference and stimulus/effect, Gestalt psychology, object and ground, relating to colour: age related preference, gender preference, and cultural preference. Apply techniques to subtractive and additive color schemes-Compare and contrast subtractive and additive color schemes-Discuss the history and theory of color-Generate additive color schemes-Generate subtractive color schemes -Describe various color palettes-Pre-organize color design for film-Develop color storyboard keys -Develop color script.

UNIT IV 9 Hours

PSYCHOLOGICAL IMPACT OF COLOR

Describe the psychological impact of color-Explain color and its emotional impact in film composition and narrative-Demonstrate editing of color from cut to cut or shot to shot for emotional impact -Discuss cultural variations in the psychology of color.Relate color theory to production and post production processes-Demonstrate color calibration as relates to output-Discuss color theory as it relates to art direction and production design-Exhibit color rhythm, timing, spacing, temperature, atmosphere, composition, balance, and speed to impact film-Generate examples of color design to build story content.

UNIT V **9 Hours**

THEORIES OF COLOUR

Theories of Color Vision- Comparative Color Vision and Evolution-Dispositions, Dispositional Theories of Color-Dispositional Theories Continued-Color Eliminativism-Primary Quality Theories of Color-Functionalist Primary Quality Theories of Color-Experience, Color Experience, and Identity Theories-Intentionalist Accounts of Color Experience-: Spectrum Inversions-The Knowledge Argument and the Explanatory Gap

FOR FURTHER READING

Blues from the 1980s to the present- Advancing and retreating colours- Learned colour responses- A scientifically arranged palette- Preferences towards colour.

Total: 45 Hours

Reference(s)

1. M L Gulrajani. Colour measurement: Principles, advances and industrial applications, Amzon .com Nov 2010
2. Hylda Rhodes and Henri M. Leon, The Psychology and Tradition of Colour, Kessinger Publishing, LLC, 2005.
3. Leatrice Eiseman, Colour: Messages & Meanings: A Pantone Colour Resource, Hand Books Press USA, 2006.
4. Frank H. Mahnke, Colour, Environment, & Human Response, Wiley, Singapore, 1996.
5. Dorothee Mella, Language of Colour, Grand Central Publishing, New York, 1988.
6. Steven Bleicher, Contemporary Colour Theory and Use, Steven Bleicher Publishing, 2004.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2			1	2					3				3				4					4	20
2	1	2			2	2					2				2			3					3	3	20
3		1				3				1	3			1	3			1	3					4	20
4		2				2					2			2	2			2	4				1	3	20
5		2				2					3			1	3			3	1				2	3	20
																								Total	100

Assessment Questions

Remember

1. Define colour.
2. Define hue.
3. List the warm and cool colors.
4. State neutral colors
5. Name the theories of color vision
6. What do you mean by color blindness?
7. State the relationship between hue and depth.
8. Name color theories.
9. label the characteristic property of yellow color
10. State color perception theory

Understand

1. How color affects the appetite?
2. Why girl baby wears mostly rose color?
3. Why do we call “men in blue”?
4. What are the factors to be considered in selecting the color of a bed room?
5. Why red color is used for danger?

6. What colours will you select for a bath room?
7. Represent the characteristics of value and saturation.
8. Interpret the phenomenon of proximity in gestalt theory
9. Classify the colors on the basis of wrights theory
10. Summarize the features of cool warm contrast

Apply

1. Draw colour for children's bedroom
2. Demonstrate the impact of color on human psychology
3. Predict a color scheme symbolic of visual tension
4. Execute a strategy to choose colors to fit a surrealistic theme
5. Implement any one principle of gesalt theory and design a collage
6. Predict the role of principles of design in achieving harmony
7. Demonstrate the process of color palette creation for a graphical layout
8. Predict the aesthetic effects of a composition applying psychology concept
9. Demonstrate the color theory as it relates to art direction and production design
10. Exhibit color rhythm with the help of abstract art example

Analyse / Evaluate / Create

1. Analyze the impact of psychology of color.
2. Justify color perception theory in the process of appreciating art
3. Oultine the framework for using colors in communication
4. Determine the communication requirements of color in signage development
5. Resolve the differences between enhancing colors and receding colors
6. Produce a color palette symbolic of post modernism

15FT012 INTERIOR DESIGN 3 0 0 3

Course Objectives

- To impart knowledge on interior design.
- To improve the design skills, sustainable with socially-conscious designs

Course Outcomes (COs)

1. Visualize and interpret other people's ideas
2. Effectively utilize principles of designing in interior design
3. Analyze the raw materials for interior designer.

UNIT I 9 Hours

INTRODUCTION

Interior designing - definition, importance, requirements and types - Structural design, Decorative Design -Designing interiors, Good taste; Design themes, types and application. Personality of the Home - Art elements - Line: types, characteristics and importance; form: size and shape, characteristics; Colour - sources, qualities, emotional effects, colour wheel and schemes. Application of colour in interiors; Texture - types and significance; Pattern: types and effects; Light - importance. Importance of Furniture Design for Interiors- Ancient Age / Middle Age / Contemporary.

UNIT II 9 Hours

GRAPHIC PRESENTATION AND ORTHOGRAPHIC PROJECTION

Graphic Presentation Free Hand Drawing Lines, Curves, Waves- Compositions in pencil, Colours and pasting-3D compostion; Isometric and Axonometric- Still life- Furniture Sketching- Object Drawing with color rendering - Interior elements, Lighting, plants. Graphic Presentation (Advance)- Colour wheel- Rendering in ink- Interior Finishes (B/W and colour)- Dotting- illusions- Interior rendering and stubbing- Stained Glass. Orthographic Projection - Lettering- Use of Scale- Solid Geometry- Introduction for sciography- Perspective, Axonometric Isometric drawing. Orthographic Projection - Lifts and escalators- Acoustics and their application in interiors, water proofing, fire safety.

UNIT III **9 Hours**

INTERIOR DESIGN PLANNING

Introduction to concept of ID- Planning of Interior Space and circulation- Residential project Principles of Hotel interiors.

UNIT IV **9 Hours**

ELEMENTS OF DESIGN AND CONSTRUCTION TECHNIQUES

Elements of Design-Interior Design as a Visual Art-Elements of Design- colours, Accessories and their significance- Project Analysis and Design Development- Design source- Interior space and flow chart, A good design. Construction Techniques (Basic)-Building Components, Basic idea of Construction, Foundation and superstructure. Doors, Windows, Staircase R.C.C., Timber-Construction Techniques (Advance)- False Ceiling, Partitions, Wall Paneling, Comics, Mosaic, Cladding- Flooring and Wall Cladding

UNIT V **9 Hours**

ROLES AND RESPONSIBILITY INTERIOR DESIGNER

Role of an Interior Designer- Responsibility towards society and need of an Interior Designer to better the environment- Ethics and Code of Conduct- Responsibility towards client, contractor and supplier, Estimation. Professional Fees- Work of an Interior Designer- Making of portfolio, JD Annual Design Awards.

FOR FURTHER READING

Professional Practice- The Client Practice, Procedure of execution- P.E.R.T/ C.P.M. Arbitration.

Total: 45 Hours

Reference(s)

1. Tomris Tangaz, Interior Design Course: Principles, Practices, and Techniques for the Aspiring Designer, Barron's Educational Series, New Jersey, 2006.
2. V. Mary. Knackstedt, The Interior Design Business Handbook: A Complete Guide to Profitability, Wiley, New Jersey; 2006.
3. M. G. Shah, C. M. Kale, and S.Y. Patki, Building Drawing with an Integrated Approach to Build Environment, Tata McGraw Hill, 2002.
4. John F. Pile, Interior Design, Prentice Hall 2003.
5. Maureen Mitton, Interior Design, Visual Presentation: A Guide to Graphics, Models & Presentation Techniques, Wiley, New Jersey, 2007.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2				3					2				4				4					4	20
2		2			1	2				1	3				3			3					3	2	20
3		2				2					3				3				4				2	4	20
4		2				3					2				3				4				3	3	20
5		2				2					3				3			1	4				1	4	20
																							Total		100

Assessment Questions

Remember

1. Define interior design
2. List the characteristics of colour used in interior designs
3. State the limitations of manual designing in interior designing
4. State the types of lightining used in interior designing
5. Define ergonomics
6. Summarize the various features of acoustical boards
7. State different types of color families
8. Define illuminance
9. Define proxemics
10. Enlist the different types of interior design themes in contemporary existence

Understand

1. Identify how the various factors influence the designing of commercial space
2. Compare the relationship of cost versus quality in interior decoration.
3. Interpret the design of large commercial complex's
4. Compare the factors that are to be considered for Colors meant for various kinds of emotions.
5. Summarize the roles and responsibilities of an interior designer.
6. Formulate the interior design planning concepts.
7. Represent the features of layering in lighting
8. Summarize the aspects of orientation
9. Interpret the furniture layout and arrangement concepts
10. Indicate the purpose of space planning

Apply

1. Interpolate the amount of light required in various locations
2. Apply timber construction techniques in visual art.
3. Demonstrate the application of Orthographic projection.
4. Predict the relationship between color choices and Interior design theme
5. Predict the application of Art Elements in interior designing.
6. Execute a strategy to design furniture layout using bamboo furniture
7. Implement the ANSI guidelines and revamp the space planning
8. Demonstrate the features of acoustics design
9. Predict the risk of anomaly in designing theatres
10. Implement the space planning rules and conceive a new residential house plan

Analyse / Evaluate / Create

1. Differentiate between carpets and rugs in floor coverings
2. Justify the importance of Boolean operation
3. Analyze the various features of paneling and cladding.
4. Criticize the relationship of cost versus quality in Interior Decoration.
5. Create a 3D Model of Interior decoration for shopping complex using Modeling system.
6. Create Design themes based on types and application
7. Create varieties of Texture based on types and significance .
8. Create a 3D Model of Interior decoration for shopping complex using Modeling system.
9. Develop a building design suitable for climate.
10. Create the Lighting for different locations and activities

15FT013 FASHION CRAFTS 2 0 2 3

Course Objectives

- To impart theoretical and practical knowledge about various handi-craft techniques.
- To enhance innovative skills on hand crafts.
- To build confidence on doing handicrafts.

Course Outcomes (COs)

1. Gain knowledge on various handicraft materials.
2. Design new toys.
3. Produce various decorative and appealing products.

UNIT I **6 Hours**

TECHNIQUES OF HANDICRAFT MATERIALS

Definition of Handicraft, Classification: Reusable, Non reusable. Raw materials used in various craft materials: printed, embroidered, stitched and hand made. Criteria for selection of raw materials; material type and end uses.

UNIT II **6 Hours**

SOURCING OF MATERIALS

Designing and Construction procedures for following various decorative and appealing products: Wall pieces, Wraps, Shawls, Ties, Tapestr's, Scarves, Interiors, Purses, Vestments.

UNIT III **6 Hours**

DECORATIVE AND APPEALING PRODUCTS - INTERIOR

Designing and Construction procedures for following various decorative and appealing products: Exhibition pieces, Coasters, Bracelets Fabric lengths, Toys - wooden, clay, Paper, Cushions, Fashion Trims, Public art, Knitwear, Handbags, Necklaces.

UNIT IV **6 Hours**

DECORATIVE AND APPEALING PRODUCTS TOYS AND ORNAMENTS

Designing and Construction procedures for following various decorative and appealing products: Hats/headpieces, Hair accessories, Brooches, Tablemats, Garlands, Paintings Fabric, Paper, Wood, Glass, Bowls, Wood carving, Braids.

UNIT V **6 Hours**

DECORATIVE AND APPEALING PRODUCTS FANCY ITEMS

Designing and Construction procedures for following various decorative and appealing products: Furniture, Home dacor items, Jewelry Box, Utility Holder, Hanging Wall Pictures, Gift items, Fancy Electrical fittings Garlands.

FOR FURTHER READING

Centers of manufacture in India, Cards -Greeting and Wedding cards, Pendants, Paper cutting arts crafts.

3 Hours

EXPERIMENT 1

Block printing of fabric materials

3 Hours

EXPERIMENT 2

Saree and pillow cover embroidery

3 Hours

EXPERIMENT 3

Preparation of tapestry using painting technique and weaving technique

3 Hours

EXPERIMENT 4

Preparation of various lace samples

3 Hours

EXPERIMENT 5

Development of wooden pendent, key holder

3 Hours

EXPERIMENT 6
Design and development of hand bags using fabric material and resins

3 Hours

EXPERIMENT 7
Preparation of decorative materials for doors and windows

3 Hours

EXPERIMENT 8
Design a glass pot using oil painting techniques

3 Hours

EXPERIMENT 9
Design and development of wall photos using wood carving techniques

3 Hours

EXPERIMENT 10
Design and development of table mats and garlands

Total: 60 Hours

Reference(s)

1. Handmade in India: A Geographic Encyclopaedia of India Handicrafts. Abbeville press; 1 edition (October 20,2009)
2. Encyclopaedia of Card making Techniques (Crafts), Search Press Ltd, illustrated edition, 2007
3. All about Techniques in Illustration, Barrons Educational Series, 2001
4. Printing by Hand: A Modern Guide to printing with Handmade stamps, Stencils and Silk Screens, STC Craft Melanie Falick Book, 2008
5. Materials & Techniques in the Decorative Arts: An Illustrated Dictionary, University of Chicago Press, 2000.
6. www.fashioncraft.com/

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	1			1	1				1	3			1	2			1	2				1	4	20
2		2			1	1				1	4			1	3			1	2				1	3	20
3	2	1			1	2				1	2			1	2			1	2				1	4	20
4	2	1				2				1	1			1	3			3	3					3	20
5		2				2					2			2	2			1	2				3	4	20
																								Total	100

Assessment Questions

Remember

1. Define Handicraft
2. List the various craft materials used in printing
3. Label the various features of raw materials selected for painting of glass and wood carvings
4. Label the simple steps used in furniture making using fabrics
5. List the various manufacturing centers of handicrafts
6. State the various criteria used in selection of raw material in painted handicrafts
7. List the material type and end uses of handicrafts
8. State the preparation procedures of fabric for painting
9. List the various non-reusable items
10. List the various raw materials used in ties

Understand

1. Identify the fabrics suitable for decorating furniture
2. Formulate the various kind of trims used in making toys
3. Identify the paints for fabric paintings
4. Explain why oil colors are selected for glass paintings
5. Interpret brooch and why it is used
6. Summarize the selection of raw materials for various kind of handicrafts
7. Abstract the constructional procedure for handbags
8. Classify the raw materials and discuss how the raw material is selected for various applications in handicraft
9. Classify Handicraft
10. Explain the selection criteria for fabrics

Apply

1. Implement the pot making process techniques and develop a statue
2. Choose a waste material on the grounds of reformability and design a handicraft model
3. Predict the role of handicrafts in contemporary interior decoration aspects
4. Demonstrate the aesthetic outlook of enamel coated art pieces
5. Predict the painting quality attributes of show piece artworks
6. Demonstrate the aesthetic attributes of embroidery
7. Carry out a work plan to reuse waste metal scraps for sculpture making
8. Construct a proposition symbolic of ethnic embroidery for decoarating furnishings
9. Demonstrate the process of wood carving
10. Demonstrate the aesthetic features of art paintings

Analyse

1. Structure the necklaces and bracelets designed with appropriate sketches
2. Contrast the features of non-reusable items
3. Parse the importance of raw material selection
4. Determine the step by step procedures of doing poster painting
5. Organize the various steps used in designing and constructing the hand bags and purses

Evaluate / Create

1. Outline the various raw materials used in handicrafts and give its pros and cons
2. Structure the step by step procedures of making fabric and wood paintings with appropriate sketches
3. Defend the construction procedures of ties and scarves
4. Differentiate between stitched and handmade materials for handicrafts
6. Generate a pendent with ruby stones
7. Design a wedding card with suitable accessories
8. Design and give the construction procedures of table mats and birth day cards

15FT014 ADVANCED PATTERN ENGINEERING 3 0 0 3

Course Objectives

- To impart knowledge on advancement in the Pattern Engineering.
- To explore unconventional techniques in the field of designing.
- To fabricate patterns of different styles using draping method.

Course Outcomes (COs)

1. Apply advanced practical pattern design skills appropriate for the fashion and apparel industry.
2. Apply sustainable advanced pattern making practices related to fashion and apparel design.
3. Prepare patterns for various garment styles based on the measurements.

UNIT I **9 Hours**

DRAPING

Introduction, Equipments, Basic patterns - Front, Back, Skirt and Sleeves - Preparation of Muslin for draping, Draping steps, Marking, Trueing, Bodices - Front Bodice with underarm Dart, Back Bodice with neckline dart, Dart variations, Pleats, Dart tucks and Gathers, The Halter, Variations of basic skirt - One piece, Tapered, Eased, Dome, Gored and Flared skirts, Basic straight trousers and Collar draping.

UNIT II **9 Hours**

CONTOURING

Principle, Contour designs, Figure versus basic garment, Fitting problems, The contour Guide patterns - Preparing the guide patterns, Measure depth of hollow areas and chart the patterns, Guidelines for cutout neckline, cutout armhole, armhole ease, empire style line, contour between the busts, strapless designs, shoulder slope and side ease, The classic Empire, Surplice (or wrap) designs, Off-shoulder Designs, Halters - V-neck halter.

UNIT III **9 Hours**

JACKETS AND COATS

Basic Jacket and coat Foundations, Two Jacket Foundations, Terms and definitions, The Jacket and coat sleeves - Cap Ease, Grading the Jacket/Coat sleeves, tailored two piece sleeve, Collar/Lapel Designs - Basic notch collar/lapel, Low-notch lapel, Portrait collar and lapel, Double-Breasted Jacket, Design variations, Shawl Foundations - collar variations, wide shawl collar, shawl collars with separated under collar and facing, Mannish Jacket foundation.

UNIT IV **9 Hours**

PATTERN MAKING FOR STRETCH FABRICS

Stretch terms - Objectives, Direction of stretch, Stretch factor, Stretch ratio, Stretch fits, Pattern making terms - Slopers, Grain, Cross grain, Grain line, Notches, Stays, Bias, Types of Fit - Tight, Loose, Semi-fit, over-sized, Sizing and measurements, Principles of Pattern drafting, Slopers and reductions, Draft - Skirts, Sleeves, Tops.

UNIT V **9 Hours**

UNCONVENTIONAL TECHNIQUES

Subtraction Cutting - Definition, three techniques of subtraction cutting, Basic things necessary for cutting, The Tunnel technique, Coil method, The Plug technique, Glove dress, Square-spiral dress, interface-spiral dress, Displacement Technique, Preparation of subtraction tunnel ready to make a dress

FOR FURTHER READING

Introduction, Computer aided garment designing, Comparison of existent 3D designing system, Possibilities of acquiring anthropometrical data, Limitations of human body 3D scanning, virtual environment and virtual reality, applications.

Total: 45 Hours

Reference(s)

1. Helen Joseph Armstrong, Pattern Making for Fashion Designers 5th Edition, Prentice-Hall, New Jersey, 2010.
2. Winifred Aldrich, Pattern Cutting for Menswear, 4th edition, Blackwell Science Publisher, USA, 2006.
3. Hilde Jaffe Nurie Relis, Draping for Fashion Design 4th Edition, Dorlingkindersley India Pvt. Ltd, 2009
4. Mary Mathew, Practical Clothing Construction, Part-II, Designing Drafting and Tailoring, Cosmic Press, Chennai, 1999.

5. Winifred Aldrich, Metric Pattern Cutting, Om Book Service, 1997.
6. Kapoor Bela, Pattern Drafting and Making, Phoenix Publishing House Pvt. Ltd., 1997.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	3				3					3				2				2				3	3	20
2	2	2				3					4				3				2					4	20
3	1	3				3					2				2			1	3				2	3	20
4	3				2						4				4				3					4	20
5	1	2				3					3				3				3				1	4	20
																								Total	100

Assessment Questions

Remember

1. List any four equipments required for patterning by means of draping.
2. What are the basic steps involved in the draping of a dress form?
3. Define Trueing.
4. Why are pleats required in a draping of a dress form?
5. What are different types of basic skirt variations?
6. Identify the principle of contour designing.
7. List out Shawl collar variations in Jacket foundation.
8. Differentiate between Basic notch and Low-notch collar and lapel.
9. How did stretch of knit fabric direction affect the fit of a garment?
10. Define Subtraction cutting.

Understand

1. Explain the limitations of human body 3D scanning techniques.
2. Compare and contrast virtual environment and virtual reality.
3. List the different possibilities available to acquire anthropometrical data.
4. Outline the concept involved in Coil method.
5. Relate stretch factor, stretch ratio and stretch fit of a stretchable fabric
6. Explain any 5 terms with definitions, involved in the basic jacket/coat foundation.
7. Summarize the contour guidelines for cutout armhole, cutout neckline and armhole ease
8. Illustrate the draping procedure for any one variations of basic skirt.
9. Explain V-neck halter using contouring technique.
10. Compare and contrast Square-spiral dress and interface-spiral dress.

Apply

1. Demonstrate the working principle of Tunnel technique with neat diagram
2. Show any three advantages of a computer aided designing and explain in detail on its applications
3. Construct and Illustrate Mannish Jacket foundation with neat diagram.
4. Demonstrate substraction cutting process
5. Consturct a pattern drafting plan to accommodate two way stretch fabric for swimsuit
6. Execute a strategy to identify the right fabric for bicycle shorts
7. Implement the principles of contouring for developing a architectural look top
8. Implement the concept of tunnel technique to make ergonomic jacket
9. Demonstrate the process of contouring
10. Execute a strategy to incorporate zero waste concept in cutting for developing patterns for semi fitted dresses

Analyse / Evaluate

1. Resolve the three types of techniques being followed under subtraction cutting and explain each of the techniques with neat diagrams.
2. Rearrrange the draping procedure involved in the making of Front bodice with underarm dart and Back bodice with neckline dart to reduce waste.
3. Justify the purpose of using darts in contouring
4. Resolve the different technqieus of adding fullness
5. Determine the steps involved in fit correction: semi fitted pattern to fitted pattern

15FT015 PLANT LAYOUT AND FACILITIES DESIGN 3 0 0 3

Course Objectives

- To understand material management show their movement in the production.
- To implement the concepts of production planning and control in the form of plant layout.
- To utilize the various techniques in production planning and control.

Course Outcomes (COs)

1. Design and develop effective layouts according to the process methods and techniques followed in the apparel industry.
2. Select appropriate process methods and techniques to minimize the cost of production
3. Develop the skill of line balancing according to the need of apparel industry.

UNIT I 9 Hours

INTRODUCTION

Plant Layout- Objectives, Principles of Plant layout, Classification of layout - Process layout, Product layout, Combination layout, fixed position layout, Group layouts and its advantages and disadvantages, Elements of facility planning, Levels of facility planning, Advantages of facility planning.

UNIT II 9 Hours

DESIGNING THE LAYOUT

Design of Product layout - Assembly lines, Line balancing, Behavioral factors, No. of models produced, Cycle times, Design of process layout - Procedure, Flow matrix, Flow-cost matrix, Proximity chart, Design of Service layout

UNIT III 9 Hours

PLANT LOCATION AND LAYOUT

Introduction, Need for selecting suitable location - In case of New factory set up, In case of existing factory location, In case of Global set up, Reasons for Global/Foreign Location, Factors Influencing Plant location/ Factory Location, Specific Locational factors - for manufacturing organization, Service organization, Location theories, Location Models

UNIT IV 9 Hours

ORGANIZATION OF PHYSICAL FACILITIES

Factory Building - Design of the building, Types of Building - Single storey & Multi-storey buildings, Lighting - Control of Lighting, Climatic conditions - Working in Hot and cold environment, Thermal environment, Ventilation, Work related welfare activities - Drinking water, Sanitary facilities, First Aid and Medical facilities, Rest, Feeding, Child care and Recreational Facilities.

UNIT V **9 Hours**

PLANT LAYOUT AND MATERIAL HANDLING TECHNIQUES

Material Handling - Objectives, Principles of Material Handling, Selection of Material Handling Equipment, Evaluation of Material Handling system, Material Handling equipment - Fixed path and Variable path equipment - Conveyors, Industrial Trucks, Cranes and Hoists, Containers, Robots, Relationship between Plant Layout and Material Handling.

FOR FURTHER READING

Introduction - Methods, Lean facility layout system - Case Study, Results, Process Re-design methodologies -Empirical approach, SLP, Lean approach.

Total: 45 Hours

Reference(s)

1. S Anil Kumar and S Suresh, Production and Operation Management, second edition, New Age Publications, 2009
2. Jack Greene, Plant Design, Facility Layout and Floor Planning, second edition, CreateSpace Independent Publishing Platform, 2013
3. James M. Moore , Plant Layout and Design , Collier Macmillan Publisher, 1962
4. http://www.inc.com/encyclopedia/facility-layout-and-design.html
5. http://cdn.intechopen.com/pdfs-wm/45563.pdf
6. http://ijergs.org/files/documents/Designing-Facilities8.pdf

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2			2						2			1	3			1	2				2	4	20
2	2					2					3			1	2			2	4				1	3	20
3		2			2					2	2				3			1	3				1	4	20
4	2				1	2				1	3				4				4					3	20
5	1	2			2	2				2	2				2				3				1	3	20
																								Total	100

Assessment Questions

Remember

1. Define Plant Layout.
2. What are the objectives of a plant Layout?
3. List the Principles of Layout
4. What are the most important physical facilities to be organized in a Plant set up?
5. What do you mean by Plant location?
6. Define agglomeration
7. Mention any four objectives of Material Handling.
8. What is ‘Equipment Utilization Ratio’?
9. List some of the Fixed path equipments.
10. What is the need for selecting a suitable location for a Plant set up?

Understand

1. Classify the types of Layout.
2. Compare and contrast Virtual proximity and Virtual factory.
3. Classify the General locational factors which influence the plant/ facility location of an organization.
4. Explain the steps involved in process of selecting a location / facility in the factor rating model.
5. Infer the term 'layering' in CAD.
6. Differentiate between Process layout and product layout.
7. How do you define cycle time of a production line system.
8. Compare and contrast single storey and multi-storey buildings
9. Explain in brief the relationship between plant layout and material handling.
10. Interpret some of the guidelines for effective utilization of material handling equipments

Apply

1. Demonstrate the reasons for selecting the location in global/ foreign countries.
2. Predict the factors to be considered while selection of material handling equipment.
3. Predict the advantages of product layout over process layout
4. Carry out a plan to rearrange the machine layout for shirt making line
5. Construct a layout incorporating the factory space planning guidelines.
6. Show the highlights of process layout in designing modular systems
7. Demonstrate the process of choosing a location in the perspective of trade maximization.
8. Implement the SA:8000 guidelines and develop a factory layout for manufacturing 1000 pieces of shirt per day.
9. Execute a strategy for smooth out the bottle necks in trouser making line
10. Carry out a rearrangement plan for the existing layout on the guidelines of Toyota production system.

Analyse / Evaluate

1. Analyse in detail on the different strategies in case of location choice for existing organization
2. Justify the physical facilities required in an organization / factory.
3. Evaluate material handling system and discuss in detail the factors influencing material handling system.
4. Resolve the planning objectives of plant layout designing process with reference to adding on a new embroidery facility.
5. Re-organize the functions of production department to incorporate new material transport and and handling facilities

15FT016 QUALITY CONTROL OF GARMENTS AND ACCESSORIES

3 0 0 3

Course Objectives

- To understand the material management and their movement in the production.
- To implement the concepts of production planning and control in the form of plant layout.
- To utilize the various techniques in production planning and control.

Course Outcomes (COs)

1. Design and develop effective layouts according to the process methods and techniques followed in the apparel industry.
2. Select appropriate process methods and techniques to minimize the cost of production.
3. Develop the skill of line balancing according to the need of apparel industry.

UNIT I **10 Hours**

INTRODUCTION

What is quality, Importance of quality, Difference between quality assurance and quality control, planning, Advantages of facility planning. Inspection – types of inspection, Raw material inspection techniques – 4 point system, 10 point system, Graniteville sytem, inprocess inspection – acceptance sampling plan, skip bundle inspection techniques, final inspection – spot checking, arbitary sampling, statistical sampling.

UNIT II **9 Hours**

QUALITY STANDARDS

Different apparel product performance standards – Bond strength, Seam strength, Dimensional stability, Button pulling strength, Spirality, Color fastness, Wash fastness, Perspiration fastness, Pilling resistance, Abrasion resistance, Puckering standards.

UNIT III **8 Hours**

SAMPLING AND QUALITY CONTROL TOOLS

Sampling, types of sampling, Quality control tools - Cause and effect diagram, control chart, flow chart, histogram, Pareto chart and Scatter diagram.

UNIT IV **9 Hours**

SPECIFICATIONS AND PROCESS DEFECTS

Raw material specifications – woven garments and knitted garments, Buyer manual specifications for constructions. Pattern grading defects, Marker defects, Spreading and laying defects, Cutting defects, Bundling and stickering mistakes, Seam defects, Stitching defects and mistakes, Finishing defects.

UNIT V **9 Hours**

SCREENING TESTS FOR CHEMICAL RESIDUES AND SAFETY REGULATIONS

The Textile Products Labelling and Fibre Composition Regulations, CPSIA Test requirements and standards, PROP 65 regulations, REACH standards, Compliance to SVHC / eco friendly dyes. Maintenance of quality test records and quality approval documents.

FOR FURTHER READING

Quality management systems, Lean approach, Quality costs.

Total: 45 Hours

Reference(s)

1. Pradip V. Mehta and Satish K. Bhardwaj, *Managing Quality in the Apparel Industry*, New Age International (P) Ltd., New Delhi, 1998.
2. Subrata Das, Quality Characterisation of apparel, Woodhead Publishing.2009.
3. Sara Kadolph, *Quality Assurance for Textiles and Apparel*, Fairchild Publicatons Inc., Chicago, 1998.
4. Anita M Stamper, Evaluating Apparel Quality, Fairchild Publications, 1996.
5. Quality Management - StitchWorld Technical Bulletin, 2006
6. J. V. Rao, *Oeko-Tex Standards*, Northern India Textile Research Association, Ghaziabad, 2006.
7. www.onlineclothingstudy.com

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	2			1						3				2				4				2	4	20
2	2					2					2				2		2	2	3				2	3	20
3		2				2				1	3				3			1	2				2	4	20
4	2				2					1	2				3			1	4				2	3	20
5		2			1	2				1	3			1	3			1	2				1	3	20
																								Total	100

Assessment Questions

Remember

1. Define in your own words “normally distributed data”
2. Define bias?
3. Define “process capability index”
4. Recall “six sigma”?
5. State how will you specify a button?
6. State seam severance
7. Retrieve the performance parameters of apparel
8. Label the functional standards for apparels
9. List the characteristic requirements of children’s apparel
10. State color fastness

Understand

1. Infer the purpose of “control charts”?
2. Compare seam strength and seam slippages
3. Explain how will you specify a seam
4. Interpret the reasons for seam puckering
5. Compare loop and knot strength
6. Interpolate in detail on the test methods of seams
7. Classify seams
8. Formulate the quality control measures for interlinings, laces and appliqués
9. Represent the quality attributes of childrens apparel
10. Indicate the role of fastness in predicting the apparel performance standards

Apply

1. Execute various test parameters for fasteners
2. Differentiate between skewing and bias
3. Construct the testing procedures for zippers strength measurement
4. Implement the various test parameters and its procedures of buttons
5. Identify the needles for men’s wear , women’s wear and kids wear
6. Differentiate between precision and accuracy
7. Demonstrate the necessities of childrens apparel
8. Predict the performance standards of flammability
9. Demonstrate the procedure for screening inprocess defects
10. Carry out an inspection plan to scrutinize a lot of 2500 pieces

Analyse / Evaluate / Create

1. Analyze the applicability of control charts for apparel industry
2. Attribute the care label symbols for “washing and dry-cleaning”
3. Analyze the influence of sewing machine settings on fabric type, sewing thread and needle.
4. Parse the test procedures for dimensional change, abrasion and color fastness
5. Judge the upholstery for its performance
6. Critically analyze the defects and its remedies in embroidery

7. Plan a care labeling procedures for an exports company which produces apparels, home furnishings and leather products
8. Design an apparel for summer wear
9. Design a quality control inspection chart for an apparel industry

15FT017 FASHION BRAND MANAGEMENT 3 0 0 3

Course Objectives

- To understand the methods of managing brands and strategies for brand management.
- To understand the importance of brands
- To gain an insight into various brand management activities.

Course Outcomes (COs)

1. Gain knowledge on fashion brands
2. Establish and sustain brands and lead to extensions
3. Understand the techniques of fashion brand management.

UNIT I **9 Hours**

OVERVIEW OF BRAND MANAGEMENT

Significance of branding -brand defined -Difference between a Product and a Brand - rationale for building a brand - types of brands - Branding Challenges -Creating a brand - Strategic planning for the brand -Designing brand Identity -Measuring brand personality - Brand Image - Luxury Brands- Organizational culture and brand performance -Brand Mantras and Internal branding for a successful brand - Case study

UNIT II **9 Hours**

UNDERSTANDING AND MEASURING BRAND EQUITY

Introduction - What is brand equity - Brand equity defined - Need for building brand equity -Steps in building a Brand -Researching for brand equity -Tracking a brand -The brand chain - Research techniques -Quantitative research techniques applied to branding - Measuring brand equity -Need for measuring brand equity -Methods to measure brand equity -Case Study

UNIT III **9 Hours**

UNDERSTANDING CONSUMERS AND MARKETS

Consumer behavior and the role of branding - concept of perception- brand evaluation and perception by customers -Consumer attitude -the Indian Consumer - Model of consumer decision making - Factors affecting consumer behavior - Brand loyalty and Brand commitment - Factors affecting brand loyalty - Concept of brand positioning - Positioning defined -Positioning strategy - Guiding principles for positioning -Repositioning- Case Study

UNIT IV **9 Hours**

MANAGING BRANDS

Branding and the marketing programme - Product Strategy -Pricing Strategy -Distribution Strategy - E-branding : Building the brand online -E-business strategy -Marketing and the internet - Branding and marketing communications -Communication options : Personal selling, sales promotions, Events and compaign marketing , Direct Marketing, Publicity and PR, Word of mouth, Internet marketing - Case Study

UNIT V **9 Hours**

BUILDING RESILIENT BRANDS

Defining branding strategy -Strategies for choosing a brand name -Line extension Category Extension - Brand Sketching - Launching a brand extension - Managing brand architecture - Brand roles in the brand portfolio -Brand relationship spectrum -Managing Brands over time - Brand challenges - Reinforcing brands - Brand revitalization -Brand turnaround -Case Study

FOR FURTHER READING

Luxury brand management. Managing brands across boundaries -Challenges in going international - Issues in going international -Local or Global - Branding strategies - Critical factors for success - Ethical brand positioning -Case Study

Total: 45 Hours

Reference(s)

1. David A. Aaker, Managing Brand Equity, Simon and Schuster, 2009.
2. Kirti Dutta , brand management principles and practices-2012, Oxford University Press
3. Kevin Lane Keller, Strategic Brand Management: Building, Measuring and Managing, Prentice Hall, 3rd Edition, 2007.
4. Moorthi YLR, Brand Management I edition, Vikas Publishing House 2012
5. Lan Batey, Asain Branding A Great way to fly, PHI, Singapore, 2002.
6. Paul Tmepoal, Branding in Asia, John Willy, 2000.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	1				2					3				2			1	4				1	4	20
2	1	2			1	2				1	2			1	2			1	3				2	2	20
3	1	2			1	1				2	1			1	3				2				2	4	20
4	2				1	1				1	2			2	2			2	2				2	3	20
5	1	2			1	2				2	1				2			1	1				3	4	20
																								Total	100

Assessment Questions

Remember

1. Define in your own words “Brand”.
2. What do you mean by hollow branding?
3. Enlist brand values
4. Define brand ambassador
5. Define brand audit
6. Enlist various types of Brands
7. What is co branding
8. Define Brand Equity
9. Different type of brand extension
10. Brand Promotion Methods

Understand

1. Functions of brand
2. Differentiate between brand augmentation and brand extension.
3. Is “No-brand” branding a brand strategy? Give reasons.
4. How do you meansure the brand performance?
5. How the brand image is built up?
6. Brand loyalty
7. Define internal branding

8. State what is brand identify
9. State the difference between brand identify and brand image
10. List any three ways in which an organization can build its brand image

Apply

1. How emotional charge is associated with brand connectivity?
2. Discuss in detail on the relationship between brand loyalty, relative spending and significance
3. Elaborate how organizations can build strong brands
4. Discuss Internal branding process
5. Demonstrate the term cultural fit. Why is it important for the organization and the brand
6. Discuss in detail the process of brand positioning and repositioning
7. Construct a brand identity appropriate for casual wear
8. Predict the brand postioning initiatives to introduce new product attributes
9. Demonstrate the brand equity values of luxury brands
10. Execute a strategy to rebuild the image of an declining luxury product

Analyse

1. Discuss on different methods of brand valuation.
2. Taking four examples, each from B2B, service and multi-faceted brands, explain the role of brand as a personality.
3. Diffenrentiate between Re-branding and re-launching
4. Out of the four various factors that influence brand equity, delineate any four, and discuss them critically
5. Identify a fashion brand that has been in the market place for more than two decades. Delineate how the brand elements have been used by the organization
6. Critically discuss how the identity of a brand can be designed

Evaluate / Create

1. Critically evaluate the brand equity
2. Evaluate the country of origin effect on building brand equity
3. Evaluate internal branding's impact on brand equity
4. Critically discuss the the strategic brand wheel
5. Compare three brands of men's casual wear
6. Pick a brand of your choice and delineate the various factors that have contributed towards building its brand equity

15FT018 INTERNATIONAL BUSINESS IN APPAREL INDUSTRY

3 0 0 3

Course Objectives

- To familarise the students to the basic concepts of international business management
- To Understand the social, cultural and economic factors that lead to trade between countries
- To know the Legal processes involved in imports and exports

Course Outcomes (COs)

1. Understand the global business environment, global strategic management practices and get acquainted with functional domain practices
2. Be equipped with business practices and protocols to develop working relationships among diverse trade sectors
3. Be familiar with conflicts situations and ethical issues in global business

UNIT I **9 Hours**

CONCEPT OF INTERNATIONAL BUSINESS

Meaning and importance of international business - Domestic business versus International business - Multinational Corporation - Modes of International business -Trade Mode -Direct and Indirect Export - Contractual Entry Modes- Licensing -Franchising- Turnkey Projects- Management Projects - Foreign Investments - Strategic Alliance

UNIT II **9 Hours**

REGULATION OF TRADE AND INVESTMENT AT THE INTERNATIONAL LEVEL

Basic Principles of multilateral trade negotiations - GATT and its early rounds -Uruguay Round - World Trade Organisation (WTO) - Basic difference between GATT and WTO - Structure of WTO - Functions of WTO - Settlement of Disputes - WTO and India -UNCTAD - Origin of UNTCAD - Major Areas of Negotiations - Free Trade Agreement (FTA) -Recent Developments

UNIT III **9 Hours**

INTERNATIONAL FINANCIAL ENVIRONMENT

International Monetary System -Gold Standard (early system) -Bretton Woods System of Exchange Rates -Exchange Regime Since 1973- Exchange rate quotation - Direct and Indirect Quotes -Buying and selling rates - Forward rates - Cross rates - Factors influencing exchange rate -International Financial Market - World Bank - Euro Banks

UNIT IV **9 Hours**

ORGANISATIONAL STRUCTURE OF INTERNATIONAL BUSINESS

Organizational Structure -Traditional organizational Structure - Functional Structure -Product Structure - Creation of Export Department - International Division - Global Division - Global Product Structure - Global Area Structure -Global Functional Structure -Multidimensional/ Matrix Structure - Some other Structures -Coordination among Sub- Units

UNIT V **9 Hours**

MANAGEMENT OF INTERNATIONAL OPERATIONS

Location for production- Factors behind selection of Location -Selecting a location Management of Inventory - deviation from EOQ-Shifting of Re-order Point - Just-in-time System - Sourcing of Inputs -Modes of procurement - Make or Buy Decision -International Logistics -Transportation Issue - Packaging of Products -Storage Facility - International services

FOR FURTHER READING

Global Technology Management -International Market Strategy-Product Strategy - Pricing Strategy - Foreign Trade Documentation -Letter of Credit -Draft - Bill of Lading -Case Study

Total: 45 Hours

Reference(s)

1. Vyuptakesh Sharan, International Business - Concepts, Environment an Strategy, 3rd Edition, Pearson Education in South Asia, New Delhi, 2011.
2. Darlie O. Koshy, Garment Exports: Winning Strategies, Prentice-Hall of India, 2006.
3. Charles W.I. Hill and Arun Kumar Jain, International Business, 6th edition, Tata Mc Graw Hill, New Delhi, 2010.
4. John D. Daniels and Lee H. Radebaugh, International Business, Pearson Education Asia, New Delhi, 2000.
5. K. Aswathappa, International Business, 5th Edition, Tata Mc Graw Hill, New Delhi, 2012.
6. Michael R. Czinkota, Ilkka A. Ronkainen and Michael H. Moffet, International Business, 7th Edition, Cengage Learning, New Delhi, 2010.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2				2					2				2			2	3				2	4	20
2	2				1	2					2			1	2				3				3	4	20
3	1	2			1	2					3				3			3	2					3	20
4	2	1			2	1				1	4				2				3				1	3	20
5		2				2					2				4			2	3				2	3	20
																								Total	100

Assessment Questions

Remember

1. State what is globalization
2. Define International Business.
3. Define MNC
4. List the various trade Barriers.
5. Define Licensing
6. State what is Franchising
7. Define Strategic Alliance
8. State what is GATT
9. Define forward rate
10. State what is cross rate

Understand

1. Distinguish between direct export and indirect export
2. Identify what is counter-trade
3. Enlist different forms of Contractural Entry Mode
4. Identify what is brown-field investment
5. Identify what are M & As
6. Compare FDI with Trade
7. Identify what is dumping
8. Comapare GATT and WTO
9. Identify what is UNCTAD
10. Compare between export department and global division

Apply

1. Show how Gold Standard disappeared
2. Find how floating rate system in foreign exchange works
3. Assess various exchange rate quotations
4. Demonstrate when cross rate is applicable
5. Show why Forward rates are important in import and export business

Analyse

1. Distinguish between domestic business and International Business
2. Distinguish between ethnocentric, polycentric, and geocentric MNCs
3. Differentiate between green-field investment and brown-field investment
4. Distinguish between GI vs M & As
5. Analyse the factors influencing Exchange Rate

Evaluate

1. Critically analyze the factors that help the human resource development in international business.
2. Judge export department and global division in terms of service
3. Choose the most fitting organization structure for MNC among various global organization structures

4. Evaluate between green-field investment and brown-field investment
5. Defend why FDI is better than Trade

15FT019 SUPPLY CHAIN MANAGEMENT 3 0 0 3

Course Objectives

- An understanding of the primary differences between logistics and supply chain management
- An understanding of the individual processes of supply chain management and their interrelationships within individual companies and across the supply chain
- An understanding of the management components of supply chain management
- An understanding of the tools and techniques useful in implementing supply chain management

Course Outcomes (COs)

1. Acquire knowledge on logistics and supply chain management
2. Identify the core processes of entire supply chain
3. Build and manage a competitive supply chain using strategies, models, techniques and information technology.

UNIT I **9 Hours**

INTRODUCTION

Concepts of Supply Chain and Logistics - Elements of Supply Chain - Elements of Logistics - Manufacturing Supply Chain - Functions of Manufacturing Supply Chain - Retail Supply Chain - Functions of Retail Supply Chain -Scope of Retail Logistics - Retail Supply Chain Management as a subset of Retail Management -Retail supply chain elements .

UNIT II **9 Hours**

MANAGING RETAIL LOGISTICS

Retail Distribution - Retail Replenishment - Direct Store Delivery - Managing Retail Home Delivery - IT for Retail distribution and replenishment -Measures for Retail Distribution and replenishment - Retail logistics -Retail Transport -Transportation Cycle of a retailer - Using IT in Transport Management -Green Transport

UNIT III **9 Hours**

ORDER MANAGEMENT AND REVERSE LOGISTICS

Order Management -Order Management Process - Concept of perfect order- Perfect order measures - Multi channel logistics -Retail Return and reverse logistics -Return Policy - Return Process -Reverse Logistics-Reverse logistics process -Designing reverse supply chain Network - Reverse Logistics Challenges -Application for Reverse Management

UNIT IV **9 Hours**

RETAIL LOGISTICS CONTEMPORARY ISSUES

Managing retail shrinkage -Elements and causes of shrinkage - Approach for shrinkage reduction - Green retailing - Green Logistics -Green Infrastructure -Green IT - Managing Logistics Service Provider -3PLs/LSPs -Services outsourced to LSP/3PL -Major drivers of logistics outsourcing - Benefits of using 3PL/LSP -Evolution of 4 PL - Retail Logistic Service Provider - An Indian perspective

UNIT V **9 Hours**

WAREHOUSE MANAGEMENT

Cross Docking -Advantages of cross docking - How cross docking works -Cross Docking Functions - Necessary ingredients for Cross Docking - How cross docking saves time -Warehouse Process Maturity Model -IT in warehouse Management - Measures of warehouse Management - Retail Warehousing -Basic Functions of retail warehouse-Value added services of a Retail Warehouse

FOR FURTHER READING

Apparel Retailing Supply Chain -supply Chain Characteristics- Pre-pack planning -Software in Pre-pack Decision - Apparel Retail supply chain innovations -Case Studies

Total: 45 Hours

Reference(s)

1. Rajesh Ray, Supply Chain Management for Retailing, Tata McGraw Hill Education Private Ltd
2. Janat Shah, Supply Chain Management Text and Cases, Pearson Education, 2009.
3. Sunil Chopra and Peter Meindl, Supply Chain Management-Strategy Planning and Operation, PHI Learning / Pearson Education, 2007.
4. Ballou Ronald H, Business Logistics and Supply Chain Management, Pearson Education, 5th Edition, 2007.
5. David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi, Designing and Managing the Supply Chain: Concepts, Strategies, and Cases, Tata McGraw-Hill, 2005.
6. Altekar Rahul V, Supply Chain Management-Concept and Cases, PHI, 2005.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	1			1	3				1	2			1	2			1	2				1	3	20
2		3				2					3				3				3				2	4	20
3	1	2			1	1				1	2			1	2			1	2				3	3	20
4	1					2					3			2	3			2	3					4	20
5	2					1					2			2	2			2	2				3	4	20
																								Total	100

Assessment Questions

Remember

1. Define Supply Chain
2. List elements of supply chain
3. List elements of Logistics
4. Define Customer chain
5. What is Reverse Supply chain
6. List scope of retail logistics
7. Define Distribution Network DesignDefine Distribution Network Design
8. List Distribution Strategies

9. Define cross decking
10. Define green logistics

Understand

1. Enlist Drivers of Supply Chain Performance
2. Enlist Supply Chain Performance Measures
3. How to Identify core processes
4. What is Outsourcing
5. Coment on Market Vs Hierarchy
6. Write the procedure on Supplier selection
7. Why Supplier development is important
8. Enlist Models for Facility Location and Capacity allocation
9. Compare return policy and reverse logistics
10. Identify what is shrinkage in retailing

Apply

1. Correlate the practical problems and factors influencing transportation of a company or a carrier
2. Show which is more important inbound logistics or outbond logistics in supply chain
3. Demonstrate push-pull supply chain system
4. Discuss recent trends in SCM
5. Discuss the interdependence of location decision and distribution decision
6. Demonstrate the importance of GSP
7. Predict the role of SCOR in supply chain management
8. Demonstrate bull whip effect in supply chain management
9. Predcit the short term losses incurred as a result of outsourcing
10. Demonstrate the role of supply chain management in ensuring delivery date commitments.

Analyse

1. Differentiate between manufacturing supply chanin and retail supply chain
2. Analyse the importance of Supply Chain in garment exporter
3. Analyse Make Vs buy decision in material procurement
4. Illustrate Impact of uncertainty on Network Design
5. Analyse various Supply Chain Network optimization models

Evaluate

1. Evaluate 3PL and LSP in terms of service response and quality
2. Determine the importance of retail distribution and retail replenishment
3. Judge concept of perfect order in terms of quality service
4. DetermineRetail supply chain elements
5. Critically check the uses of measures of warehouse Management

15FT020 HUMAN RESOURCE MANAGEMENT 3 0 0 3

Course Objectives

- To provide knowledge about staffing, training, performance, compensation, human factors consideration and compliance with human resource requirements.
- To impart knowledge on personal resource and utilization
- To know about the performance appraisal of personnel

Course Outcomes (COs)

1. Gain knowledge and skills needed for success as a human resources professional
2. Understand the role of HR in an apparel industry.
3. Understand the procedures for recruitment of staff, their retention, retirement, and dismissals

UNIT I **9 Hours**

INTRODUCTION

Human Resource Management (HRM)-Features of HRM - Objectives of HRM -Scope of HRM - Role of HRM- Functions of HRM - Limitations of HRM - Personnel Management -HRM & Personnel Management -Challenges to Personnel Management - Organisation of Personnel Department- Personnel Department in line, functional and line & staff organization - Role of Personnel Manager.

UNIT II **9 Hours**

PROCUREMENT

Job Analysis -Need of Job Analysis -Steps in Job Analysis - Methods of data collection - Job Description - Job specification - Job design - Methods of job design - Human Resource Planning - Types of manpower planning - Recruitment - Process of recruitment - Sources of recruitment - Selection- Steps in selection process - tests and Interviews -Placement and Orientation -Transfer, Promotion and Separations

UNIT III **9 Hours**

DEVELOPMENT

Performance Appraisal (PA) - Objectives, benefits & Methods of PA -Essentials of Effective Appraisal System -Training and Development -Training Methods-Steps in systematic Training Plan - Executive Development - Methods of Executive Development - Career Planning and Development - Individual vs. organization career planning -Career Counseling

UNIT IV **9 Hours**

COMPENSATION

Job Evaluation - Difference between job evaluation and performance appraisal - Objectives and methods of Job Evaluation - Employee Remuneration - Remuneration Package - Wage and Salary administration -Methods of wage system - Wage Policy and various Acts -Pay Structure - Bonus - Incentives - types of incentive plans - Profit sharing - Non-financial incentives

UNIT V **9 Hours**

INTEGRATION

Morale - Morale vs. productivity -Building high morale -Absenteeism - Causes and effects of absenteeism -Labour turnover - Methods to calculate labour turnover - Causes and effect of labour turnover - Steps to control labour turnover - Motivation -Importance of motivation -Techniques to increase motivation - Theories of motivation (Maslow , Herzberg, theory X and theory Y and Vroom's expectancy theory)

FOR FURTHER READING

Discipline -Aims and Objectives of Discipline -Indiscipline or misconduct -punishments - Reasons for indiscipline -procedure for disciplinary action - major areas of misconduct -code of discipline - Employees health - Industrial safety - Human Resource Records -Emerging Horizons in HRM - Case Studies

Total: 45 Hours

Reference(s)

1. Vaishali K Shah, Human Resource Management, 2007, Global book publishing Company
2. Dessler, Human Resource Management, Pearson Education Limited, 2007.
3. Decenzo and Robbins, Human Resource Management, Wiley, 8th Edition, 2007.
4. Luis R.Gomez-Mejia, David B.Balkin, Robert L Cardy. Managing Human Resource, PHI Learning. 2012.
5. Bernadin, Human Resource Management,Tata Mcgraw Hill ,8th edition 2012
6. Wayne Cascio, Managing Human Resource, McGraw Hill, 2007.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1		3				3					3				2			1	4					4	20
2	2	2			1	2					2				2			1	3				2	3	20
3		2				3					3				2			2	2				2	4	20
4	3	1			1	2				1	2			1	2			1	3				1	2	20
5	1	2				3					3				3			1	2				2	3	20
																								Total	100

Assessment Questions

Remember

1. Define HRD
2. State The importance of the humanresource planning
3. Outline the strategies of HR management.
4. Define recruitment
5. List the factors influencing recruitment
6. State what is orientation training
7. Define placement
8. Define job evaluation
9. List the methods of job evaluation
10. State what is wage policy in India

Understand

1. How to create linkage between apparel industry and Human Resources Management?
2. Indicate the methods by which you retain staff in a management
3. Role of human resource
4. Discuss the steps in human resource planning
5. Identify the steps in recruitment process
6. Ilustrate the elements of good recruitment policy
7. Compare layoff and retrenchment
8. Identify what is demotion
9. Enlist the reasons for transfer
10. Compare job analysis, job evaluation and job description

Apply

1. Criticize the HR development aspects of employee relations
2. Appraise about the philosophy of Human Resources Management.
3. Human resource accounting and audit
4. Enlist the benefits and limitations of human resource planning
5. Demonstrate the merits and limitations of a time rate system of wage payment.
6. Demonstrate various steps in interview process
7. Show how Maslow’s theory is applied human resource development
8. find the various interview methods
9. state the methods of employee participation in determining the incentives

Analyse

1. Computer applications in human resource management
2. Justify the following aspects in apparel industry such as unfair treatment, construction and wrongful dismissals.
3. Justify the following aspects in apparel industry such as unfair treatment, construction and wrongful dismissals.
4. Design a module to motivate unskilled operators.
5. Distinguish between placement and inductionDistinguish between placement and induction
6. Analyse the problems in induction
7. Distinguish between transfer and promotion
8. Distinguish between suspension and dismissal

9. Analyse various problems faced in the interview process.

Evaluate / Create

1. Evaluate various types of wage payment system with merits and demerits
2. Evolve a method to train employees for negotiation skills
3. Determine which theory is appropriate for human development – Maslow or Herzbergs
4. Produce a framework to involve the emerging horizons in human resrouce management.
5. Generalize the training requirements of career development

15FT021 FINANCIAL MANAGEMENT 3 0 0 3

Course Objectives

- Facilitate student to understand the operational nuances of a Finance Manager
- Facilitate student to comprehend the technique of making decisions related to finance function
- Facilitate student to develop the basic knowledge in financial management of an apparel industry

Course Outcomes (COs)

1. Understand the basics of managing finance in an organization
2. Calculate common investment criteria and project cost associated with corporate project
3. Measure the cost of capital and financial leverages to form long-term financial policies for business

UNIT I 9 Hours

INTRODUCTION

Evolution of Financial Management - Definition of Financial Management -Goals of Financial Management - Key Activities of Financial Management -Risk -return tradeoff - Organization of Finance Function - Relationship of Finance to Economics and Accounting - Environment of Finance - Forms of Business organizations - Regulatory Frame Work - Taxes- Financial System

UNIT II 9 Hours

CAPITAL BUDGETING

Time Value of Money -Future Value of Single Amount - Future Value of Single Annuity - Present Value of Single Amount - Present Value of Single Annuity - Basics of Capital Budgeting - Capital Budgeting Process -Costs and benefits - Investment Criteria - Net Present Value- Benefit Cost Ratio - Internal rate of return -Payback period - Accounting rate of return -Cost of Capital

UNIT III 9 Hours

FINANCIAL ANALYSIS, PLANNING AND CONTROL

Basic Concepts underlying Financial Accounting -Balance Sheet - Profit and Loss Account - Financial Statement Analysis - Financial Ratios - Comparative Analysis -Using Financial Statement Analysis -Funds Flow Analysis-Funds Flow Statement : Total Resources Basis - Working Capital Basis - Cash Basis -Break Even Analysis - Leverages : Operating Leverage and financial Leverage

UNIT IV 9 Hours

WORKING CAPITAL MANAGEMENT

Characteristics of Current Assets - Current Assets Financing - Cash Requirement for Working Capital -Cash Management -Monitoring Collections and Receivables - Credit Management- Terms of payment -Control of Accounts Receivables - Inventory Management - Order Quantity - EOQ Model - Working Capital Financing -Accruals - Trade Credit -Working Capital Advance by Commercial Banks

UNIT V **9 Hours**

LONG TERM FINANCING

Sources of long-term finance - Raising Long-term Finance -Venture Capital -Initial Public Offer - Secondary Public Offer - Rights Issue- Private Placement - Preferential Allotment -Obtaining a term loan -Investment Banking - Stock Market in India - Functions of stock market - NSE & BSE - Trading & Settlement-Buying and Selling Shares -Stock Market Quotations and Stock Market Indices -Role of SEBI

FOR FURTHER READING

Leasing - Hire Purchase Agreement- Project Finance - Mergers, Acquisitions and Takeovers- International Financial Management

Total: 45 Hours

Reference(s)

1. Prasanna Chandra, Fundamentals of Financial Management, 4th Edition, Tata McGraw Hill Education Private Limited
2. M.Y. Khan and P.K.Jain, Financial management, Text, Problems and cases, Tata McGraw Hill, 6th edition, 2011.
3. M. Pandey, Financial Management, Vikas Publishing House Pvt. Ltd., 10th edition, 2012.
4. Aswat Damodaran, Corporate Finance Theory and practice, John Wiley & Sons, 2011
5. James C. Vanhorne, Fundamentals of Financial Management PHI Learning, 11th Edition, 2012.
6. Brigham, Ehrhardt, Financial Management Theory and Practice, 12th edition, Cengage Learning 2010.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			3	3					2				2									3	20
2	3	4			3	4					2				2									2	20
3	2	3			3	3					3				3									3	20
4	3	3			3	3					1				3									4	20
5	2	3			3	2					3				3									4	20
																							Total		100

Assessment Questions

Remember

1. State the limitations of ratio analysis.
2. State what are mutually exclusive projects.
3. Define cash flow.
4. Define cash flow cycle?
5. Define risk.
6. State what profitability ratio indicate
7. Define long term financing.
8. List the sources of long term finance
9. Define capital market and classify it.
10. List the types of capital market

Understand

1. Enlist the goals of financial management
2. Enlist the daily activities of financial management?
3. How capital budget decisions are taken?

4. Distinguish between preference shares and debentures.
5. What is depreciation?
6. What is the use of financial ratio?
7. Enlist the three primary sections of the statement of cash flow
8. Enlist the cash inflows and outflows from investing activities
9 Differentiate between equity and debt market
10 Define public issue

Apply

1. Demonstrate how the existing interest of the shareholders can be protected
2. Show how the concept of cost of capital applied in start-ups
3. Assess various inventory management models
4. Choose the best inventory model for retailing
5. Show how the concepts of stock out and safety stock are applied in industry
6. Demonstrate the advantages of DEMAT process
7. Predict the role of budget planning in leveraging break even status
8. Carry out a plan to appraise the overheads situation in the process of financial planning
9. Predict the functions of stock exchange in maintaining the status quo of financial markets
10. Demonstrate the role of capital budgeting process.

Analyze

1. Under what circumstances the Net Present Value (NPV) and the Internal Rate of Return (IRR) methods differ?
2. Elaborate that “Sound financial management is the key to the prosperity of the business.”
3. Differentiate between primary market and the secondary market.
4. Compare between ratio analysis and trend analysis
5. Contrast between financial statements and financial ratio
6. Compare between current ratio and quick ratio

Evaluate

1. “Share capital is better than debt capital”. Justify the statement.
2. Choose which is best for describing the pattern: ratio analysis or trend analysis
3. Choose which is more useful in analyzing the performance : financial statements or financial ratio
4. Evaluate the applications of present value and future value concepts
5. Evaluate the usefulness of operating leverage and financial leverage

15FT022 TOTAL QUALITY MANAGEMENT 3 0 0 3

Course Objectives

- To learn the quality philosophies and tools in the managerial perspective.
- To understand the Total Quality Management concept and principles and the various tools available to achieve Total Quality Management.
- To understand the application of statistical approach for quality control.

Course Outcomes (COs)

1. Understand the quality philosophies and tools to facilitate continuous improvement and ensure customer delight
2. Learn and apply quality Planning
3. Understand and apply the concept of strategic planning

UNIT I **9 Hours**

INTRODUCTION

What is quality? - Definition of TQM- Dimensions of quality -Quality Planning - Quality Costs - types and bases of quality costs - Analysis techniques for quality costs - Basic concepts of TQM- Principles of TQM -Characteristics of Quality leaders -Role of Senior Management - TQM Implementation - Quality Council - Quality statements - Strategic planning - Deming's philosophy - Barriers to TQM implementation

UNIT II **9 Hours**

CUSTOMER SATISFACTION

Types of customers -customer satisfaction - customer perception of quality - customer complaints - Service Quality - Customer Retention -Motivation -Employee Empowerment - Teams -Recognition and Reward -Performance appraisal- Benefits of Employee Involvement -Continuous Process Improvement -Juran's Trilogy- PDCA Cycle - Kaizen Movement -5S - Partnering - Performance Measures

UNIT III **9 Hours**

STATISTICAL PROCESS CONTROL

Introduction - Seven TQM Tools -New Seven Management Tools -Statistical Fundamentals -Data Collection - Sampling and sampling error - Measures of Central Tendency - Measures of Dispersion- Normal Curve -Six Sigma - Tools of Six Sigma - Statistical Process Control -Control process - variation and control -Control Charts for variables and attributes - Process Capability

UNIT IV **9 Hours**

TQM TOOLS

Bench Marking - How to bench mark -Quality function deployment (QFD) -QFD Process - Taguchi's quality loss function - Total Productive Maintenane (TPM)- TPM Implementation -Five basic activities for the development of TPM - Six Major Loss Areas - Overall Equipment Effectiveness (OEE) - Autonomous Work Groups (AWG) - Failure Mode and Effect Analysis (FMEA) - Stages of FMEA - Risk Priority Number (RPN)

UNIT V **9 Hours**

QUALITY SYSTEMS

Need for ISO 9000 and other quality systems - ISO 9000 - Implementation process of ISO 9001:2000- Structure of ISO 9000 series -QMS Requirements (ISO 9000: 2000) - Steps for Implementation of QMS- Documentation and record keeping - Documentation Pyramid - Internal Audits -Auditing Techniques - Registration Process - QS 9000 - Environmental Management System (EMS) - ISO 14000

FOR FURTHER READING

Check sheet (Check list) - Pareto Diagram - Cause & Effect Diagram -Scatter Diagram -Run Charts

Total: 45 Hours

Reference(s)

1. N Srinivasa Gupta & B Valarmathi , Total Quality Management, 2006, Vijay Nicole Imprints Private Ltd
2. Dale H.Besterfield, Carol Besterfield Michna, Glen H. Besterfield, Mary Besterfield Sacre Hermant Urdhwareshe, Rashmi Urdhwareshe, Total Quality Management, Revised Third edition, Pearson Education, 2011
3. Shridhara Bhat K, Total Quality Management Text and Cases, Himalaya Publishing House, First Edition 2002.
4. Douglas C. Montgomory, Introduction to Statistical Quality Control, Wiley Student Edition, 4th Edition, Wiley India Pvt Limited, 2008.

5. James R. Evans and William M. Lindsay, The Management and Control of Quality, Sixth Edition, Thomson, 2005.
6. Poornima M.Charantimath, Total Quality Management, Pearson Education, First Indian Reprint 2003.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	2			3	2					2				3				1					3	20
2	3	4			3	4					1				3				1					1	20
3	3	2			4	2					3				2				2					2	20
4	3	2			3	3					2				3				2					2	20
5	4	3			2	4					3				2				1					1	20
																							Total		100

Assessment Questions

Remember

1. Define Quality.
2. State the analysis techniques for quality costs.
3. Define Quality functions development (QFD)
4. Recall what is Business process Improvement (BPI)
5. Define Bench marking
6. Define loss function
7. State Japanese 5S principles
8. Define 8D methodology
9. Enlist the essential characteristics of a leader
10. State Juran's Trilogy

Understand

1. Define vision
2. Define mission
3. Define policy statement
4. Summarise the steps involved in TQM planning?
5. Identify the principles of TQM?
6. Indicate what is House of quality (HOQ),
7. Identify what is POKA YOKE
8. Illustrate Failure mode effect analysis (FMEA)with examples
9. Explain TQM culture
10. Explain Deming's 14 points

Apply

1. Denonstrate how various dimensions of quality are used in manufacturing industry
2. Show how TQM principles & strategies in export house
3. Construct the diagram displaying Maslow's hierarchy theory
4. Show how employee involvement result in improved quality
5. Demostrate the application of control charts in industry
6. Enlist the applications of p-chart and c-chart
7. Show how Risk Priority Number (RPN) is calculated
8. Show how a quality system is being introduced for a product by incorporating six sigma.
9.

Analyze

1. Differentiate between Quality – vision, mission and policy statements.
2. Enlist and analyse 7 new methods of quality control & statistical process control methods.
3. Analyse various TQM tools.
4. Write the Overview of the contributions of Deming and Juran Crosby

5. Differentiate between conventional QC tools and new seven QC tools

Evaluate

1. Quality systems, awards &EMS.
2. Evaluate Seven Tools of quality management (old & new)
3. Rate various types of benchmarking exercise with suitable examples
4. Determine the benefits of ISO 14000
5. Choose the right six sigma tool for export unit

15FT023 PROJECT MANAGEMENT 3 0 0 3

Course Objectives

- To learn the basics of managing projects.
- To understand the concepts related to project management.
- To get self confidence to manage projects on his own

Course Outcomes (COs)

1. Understand project management principles in business situations to optimize resource utilization and time optimisation.
2. Develop commercial skills such as marketing, costing & budgeting in the students.
3. Develop technical project planning, implementation, evaluation and financial assessment skills.

UNIT I 9 Hours

PREPARING FOR PROJECT MANAGEMENT SUCCESS

Importance of Project Management -project Management - Characteristics of Project Work -Role of the project manager -Project Manager skills -Project Manager relationships and tools - Role of Team Members -Roles of clients, customers and other stakeholders - setting up a planning and control system (PCS) - Need for PCS - Elements and models of a PCS

UNIT II 9 Hours

PLANNING THE PROJECT

Defining the project -defining the problem or opportunity - Types of projects - Project objectives - Work breakdown structure - Estimating activities -Estimating methods - Precision of Estimates- Sequencing activities -Diagramming methods - Network diagram -Calculating the critical path - Preparing schedules - Gant chart -preparing resource plans and budget plans

UNIT III 9 Hours

EXECUTING THE PROJECT -I

Initiating project -communicating project plans - controlling project objectives -Time control - Cost control- common causes of cost problems- Scope and Quality Control - Resource Control-Control thresholds - Tools to use in controlling project objectives -Inspection-Statistical sampling- Flow charting -Control Charts -Trend Analysis -Pareto Diagrams - Cause & Effect Diagram

UNIT IV 9 Hours

EXECUTING THE PROJECT -II

Reporting on project objectives -Graphical reports -Reporting percent complete - Sample reports - Status report - Schedule baseline plan -Cost report - Controlling changes in the project -Conducting Project evaluations -types of project evaluations - Parameters for project evaluations - Managing Risk - major categories of risk - Assessing risk -Responding to risk - Closing the Project - Project closure checklist

UNIT V **9 Hours**

LEADING THE PROJECT TEAM

Developing project teams - Leadership environment -Stages of Team Development -Managing Conflict - Potential causes of conflict - Handling conflict -Communicating effectively -Process of communication -Barriers to communication - Holding Effective Meetings- Making Team Decisions - Using sources of power wisely -Managing Change - Managing performance

FOR FURTHER READING

Project management software - PERT& CPM softwares -Earned Value Analysis (EVA) - Various checklists in Project Management - Case studies

Total: 45 Hours

Reference(s)

1. Larry Richman, Project Management Step-by-Step, 2009, PHI Learning Private Ltd, Eastern Economy Edition
2. Clifford Gray and Erik Larson, Project Management, Tata McGraw Hill Edition, 2005.
3. John M. Nicholas, Project Management for Business and Technology - Principles and Practice, Second Edition, Pearson Education, 2006.
4. Gido and Clements, Successful Project Management, Second Edition, Thomson Learning, 2003.
5. Harvey Maylor, Project Management, Third Edition, Pearson Education, 2006.
6. https://www.chandleraz.gov

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	3			4	2					3				2				2					1	20
2	4	4			2	1					1				3				2					3	20
3	3	2			3	3					3				2				2					2	20
4	2	1			3	3					3				2				3					3	20
5	2	3			2	2					2				3				3					3	20
																								Total	100

Assessment Questions

Remember

1. What are the essential elements of the project?
2. Enlsit various types of organizational structures
3. What tools and techniques would you use in the analysis of data?
4. Define matrix organization
5. List the project manager skills
6. List the various roles of project manager
7. List the project types
8. Recall what is benefit-cost analysis
9. Define a work breakdown structure
10. Define critical path

Understand

1. What are the critical stages to be observed in implementation of a project?
2. What are the significant techno-economic feasibility aspects of the project?
3. Budget uncertainty
4. What is Risk management
5. Compare early start and early finish

6. Explain Gantt chart
7. Compare status report and schedule baseline plan
8. Compare the stages of forming and storming
9. Compare the stages of norming and performing
10. Identify various methods of handling conflict in project management

Apply

1. Show how you will carry out feasibility studies
2. Show the difficulties that may possibly be encountered in the project implementatio
3. Demonstrate how to budget the project
4. Show how work break down Structure is applied in project management
5. Show how to calculate critical path
6. Show how earned value analysis is applied in project management
7. Construct the table of potential causes of conflict in project management
8. Demonstrate the element of kaizen in organizing the QMS
9. Carry out the role of 5S in establishing best manufacturing practices
10. Predict the role of external factors in risk management

Analyze

1. Justify Why project management is a sound strategy in today's business world
2. Breakdwon the implications of SWOT in analyzing the project ideas
3. Compare the technical and commercial components of a given project
4. Differentiate between flowcharting and control charts
5. Breakdown the project closure checklist

Evaluate

1. Develop a proposal for getting financial assistance from a bank for your apparel industry.
2. Evaluate various tools to use in controlling project objectives
3. Evaluate major categories of risk in project management
4. Critque about various barriers to communication
5. Evaluate critically cost control and resource control in project management

15FT024 FASHION ENTREPRENEURSHIP 3 0 0 3

Course Objectives

- To develop motivation and strengthen entrepreneurial urge in students.
- To impart basic entrepreneurial skills and understandings to run a fashion boutique/retail business efficiently and effectively

Course Outcomes (COs)

1. Gain knowledge and skills needed to run a business.
2. Understand the barriers of starting a small business

UNIT I 9 Hours

INTRODUCTION

The concept of entrepreneur -Characteristics of an Entrepreneur -Distinction between an Entrepreneur and a Manager- Functions of an Entrepreneur -Types of Entrepreneur -Intrapraneur -Entrepreneurial motivation- Maslow's Need Hierarchy Theory -McClelland's Acquired Needs Theory - Motivating factors -Major Entrepreneurial competencies (Traits)-Developing competencies

UNIT II 9 Hours

START-UP

Small scale industry-Types of small-scale industries- Characteristics of small scale industries - Project Identification and Selection (PIS) -Meaning of Project - Project Classification -Idea Generation - Project Formulation - Meaning of Project Report -Contents and formulation -Specimen of a project report -Network Analysis -Network Techniques -PERT and CPM techniques

UNIT III **9 Hours**

PROJECT APPRAISAL

Concept of Project Appraisal -Methods of Project Appraisal - Economic Analysis -Financial Analysis -Market Analysis - Opinion Polling Method -Life Cycle Segmentation Analysis - Technical Feasibility - Financing of Project - Need for financial planning -Financial needs - Sources of Finance - Capital Structure -Term Loans - Venture Capital -Export Finance -Ownership Structure

UNIT IV **9 Hours**

SUPPORT

Institutional Finance to Entrepreneurs -Commercial Banks -other Financial Institutions - IDBI, IFCI, ICICI, UTI, IRBI, LIC,SFCs, SIDCs, SIDBI, EXIM Bank, Lease Financing -Concept of lease - Types of Lease agreements - Concept of Hire Purchase -Difference between hire purchase and leasing - Procedure for Hire Purchase - Taxation benefits and Government Policy for small-scale industry

UNIT V **9 Hours**

MANAGEMENT

Meaning of business -Requisites of a successful business -Fundamentals of Management- Characteristics of Management -Difference between Management and Administration -Scope of Management -Functions of Management -Management Process -Production and Operation Management - Working Capital Management -Inventory Management -HRM -Marketing Management

FOR FURTHER READING

Accounting for small enterprises -Growth Strategies in small enterprises- Expansion -Diversification - Joint Venture -Merger - Sub-contracting- Franchising -E-commerce -Case Studies

Total: 45 Hours

Reference(s)

1. Dr S S Khanka, Entrepreneurial Development, S. Chand & Co Ltd
2. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi, 2001.
3. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi, 2001.
4. Mathew Manimala, Entrepreneurship Theory at the Crossroads, Paradigms & Praxis, Biztrantra ,2nd Edition ,2005
5. Prasanna Chandra, Projects - Planning, Analysis, Selection, Implementation and Reviews, Tata McGraw-Hill, 1996.
6. P.Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai -1997.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	3			4	3					1				2				2					1	20
2	2	2			3	4					2				2				2					3	20
3	3	4			2	3					3				1				2					2	20
4	2	3			4	2					2				1				3					3	20
5	4	2			3	2					4				3				1					1	20
																								Total	100

Assessment Questions

Remember

1. Define enterpreneurship.
2. Entrepreneurial Personality
3. Mention various models of entrepreneurship.
4. Define business plan
5. Define pre-feasilbility study
6. Define incubation
7. Define venture capital
8. Define IT startups
9. List Financial Institutions in India
10. Define PERT and CPM

Understand

1. Enlist required Skills of Entrepreneur
2. Compare entrepreneur and intrapreneur
3. Identify the motivating factors for a yound entrepreneur.
4. Enlsit major entrepreneurial competencies
5. What do you understand by collaborative affiliation?
6. How will you take into account, various aspects of legal, financial, operational in organizational planning?
7. What is SME?
8. What is the limit of investment for SME?
9. What do you mean by rehabilitation?

Apply

1. Demonstrate the characteristic attributes of successful entrepreneur
2. Predict the profiles that an entrepreneur should possess?
3. Predict the methods for spotting new venture opportunities in global environment?
4. How to prepare business plan?
5. How to launch product?
6. How to prevent sickness of business unit
7. Predict the requirements of effective Management of small Business
8. Demonstrate the financial sources role in managing a start up firm
9. Execute a business plan model for starting a apparel buying house firm
10. Carry out the business plan modeling process for starting a boutique

Analyze

1. Evaluate the factors such as legal, financial, operational and marketing aspects in medium business?
2. How to evaluate the success factor of an entrepreneurship?
3. Contrast between management and administration
4. Analyse Central and State Government Industrial Policies and Regulations
5. Differentiate between leasing and hire purchase

Evaluate

1. Evaluate a business plan of XYZ company in terms of feasibility and viability
2. Evaluate a Feasibility Report Prepared for XYZ company
3. Determine the applications of PERT and CPM
4. Choose the best financing source for starting up a boutique
5. Defend Maslow’s Need Hierarchy Theory in the motivation of entrepreneur

15FT025 INTERNATIONAL SOCIAL COMPLIANCE 3 0 0 3

Course Objectives

- To educate the various laws pertaining to suitable working conditions for labors
- To study the various welfare measures introduced as per the international laws
- To gain knowledge about various standards pertaining to welfare of the personnel in the apparel industry

Course Outcomes (COs)

1. Understand the implementation of various welfare measure of apparel industry.
2. Gain knowledge about different schemes under social compliance.
3. Develop the ability to follow various international standards pertaining to welfare of the personnel of the apparel industry

UNIT I **9 Hours**

WORKING CONDITIONS

Child labour-Wages and benefits -Working hours -Forced / bonded labour -Discrimination -Discipline -freedom of association - Health and safety -accommodation -Toilets and other facilities. Management controls; Sub-contractors -Environment

UNIT II **9 Hours**

WELFARE MEASURES

Forming trade unions, Collective bargaining machinery, provision of welfare measures such as ESI, PF contribution, first aid, rest rooms and crèches, maternity facilities, transport facilities.

UNIT III **9 Hours**

COMPLIANCE WITH ETHICAL CODES

International labour organiasation conventions- United Nations global compact -Ethical trading initiative base code -World-wide Responsible Apparel Production (WRAP) - Fair Labour Association - International Council of Toy Industries (ICTI) -Initiative clause society (ICS) -AVE sector model-Fair Trade Practices

UNIT IV **9 Hours**

SOCIAL ACCOUNTABILITY

Overview -SA8000 certification - Benefits of SA8000 - Food safety and certification - HACCP - Benefits of adopting HACCP - ISO 9001:2000 - Benefits of adopting ISO9001:2000, ISO 26000 - Benefits of adopting ISO 26000 - International Food Standards

UNIT V **9 Hours**

ISSUES IN LABOUR POLICY

Labour Law reforms - Key concerns in Labour Policy -Reviewing the link between Parliament Executive and Judiciary- Second National Labour Commission -Major recommendations -Terms of Reference of First and Second NLC - Employee participation - Labour management cooperation in decision making. `

FOR FURTHER READING

Compliance with local, national and international laws - BRC Global Food Standards - Benefits of BRC Global Food Standards

Total: 45 Hours

Reference(s)

1. C. S. Venkata Ratnam, Industrial Relations, Oxford University Press, New Delhi, 2006.
2. R. S. Dwivedi, Human Relations & Organisational Behaviour, Macmillan India Ltd., New Delhi, 1997.

3. M. V. Pylee and Simon George, Industrial Relations and Personnel Management, Vikas Publishing House Ltd., New Delhi, 1995.
4. S. C. Srivastava, Industrial Relations and Labour Laws, Vikas Publications, 2000.
5. By Debbie Troklus and Sheryl Vacca International Compliance 101
6. http://www.sa-intl.org

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	3			3	4					3				3				1					1	20
2	4	3			2	2					3				3				1					2	20
3	3	4			1	1					3				4				2					2	20
4	2	3			2	3					2				3				2					3	20
5	4	2			3	3					4				2									2	20
																								Total	100

Assessment Questions

Remember

1. Define social compliance
2. What are the laws pertaining to child labour?
3. Elaborate upon Fair labor associations.
4. Enlist local laws concerning compliance
5. Enlist national laws concernred with compliance
6. Brief about international laws connected with social compliance
7. SA8000 certification
8. What is HACCP
9. Define ISO 26000
10. Define BRC

Understand

1. What do you understand by collective bargaining machinery?
2. Differentiate between forced and bonded labour.
3. What do you mean by freedom of association
4. Enlist Benefits of SA8000
5. What do you mean by BRC Global Food Standards
6. Enlist Benefits of adopting HACCP
7. Enumerate the Benefits of adopting ISO 26000
8. Comment on international food standards
9. Enlist the benefits of ISO 26000
10. What are first and second NLC

Apply

1. Show the benefits of adopting ISO9001:2000
2. Demonstrate the benefits of adopting ISO9001:2000 in industry
3. Predict the advantages of Labour Law reforms
4. Demonstrate the advantages of social accountability
5. Show how SA8000 is beneficial to the industry
6. Carry out a revamping shceme to implement SA 8000 standards
7. Execute a strategy fro adopting fair trade practices in procuring cotton
8. Predict the responses obtained for implementing WRAP
9. Construct the framework of basic social compliances
10. Demonstrate the features of International food standards for processed and caned food stuffs

Analyze

1. Differentitate between and Forced and bonded labour
2. Enumerate the BRC global food standards that are available for the consumers.
3. Critically analyze the role of Environment and Ethical standards in the apparel industry.
4. Break down key concerns in Labour Policy
5. Justify the employee participation in decision making

Evaluate

1. Determine the benefits of WRAP
2. Evaluate SA 8000 and ISO 26000
3. Evaluate first and second NLC
4. Choose the ethical codes appropriate for garment exporter
5. Defend the social accountability in export units

15FT026 ERP AND MIS IN APPAREL INDUSTRY 3 0 0 3

Course Objectives

- Students will have fundamental knowledge of information systems.
- Students will know the principles and features of ERP/MIS packages.
- Students will know the applications of ERP/MIS packages.

Course Outcomes (COs)

1. Understand the fundamentals of information systems.
2. Intrepret the features of ERP/MIS.
3. Analyse the various commercial ERP/MIS packages.

UNIT I **9 Hours**

INTRODUCTION

An overview and features of ERP, MIS integration, ERP drivers, Trends in ERP, ERP in India. ERP system perspective - Management Information System, Operations Support System, Transaction Processing System, Network Structure of ERP system, ERP work flow, Process modeling for ERP systems, Communication in ERP systems, OLTP, (On Line Transaction Processing), OLAP (On Line Analytical Processing). Enterprise Integration application tools for ERP.

UNIT II **9 Hours**

RESOURCE MANAGEMENT PERSPECTIVE

Business modules in ERP packages, Finance, Production, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution, Resource Management, Business Process Reengineering, Relationship between ERP and BPR, ERP Implementation Life cycle, Implementation methodology, ERP Project Management and Monitoring. ERP and E-Commerce, ERP Culture, ERP and CRM, ERP and SCM, ERP selection issues, ERP in Public Sector Enterprises, Pre- and Post-implementation issues, ERP Vendors, Key ERP consultants in India, Future directions in ERP.

UNIT III **9 Hours**

BASICS OF INFORMATION SYSTEM

Introduction to Information system in business, Need for Information Technology, System concept, Components of an information system, Information system resources, Information system activities, recognizing information system. Expanding role of information systems, Operating support system. Management support systems.

UNIT IV **9 Hours**

INTERNET AND ELECTRONIC COMMERCE

Introduction, Business use of internet, Interactive marketing, Business value of the internet, Customer value and the internet. Fundamentals of Electronic Commerce (EC), EC applications, Business-to-Consumer commerce, Business to Business commerce. Electronic payments and security.

UNIT V **9 Hours**

INFORMATION SYSTEMS FOR BUSINESS OPERATION

Applications of intranets, intranet technology resources, the business value of intranets, the role of Extranets, enterprise collaboration systems. Information systems for marketing, manufacturing, human resources, accounting, financial, transaction processing, managerial and decision support, Information systems for strategic advantages, Strategic application and issues in IT. Role of ERP/ SAP.Ethical and societal challenges of information technology.

FOR FURTHER READING

Commercial ERP & MIS packages: Operation, Advantages & disadvantages. SAP Modules: Comparision.

Total: 45 Hours

Reference(s)

1. Alexis Leon, ERP Demystified, Tata McGraw Hill, New Delhi, 2014.
2. Kenneth C. Laudon, Jane P. Laudon, Management Information Systems: Managing the Digital Firm, 14th edition, Pearson Education, 2015.
3. E. Turban, E. McLean and J. Wetherbe, Information Technology for Management: Transforming organizations in the digital economy, 6th edition, New Jersey, 2008.
4. V. K. Garg, Venkat and N.K.Krishna, ERP Concepts and Practices, PHI Publications, 2003.
5. James A OBrien, George, M. Marakas, Introduction to Information Systems, Tata McGraw Hill, New Delhi, 2008.
6. Langenalter and A. Gary, Enterprise Resources Planning and Beyond, St. Lucie Press, USA, 1999.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	4			3	3					2				2				2					1	20
2	3	3			2	3					1				3				3					2	20
3	3	3			4	3					2				2				1					2	20
4	2	3			3	3					3				2				2					2	20
5	2	3			4	3					3				3				1					1	20
																								Total	100

Assessment Questions

Remember

1. Define ERP.
2. Mention the current trends in ERP.
3. What is meant by supply chain integration?
4. Expand the terms “OLAP, OLTP”.
5. Give the fundamentals of Information system.
6. What are the different phases of ERP implementation?

7. What do you understand by MIS?
8. List the benefits of ERP for apparel Industry.
9. List the modules of SAP.
10. Sate the social and ethical practices followed by ERP

Understand

1. Explain the Features of ERP Drivers.
2. Differentiate between operating support system and management support systems
3. Discuss the relation between ERP and E-Business.
4. Summarize the working principle of e-commerce.
5. Formulate the basic concepts of information system.
6. Explain in detail on the transaction processing information system.
7. Formulate the minimum requirements of a decision support system.
8. Illustratate the salient features of interactive marketing.
9. Formulate the implementation strategy of ERP.
10. Explain the Enterprise Integration application tools for ERP.

Apply

1. Assess the key issues related to the selection of ERP software for an organisation.
2. Predict the salient features of a good ERP package for an apparel industry.
3. Select the salient featurs of a MIS system for an apparel industry.
4. Demonstrate the ease of managing inventories in ERP systems
5. Construct a framework of process functions for ERP implementation
6. Execute a blue print of process functions as a part of standardization initiative
7. Predict the ease of carrying out MRP using ERP systems
8. Predict the business analytic applications enabled by the data managed in ERP systems
9. Implement the task of standardizing before implementing ERP
10. Demonstrate the flexibilities of imparting MRP adjustments in ERP systems

Analyze / Evaluate

1. Compare and contrast ERP and MIS.
2. "Manufacturing module and Materials management module play a vital role in any ERP system." Justify the statement with relevant examples.
3. Compare and contrast SCM and CRM.
4. Critically analyze the implementation strategy of ERP.
5. How will you evaluate the performance of a ERP package.
6. Criticize the ethical and societal roles of ERP/MIS packages.

15FT027 GRAPHIC DESIGNING FOR LAYOUTS 3 0 0 3

Course objectives

- To enable students interpret and comprehend fundamentals of graphic designing
- To impart knowledge of designing layouts, websites, newspapers, magazines and brochures
- To enable students develop different types of layouts using design principles

Course outcomes

1. Identify and interpret graphic design concepts
2. Interpret the different types of layout design requirements
3. Use the knowledge of graphic design and develop layout designs

UNIT I **9 Hours**

INTRODUCTION TO DESIGN PROCESS

Process of design – Research, ideate and prototype. methodologies of design, design relationship with time. Measurements - Absolute measurements, relative measurements, Proportion – geometry and mathematics, Rule of thirds, Visual center. Anthropometry – its applications

UNIT II **9 Hours**

PRINCIPLES OF LAYOUT DESIGN

Layout design – gestalt principles, Articulation techniques, grids & formations – columns, fields or modules – types of grids. Representation and reality – representational layouts. Matrices –patterns, pixels and pointillism. Any four Webpage design principles in contemporary use.

UNIT III **9 Hours**

PLACEMENT OF OBJECTS

Placement of objects on the page – Narration style, Role of white space, Balance, Juxtaposition, Alignment, Broad side, fonts, hyphenations and justification, Indentation, hierarchy, color texture, pace

UNIT IV **9 Hours**

GRAPHIC DESIGN APPLICATIONS

Applications – typography, music, interior design, furniture, architecture, books, brochures, newspapers, magazines, packaging, websites, built environment, quantitative information, identity programmes. Brochure design and book front page designs

UNIT V **9 Hours**

GRAPHIC DESIGN STANDARDS

References – ISO, DIN, ISO Envelope sizes, book sizes, outdoor media sizes, standard templates. File image formats – Jpeg, png, pdf, tiff,Gif, RAW image. Video image formats - Avi, mpeg, mp3, mp4.

FOR FURTHER READING

Explore the principles of grid design and different rules of composition. Prepare a journal for grid design reference

Total = 45 Hours

Reference(s)

1. Bath Tondreau, Layout essentials 100 design principles for using grids, Rockport publishers, 2009.
2. Paul rand, Thoughts on design, Chronicle books, 2014.
3. Gavin ambrose and Paul harris, The layout book, AVA publishing SA, 2007.
4. Gavin ambrose and Paul harris, Design thinking, AVA publishing SA, 2010.
5. www.paul-rand.com

Assessment pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1		1				4				2	1			2	4				3				3		20
2	1	3			3	1				2	3			1	1				5						20
3	2	3				5				2					3				3				2		20
4	3				3	4				1	1				3				4				1		20
5	2					2					3				6				6				1		20
																								Total	100

Assessment questions

Remember

1. State golden ratio
2. Represent the types of measurement systems in layout design
3. State golden section
4. Define visual center in a still life image
5. Define pointillism
6. State leading fonts concept used in layout design
7. List the elements of a grid
8. Label the properties of color harmony
9. State the difference between movement and rhythm
10. State DIN standards

Understand

1. Discuss the different methodologies that can be used as starting framework for producing design
2. Summarize the concept of rubbish theory
3. Illustrate rule of thirds composition principle
4. Illustrate the concept of grids and matrices in layout design
5. Discuss juxtaposition in layout design
6. Explain the term broadside
7. Interpret the phenomenon of orientation
8. Explain hierarchy
9. Explain the role of typography in defining zones in the grid
10. Summarize the gesalt concepts

Apply

1. Predict the importance of proportion in layout design
2. Compare the different types of grid
3. Predict the role of balance in layout design
4. Choose the measures to avoid overcrowding in the layout design
5. Predict the combined role of typography and color in layout design
6. Carry out a layout plan applying the color harmony principles
7. Execute a strategy for implementing monchromacity in web design
8. Represent the attributes of ISO standards in print media works
9. Summarize the qualities of visual tension engineered in logo designs
10. Indicate the role of establishing foal points in web page layout

Analyze

1. Differentiate between golden section and golden ratio
2. Resolve the articulation elements of design
3. Resolve the techniques of matrices applied in layout design
4. Breakdown the alignment techniques applied in layout design
5. Differentiate between hyphenation and indentation

Evaluate / Create

1. Justify the importance of column width and typesize
2. Critique how representational techniques help layouts convey convey complex ideas and information
3. Justify how narratives provide meaning to visual communication of layout design
4. Justify the role of typography in layout design
5. Derive a scheme of color and texture for a webpage design
6. Develop a tabloid front page design for fashion magazine
7. Produce an event brochure using asymmetrical balance principle
8. Produce a layout plan that establishes the hierarchy of information in layout design
9. Derive a color palette appropriate for event brochure

ENTREPRENEURSHIP ELECTIVES

15GE001 ENTREPRENEURSHIP DEVELOPMENT I 3 0 0 3

Course Objectives

- To understand the functions of entrepreneur
- To learn financial assistance provided by the institutions, methods of taxation and tax benefits, etc

Course Outcomes (COs)

1. Gain Knowledge about entrepreneurship, motivation and business.
2. Develop small scale industries in different field.

UNIT I **9 Hours**

BASICS OF ENTREPRENEURSHIP

Nature, scope and types of Entrepreneurship, Entrepreneur Personality Characteristics, Entrepreneurship process. Role of entrepreneurship in economic development

UNIT II **9 Hours**

GENERATION OF IDEAS

Creativity and Innovation, Lateral Thinking, Generation of Alternatives, Fractionation, Reversal Method, Brain Storming, Analogies

UNIT III **9 Hours**

LEGAL ASPECTS OF BUSINESS

Contract act-Indian contract act, Essential elements of valid contract, classification of contracts, sale of goods act- Formation of contract of sale, negotiable instruments- promissory note, bills and cheques, partnership, limited liability partnership (LLP), companies act-kinds, formation, memorandum of association, articles of association.

UNIT IV **9 Hours**

BUSINESS FINANCE

Project evaluation and investment criteria (cases), sources of finance, financial statements, break even analysis, cash flow analysis.

UNIT V **9 Hours**

OPERATIONS MANAGEMENT

Importance- functions-deciding on the production system- facility decisions: plant location, plant layout (cases), capacity requirement planning- inventory management (cases)-lean manufacturing, Six sigma.

Total: 45 Hours

Reference(s)

1. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi: 2005
2. Prasanna Chandra, Projects Planning, Analysis, Selection, Implementation and Reviews, Tata McGraw-Hill Publishing Company Limited, New Delhi: 2000.
3. Akhileshwar Pathak, Legal Aspects of Business, Tata McGraw Hill: 2006

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3					2				2	1			2				2	2				4	2	20
2		3				2				2	2			2	2				3				4		20
3		3				2				2	2				2			4	3				4		20
4		3				2				2				2	3			4						4	20
5	2	1				2				2	2				2				5				4		20
																								Total	100

Assessment Questions

Remember

1. What is entrepreneurship?
2. What are the factors that motivate people to go into business?
3. Define a small-scale industry
4. Who is an intrapreneur?
5. State functions of SISI
6. What is serial entrepreneur?
7. What is Technopreneurship?
8. What is reversal method?
9. What is brainstorming?
10. What do you mean by term business idea?
11. Mention any two schemes Indian government provides to the development of entrepreneurship
12. What is a project report?
13. What is project scheduling?
14. Mention any four techniques available for project scheduling.

Understand

1. Why is entrepreneurship important of growth of a nation?
2. Mention the essential quality required for someone to be an entrepreneur.
3. How is network analysis helpful to the development of an entrepreneur?
4. Mention the essential requirements for a virtual capital.
5. How under-capitalization affects an entrepreneur
6. Mention the causes of dissolution of a firm.
7. How important is the support of IDBI to an entrepreneur?
8. What are the salient features of New Small Enterprise Policy, 1991?
9. Why scheduling is very important for a production design?

Apply

1. If you want to become as an entrepreneur, what will be your idea?
2. Select any one of the creative idea generation method and suggest an innovation that you can implement in your business.
3. Write a short notes on various legal aspects that you have to consider to run you business.
4. How will you generate your capital and other financial supports?
5. In case of getting enough financial support, plan your business and plot the various stages using any of the tools or techniques
6. Predict the advantages of contract act?
7. Demonstrate the role of signing MOU.
8. Carry out the selection of any five external sources of finance to an entrepreneur.
9. Execute a action plan to identify the financial needs of an organization
10. Predict the importance of motivational theories for an entrepreneur?

Create

1. Draft a sample project report for your business
2. Do a network analysis using PERT and CPM for your business plan.
3. Write a brief report to apply to a financial organization for seeking financial support to your business
4. Draft a framework for streamlining the legal aspects
5. Genralize the requirements of project management

15GE002 ENTREPRENEURSHIP DEVELOPMENT II 3 0 0 3

Course Objectives

- Evolve the marketing mix for promoting the product / services
- Handle the human resources and taxation
- Understand Government industrial policies / support provided and prepare a business plan

Course Outcomes (COs)

1. Increase in awareness of the entrepreneurship Development for engineering decisions.

UNIT I **9 Hours**

MARKETING MANAGEMENT

Marketing environment, Segmentation, Targeting and positioning, Formulating marketing strategies, Marketing research, marketing plan, marketing mix (cases)

UNIT II **9 Hours**

HUMAN RESOURCE MANAGEMENT

Human Resource Planning (Cases), Recruitment, Selection, Training and Development, HRIS, Factories Act 1948 (an over view)

UNIT III **9 Hours**

BUSINESS TAXATION

Direct taxation, Income tax, Corporate tax, MAT, Tax holidays, Wealth tax, Professional tax (Cases).Indirect taxation, Excise duty, Customs, Sales and Service tax, VAT, Octroi, GST (Cases)

UNIT IV **9 Hours**

GOVERNMENT SUPPORT

Industrial policy of Central and State Government, National Institute-NIESBUD, IIE, EDI. State Level Institutions-TIIC, CED, MSME, Financial Institutions

UNIT V **9 Hours**

BUSINESS PLAN PREPARATION

Purpose of writing a business plan, Capital outlay, Technical feasibility, Production plan, HR plan, Market survey and Marketing plan, Financial plan and Viability, Government approvals, SWOT analysis.

Total: 45 Hours

Reference(s)

1. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi: 2005.
2. Philip Kotler., Marketing Management, Prentice Hall of India, New Delhi: 2003
3. Aswathappa K, Human Resource and Personnel Management - Text and Cases, Tata McGraw Hill: 2007.

4. Jain P C., Handbook for New Entrepreneurs, EDII, Oxford University Press, New Delhi: 2002.
5. Akhileshwar Pathak, Legal Aspects of Business, Tata McGraw Hill: 2006.
6. http://niesbud.nic.in/agencies.htm

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	2			2	2				4					4					2			2	2	20
2	2									6					6								6		20
3		3				2					3			3					3				3	3	20
4		3				3				3					3			3	3				2		20
5		3				3					3				3								5	3	20
																								Total	100

Assessment Questions

Remember

1. Who are Fabian Entrepreneur?
2. Mention the three functions of NSIC?
3. Narrate the role of IDBI in the development of Entrepreneurship?
4. What are the stages in a Project Lifecycle?
5. Give the meaning of Feasibility Report
6. What is Motivating Training?
7. Who is a Small Scale Entrepreneur?
8. How to develop Rural Entrepreneur?
9. What are the Social Problems of Women Entrepreneur?
10. What are the types of entrepreneurs?

Understand

1. What are the elements of EDP?
2. How would you Classify Projects?
3. What is the role played by commercial banks in the development of entrepreneur?
4. What are the target groups of EDP?
5. What are the major problems faced by Small Entrepreneur?
6. What are the problems & prospects for women entrepreneur in India?
7. Summarize the various qualities of entrepreneur.
8. Indicate the requirements of entrepreneurship training?
9. Represent the role of NISIET.
10. Represent the challenges and opportunities available in SSI's?

Apply

1. Describe the various functions performed by Entrepreneurs?
2. Demonstrate the role of different agencies in the development of Entrepreneur?
3. Construct the criteria for selecting a particular project?
4. Predict the role of Entrepreneur in the Development of Country?
5. Demonstrate business idea with due consideration to the problems and opportunities for an entrepreneur.
6. Demonstrate the schemes offered by commercial banks for development of entrepreneurship.
7. Predict the significant role played by DIC & SISI for the development of entrepreneurship.
8. Show the recommendation and policy implications for survival of SME's.
9. Developing countries like India need imitative entrepreneurs rather than innovative entrepreneurs". Do you agree? Justify your answer with examples.
8. Discuss the "Culture of Entrepreneurship" and its role in economic development of a nation. Predict the factors that contribute to nurturing such a culture?

Analyse / Evaluate / Create

1. Differentiate between entrepreneur and entrepreneurship.
2. What are the problems of Women entrepreneurs and discuss the ways to overcome these barriers?
3. Discuss the importance of small scale industries in India
4. Review the entrepreneurial growth by the communities of south India.
5. Critically examine the growth and development of ancillarisation in India.
6. Design a short entrepreneurship development programme for farmer.

PHYSICAL SCIENCE ELECTIVES

15GE0P1 NANOMATERIALS SCIENCE 3 0 0 3

Course Objectives

- To understand the fundamentals of physics of nanomaterials
- To correlate on multidisciplinary branch
- To acquire the knowledge in nanomaterials synthesis, compile and analyze data and draw conclusions at nano level

Course Outcomes (COs)

1. Categorize nanomaterials based on their properties
2. Design different experimental methods for preparation of nanomaterials
3. Infer the working mechanism of different characterization instruments as well as analyses and interpret data
4. Know the different techniques for making nano semiconducting materials and utilize them for applications
5. Understand the impact of nanomaterials and their applications in nanodevices

UNIT I **9 Hours**

NANO SCALE MATERIALS

Introduction-Feynman's vision-national nanotechnology initiative (NNI) - past, present, future - classification of nanostructures,nanoscale architecture - effects of the nanometer length scale - changes to the system total energy, and the system structures- effect of nanoscale dimensions on various properties -magnetic properties of nanoscale materials -differences between bulk and nanomaterials and their physical properties.

UNIT II **9 Hours**

NANOMATERIALS SYNTHESIS METHODS

Top down processes - mechanical milling, nanolithography and types based on radiations - Bottom up process - chemical vapour deposition, plasma enhanced CVD, colloidal and sol-gel methods - template based growth of nanomaterials - ordering of nanosystems, self-assembly and self-organization - DC sputtering and RF sputtering process.

UNIT III **9 Hours**

CHARACTERIZATION TECHNIQUES

General classification of characterization methods - analytical and imaging techniques - microscopy techniques - electron microscopy, scanning electron microscopy, transmission electron microscopy, atomic force microscopy - diffraction techniques - X-ray spectroscopy - thermogravimetric analysis of nanomaterials.

UNIT IV **9 Hours**

SEMICONDUCTOR NANOSTRUCTURES

Quantum confinement in semiconductor nanostructures - quantum wells, quantum wires, quantum dots, super lattices-epitaxial growth of nanostructures-MBE, metal organic VPE, LPE - carbon nano tubes- structure, synthesis and electrical properties -applications- fuel cells - quantum efficiency of semiconductor nanomaterials.

UNIT V **9 Hours**

NANOMACHINES AND NANODEVICES

Microelectromechanical systems (MEMS) and Nanoelectromechanical systems (NEMS)-fabrication, actuators-organic FET- principle, description, requirements, integrated circuits- organic LEDâ??s - basic processes, carrier injection, excitons, optimization - organic photovoltaic cells- nano motors -bio nano particles-nano - objects - applications of nano materials in biological field.

FOR FURTHER READING

Application of graphene in various field - supercapacitors - third generation solar cell-dye sensitized solar cell (DSSC) -fuel cells.

Total: 45 Hours

Reference(s)

1. Willam A. Goddard, Donald W.Brenner, Handbook of Nanoscience, Engineering, and Technology, CRC Press, 2012.
2. Charles P. Poole Jr and. Frank J. Owens, Introduction to Nanotechnology, Wiley Interscience, 2007.
3. Guozhong Cao, Y. Wang, Nanostructures and Nanomaterials-Synthesis, Properties & Applications, Imperials College Press, 2011.
4. T. Pradeep, NANO: The Essentials Understanding Nanoscience and Nanotechnology, McGraw - Hill Education (India) Ltd, 2012.
5. Robert W. Kelsall, Ian W. Hamley, Mark Geoghegan, Nanoscale Science and Technology, John Wiley and Sons Ltd, 2006
6. Viswanathan B, AuliceScibioh M, Fuel cells: Principles and Applications, University Press, 2009.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	4	4		2					4				3					4						24
2	2	3	4		4	4				3				4											24
3	2	4	2			2	2				2			2											16
4		2			2	4				2				4					3						17
5	2	4				3	2				4				4										19
																								Total	100

Assessment Questions

Remember

1. Explain the term nano
2. List three types of classifications of nanomaterials.
3. Recall the principle behind lithography.
4. Define top-down and bottom-up approach.
5. Name two types of nanoarchitecture
6. Define nanocomposites.
7. Recall the principle of electron microscopy.
8. List 5 characterization techniques in nanotechnology.
9. Define quantum well and quantum wire.
10. Write the allotropy of carbon.

Understand

1. Explain the effect of nanometer length scale.
2. Can affect the system total energy when particle size reduced? Justify.
3. Explain plasma enhanced CVD.
4. Identify the difference between self-assembly and self-organization.
5. Name 3 synthesis process under bottom-up approach.
6. Explain contact mode in AFM.
7. Is it possible to explain the entire details of the sample by taking one characterization technique? if no, justify.

Apply

1. Find three day to day live commercial application of nanotechnology?
2. Choose two template methods used to obtain nanowire or nanorods.
3. Construct the experimental setup for organic LED.
4. Find 4 industrial applications of CNT.

Analyse

1. Differentiate between bulk and nanomaterials.
2. Identify the roll of nanoparticles in biological field.
3. Distinguish between glow discharge and RF sputtering.
4. Criticize the future challenges for nanotechnology?

Evaluate

1. Nanomaterials, do they exist in nature? If yes, Identify the nanomaterials and recognize.

15GE0P2 SEMICONDUCTOR PHYSICS AND DEVICES

3 0 0 3

Course Objectives

- To impart knowledge in physical properties of semiconducting materials
- To analyze the factors affecting the operation of semiconductor devices
- To apply the physics of semiconductors to develop semiconductor devices

Course Outcomes (COs)

1. Exemplify the transport properties of semiconductors
2. Understand the physics of PN junction
3. Analyze the factors affecting the properties of PN junction diode
4. Demonstrate the geometry and operation of bipolar junction Transistors
5. Summarize the optical properties and design of optoelectronic devices

UNIT I

9 Hours

CARRIER TRANSPORT IN SEMICONDUCTORS

Carrier drift - drift current density - mobility effects on carrier density - conductivity in semiconductor - carrier transport by diffusion - diffusion current density - total current density - breakdown phenomena - avalanche breakdown.

UNIT II **9 Hours**

PHYSICS OF P-N JUNCTION

Basic structure-Built in potential barrier, Electric field and space charge width of P-N junction under zero, forward and reverse bias- Diffusion capacitance - one sided and linearly graded junctions.

UNIT III **9 Hours**

P-N JUNCTION DIODE

Qualitative description of charge flow in p-n junction - boundary condition - minority carrier distribution - ideal p-n junction current - temperature effects - applications - the turn on transient and turn off transient.

UNIT IV **9 Hours**

BIPOLAR JUNCTION TRANSISTOR

Introduction to basic principle of operation - the modes of operation - amplification - minority carrier distribution in forward active mode - non-ideal effects - base with modulation - high injection emitter band gap narrowing - current clouding - breakdown voltage - voltage in open emitter configuration and open base configuration.

UNIT V **9 Hours**

OPTO ELECTRONIC DEVICES

Optical absorption in a semiconductor, photon absorption coefficient - electron hole pair generation - solar cell - homo junction and hetero junction - Photo transistor - laser diode, the optical cavity, optical absorption, loss and gain - threshold current.

FOR FURTHER READING

Organic semiconductors- diodes - transistors-working and applications

Total: 45 Hours

Reference(s)

1. Donald A Neamen, Semiconductor Physics and Devices, Tata McGraw Hill, 2012.
2. S. M. Sze and M. K. Lee, Semiconductor Devices, Physics and Technology, John-Wiley & Sons, 2015.
3. Ben. G. Streetman and S. K. Banerjee , Solid State Electronic Devices, Pearson Education Ltd, 2015.
4. C. Kittel, Introduction to Solid State Physics, John-Wiley & Sons, 2012.
5. J. Millman and C. Halkias, Electronic Devices and Circuits, Tata McGraw Hill, 2010.
6. Hagen Klauk, Organic Electronics: Materials, Manufacturing and Applications, Wiley-VCH, 2006.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	4	4		2					2				3					2						20
2	2	3	4		4	4				3				4											24
3	2	4	2		2	2					4			4											20
4		2			2	4				2				4					4						18
5	2	4				2	2				4				4										18
																								Total	100

Assessment Questions

Remember

1. Define drift current density
2. Recall diffusion capacitance
3. Write the ideal diode equation
4. List the three modes of transistor operation
5. State the principle of solar cell

Understand

1. Identify the two scattering mechanisms that affect mobility of charge carriers in semiconductors
2. Sketch the energy band diagram of a P-N junction under thermal equilibrium
3. Exemplify the boundary conditions used to calculate minority carrier distribution in a junction diode
4. Explain the base width modulation occur in transistors
5. Illustrate the working mechanism of a phototransistor

Apply

1. By applying the concept of scattering, explain the mobility of holes in a semiconductor.
2. Apply Poission equation to space charge region and hence derive the electric field under zero bias
3. Show that the minority carrier concentrations in a diode decay exponentially with distance away from the junction to their thermal-equilibrium values.
4. Derive an expression for excess minority current in the emitter region under forward action mode by applying the ambipolar transport equation.
5. Show that the minority carrier concentrations in a diode decay exponentially with distance away from the junction to their thermal-equilibrium values.

Analyse

1. Differentiate drift current and diffusion current
2. Space charge width increases upon reverse bias. Justify
3. Silicon is preferred over germanium for the manufacture of semiconductor devices. Justify
4. Compare emitter bandgap narrowing and current crowding.
5. Differentiate homojunction and heterojunction laser

15GE0P3 APPLIED LASER SCIENCE 3 0 0 3

Course Objectives

- To impart knowledge on laser science
- To explore different strategies for producing lasers
- To create expertise on the applications of lasers in various fields

Course Outcomes (COs)

1. Realize the concept of stimulated emission and apply the same for laser oscillation
2. Understand the properties laser and working of different laser systems
3. Determine the rotation of earth, velocity and distance using lasers and apply the same for day today applications
4. Design the different laser based instrumentation for medical field
5. Summarize the applications of lasers in industry

UNIT I **9 Hours**

LASER FUNDAMENTALS

Introduction - principle - Einstein's prediction - spontaneous emission - stimulated emission - Einstein's relations - A and B coefficients - population inversion - condition for large stimulated emission - spontaneous and stimulated emission in optical region - light amplification. Components of lasers: active medium - pumping - pumping mechanisms - resonant cavity.

UNIT II **9 Hours**

CHARACTERISTICS AND TYPES OF LASERS

Introduction - directionality - intensity - coherence - monochromaticity. Classification of lasers - principle, construction, working, energy level diagram and applications of CO2 laser - dye laser - excimer laser - Nd:YAG laser - semiconductor laser.

UNIT III **9 Hours**

LASERS IN SCIENCE

Harmonic generation - stimulated Raman emission - lasers in chemistry - laser in nuclear energy - lasers and gravitational waves - LIGO - rotation of the earth - measurement of distance - velocity measurement - holography.

UNIT IV **9 Hours**

LASERS IN MEDICINE AND SURGERY

Eye laser surgery - LASIK - photocoagulations - light induced biological hazards: Eye and skin - homeostasis - dentistry - laser angioplasty - laser endoscopy - different laser therapies.

UNIT V **9 Hours**

LASERS IN INDUSTRY

Applications in material processing: laser welding - hole drilling - laser cutting. Laser tracking: LIDAR. Lasers in electronics industry: ranging - information storage - bar code scanner. Lasers in defence: laser based military weapons - laser walls.

FOR FURTHER READING

Q-switching - mode locking - thermo-optic effects - astronomy lasers - fighting crime with lasers - laser engraving.

Total: 45 Hours

Reference(s)

1. K. Thiyagarajan and A. K. Ghatak, LASERS: Fundamentals and Applications, Springer, USA, 2015.
2. M. N. Avadhanulu, An Introduction to Lasers Theory and Applications, S. Chand Publisher, 2013.
3. W. Koechner, M. Bass, Solid State Lasers: a graduate text, Springer Verlag, New York, 2006.
4. K. P. R. Nair, Atoms, Molecules and Lasers, Narosa Publishing House, 2009.
5. K. R. Nambiar, Lasers: Principles Types and Applications, New Age International Publications, 2006.
6. A. Sennaroglu, Solid-State Lasers and Applications, CRC Press, 2006.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	2			2	2	1		2	3	1			2			1	2							20
2	2	2			3	2	2		2	2			1	1			1		2						20
3	3				2	2	1		2		3		2	1	1			1	2						20
4	2	2			2	1	1		2	2	1		2	2	1			1	1						20
5	2	1			1		3		2		2		2	1			1	2	3						20
																								Total	100

Assessment Questions

Remember

1. Recognise the term LASER
2. Define stimulated absorption
3. Define spontaneous emission
4. Define stimulated emission
5. Distinguish between spontaneous and stimulated emission
6. State population inversion
7. List the four characteristics of lasers
8. Mention the five medical applications of lasers
9. State the principle behind the holography
10. Recall the term resonant cavity

Understand

1. Identify the condition needed for laser action
2. Interpret the pumping of atoms
3. Exemplify the optical excitation occurs in three level laser systems
4. Explain the determination of rotation of earth using laser
5. Summarize the application of lasers in welding and cutting
6. Explain the term LASIK
7. Classify the different types of lasers based on materials
8. Illustrate the working of laser in material processing

Apply

1. Predict the condition for laser action
2. Derive the Einstein's A and B coefficients
3. Deduce the expression for large stimulated emission
4. Construct the experimental setup for distance measurement
5. Find the applications of lasers in stimulated Raman
6. Assess the wavelength of emission of GaAs semiconductor laser whose bandgap energy is 1.44 eV.

Analyse / Evaluate

1. Laser beam should be monochromatic, Justify?
2. Differentiate ordinary light source from laser source
3. Compare the working of gas lasers with excimer laser
4. Four level laser systems are more efficient than three level laser systems. Justiify**?**
5. Determine the intensity of laser beam be focused on an area equal to the square of its wavelength. For He-Ne laser wavelength is 6328 A^0 and radiates energy at the rate of 1mW.
6. Choose the appropriate lasers for the materials processing in industry

15GE0C1 CORROSION SCIENCE 3 0 0 3

Course Objectives

- To recognize the terminologies used in corrosion science.
- To impart knowledge about the various types of corrosion and its mechanism.
- To understand the various methods of corrosion control, corrosion testing and monitoring.

Course Outcomes (COs)

1. Familiarize with the fundamentals of corrosion science.
2. Understand the types of corrosion and role of chemistry behind corrosion of metals.
3. Develop their ability to identify, formulate and solve corrosion based problems.
4. Calculate the corrosion rate using different methods.
5. Analyze the analytical part of corrosion science which gives contextual knowledge to their higher research programmes.

UNIT I **9 Hours**

CORROSION

Importance of corrosion - spontaneity of corrosion - passivation - direct and indirect damage by corrosion - importance of corrosion prevention in industries - area relationship in both active and passive states of metals - Pilling Bedworth ratio and its significance - units of corrosion rate (mdd and mpy) - importance of pitting factor - Pourbaix digrams of Mg, Al and Fe and their advantages and disadvantages.

UNIT II **7 Hours**

TYPES OF CORROSION

Eight forms of corrosion: uniform, galvanic, crevice corrosion, pitting, intergranular corrosion, selective leaching, erosion corrosion and stress corrosion. High temperature oxidation, kinetics of protective film formation and catastrophic oxidation corrosion.

UNIT III **9 Hours**

MECHANISM OF CORROSION

Hydrogen embrittlement - cracking - corrosion fatigue - filliform corrosion - fretting damage and microbes induced corrosion - corrosion mechanism on steel, iron, zinc and copper metal surfaces - thick layer and thin layer scale formation - in situ corrosion scale analysis.

UNIT IV **10 Hours**

CORROSION RATE AND ITS ESTIMATION

Rate of corrosion: factors affecting corrosion - electrochemical methods of polarization - Tafel extrapolation polarization, linear polarization, impedance techniques - weight loss method - susceptibility test - testing for intergranular susceptibility and stress corrosion. Visual testing - liquid penetrant testing - magnetic particle testing - eddy current testing.

UNIT V **10 Hours**

CORROSION CONTROL METHODS

Fundamentals of cathodic protection - types of cathodic protection. Stray current corrosion problems and its prevention. Protective coatings: anodic and cathodic coatings - metal coatings: hot dipping (galvanizing, tinning and metal cladding) - natural inhibitors. Selection of sacrificial anode for corrosion control.

FOR FURTHER READING

Corrosion issues in supercritical water reactor (SCWR) systems.

Total: 45 Hours

Reference(s)

1. Mouafak A. Zaher, Introduction to Corrosion Engineering, CreateSpace Independent Publishing Platform, 2016.
2. E.McCafferty, Introduction to Corrosion Science, Springer; 2010 Edition, January 2010.
3. R. Winstone Revie and Herbert H. Uhlig, Corrosion and Corrosion Control: An Introduction to Corrosion Science and Engineering, 4th Edition, John Wiley & Science, 2008.
4. Mars G. Fontana, Corrosion Engineering, Tata McGraw Hill, Singapore, 2008.
5. David E.J. Talbot (Author), James D.R. Talbot, Corrosion Science and Technology, Second Edition (Materials Science & Technology), CRC Press; 2nd Edition, 2007.
6. http://corrosion-doctors.org/Corrosion-History/Eight.htm

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	2	2		1	2	1		1	1	1		1	1	2		2	1			1				20
2	1	3			2	1	1			2			1	2			1	1					1		16
3	2	1			1	4	1			3				2			2	2				2			20
4	1	1	1		2	3	1		2	2	1		2	1	1		1	2					1		22
5	1	2			1	2			2	3			2	3			1	2			1	2			22
																								Total	100

Assessment Questions

Remember

1. Define Corrosion
2. Mention the five types of corrosion
3. Define dry corrosion. Explain the mechanism.
4. What are corrosion inhibitors? Give two examples.
5. Write the working principle of Tafel polarization techniques.
6. How polarization and impedance techniques are used to measure the corrosion products?
7. Define cathodic protection.
8. ellaborate non-electrochemical and electrochemical methods of corrosion testing and monitoring.
9. What is Tafel linear polarization?
10. What is Tafel linear polarization?

Understand

1. Explain the mechanism of electrochemical corrosion.
2. Identify the relation between the two units used to measure corrosion rate.
3. Illustrate the Pourbaix digrams of Mg/Al/Fe and their limitations.
4. List the eight forms of corrosion. Explain each type with an example.
5. What are the factors influencing the corrosion rate? Explain.
6. Discuss the Pilling-Bedworth rule.
7. Differentiate between electrochemical and dry corrosion.
8. How inhibitors are used to protect the corrosion rate of the metal? Explain.
9. What are consequences of Pilling-Bedworth ratio?
10. List the difference between filliform corrosion and pitting corrosion.

Apply

1. Area relationship between the anodic and cathodic part in galvanic corrosion. Discuss.
2. Describe alternatives to protective coatings.
3. How Tafel polarization and impedance techniques used to measure the corrosion products?

Analyse

1. Explain why corrosion rate of metal is faster in aqueous solution than atmosphere air?
2. Why pitting corrosion is localized corrosion? Explain.
3. Compare the effects of corrosion products.
4. Identify different forms of corrosion in the metal surface.
5. What are the major implications of enhanced techniques of corrosion product analysis?

15GE0C2 ENERGY STORING DEVICES AND FUEL CELLS

3 0 0 3

Course Objectives

- To understand the concept, working of different types of batteries and analyze batteries used in electric vehicles.
- To identify the types of fuel cells and to relate the factors of energy and environment.
- To analyze various energy storage devices and fuel cells.

Course Outcomes (COs)

1. Understand the knowledge of various energy storing devices.
2. Acquire the knowledge to analyze the working of different types of primary and secondary batteries.
3. Differentiate the types of fuel cells and recognize the utility of hydrogen as a fuel.
4. Realize the importance of using green fuel for sustainable development.

UNIT I **6 Hours**

BASICS OF CELLS AND BATTERIES

Components - classification - operation of a cell - theoretical cell voltage - capacity - specific energy - energy density of practical batteries - charge efficiency- charge rate - charge retention - closed circuit voltage, open circuit voltage current density - cycle life - discharge rate-over charge-over discharge.

UNIT II **10 Hours**

BATTERIES FOR PORTABLE DEVICES AND ELECTRIC VEHICLES

Primary batteries- zinc-carbon, magnesium, alkaline, manganous dioxide, mercuric oxide, silver oxide batteries - recycling/safe disposal of used cells. Secondary batteries - introduction, cell reactions, cell representations and applications - lead acid, nickel-cadmium and lithium ion batteries - rechargeable zinc alkaline battery. Reserve batteries: Zinc-silver oxide, lithium anode cell, photogalvanic cells. Battery specifications for cars and automobiles.

UNIT III **10 Hours**

TYPES OF FUEL CELLS

Importance and classification of fuel cells - description, working principle, components, applications and environmental aspects of the following types of fuel cells: alkaline fuel cells, phosphoric acid, solid oxide, molten carbonate and direct methanol fuel cells.

UNIT IV **10 Hours**

HYDROGEN AS A FUEL

Sources and production of hydrogen - electrolysis - photocatalytic water splitting - biomass pyrolysis -gas clean up - methods of hydrogen storage- high pressurized gas - liquid hydrogen type - metal hydride - hydrogen as engine fuel - features, application of hydrogen technologies in the future - limitations.

UNIT V **9 Hours**

ENERGY AND ENVIRONMENT

Future prospects of renewable energy and efficiency of renewable fuels - economy of hydrogen energy - life cycle assessment of fuel cell systems. Solar Cells: energy conversion devices, photovoltaic and photoelectrochemical cells - photobiochemical conversion cell.

FOR FURTHER READING

Energy conservation, Over utilization, Energy demanding activities.

Total: 45 Hours

Reference(s)

1. M. Aulice Scibioh and B. Viswanathan, Fuel Cells: Principles and Applications, University Press, India, 2009.
2. F. Barbir,PEM fuel cells: Theory and practice,Elsevier, Burlington, MA, Academic Press, 2013.
3. M. R. Dell Ronald and A. J. David, Understanding Batteries, Royal Society of Chemistry, 2001.
4. J. S. Newman and K. E. Thomas-Alyea, Electrochemical Systems, Wiley, Hoboken, NJ, 2012.
5. Shripad T. Revankar, Pradip Majumdar, Fuel Cells: Principles, Design, and Analysis, CRC Press, 2016.
6. Thomas B. Reddy, Linden's Handbook of Batteries, 4th Edition, McGraw Hill Professional, 2010

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	2			1	2	2			1			1	3				1							15
2	4	1			4	5	2			2			1	2				1							22
3	3				4	6	2		1	3			1	1				1							22
4	1	2			4	4	1			4			2	4											22
5	2	2			2	5				3			2	3											19
																								Total	100

Assessment Questions

Remember

1. How galvanic cell is differing from electrolytic cell?
2. How is the potential of an electrochemical cell calculated?
3. List any four characteristics of primary batteries.
4. Mention any two characteristics and applications of zinc-carbon battery.
5. Recognize any two applications and characteristics of primary magnesium batteries.
6. Identify the applications and characteristics of Zn/HgO primary batteries.
7. Indicate any two applications of Zn/alkaline/MnO_2 battery.
8. Mentioned any two applications of Zn/Ag_2O primary battery.
9. Define capacity of a cell

10. Define discharge rate of a battery.
11. Describe the construction, cell reaction and applications of zinc-carbon battery.
12. Explain the construction, chemistry, advantages and uses of mercuric oxide battery.
13. Explain the major components and reaction of direct methanol fuel cell. List two applications.
14. Explain the working principle, components and applications of alkaline fuel cells
15. Discus the conversion of sunlight into electrical power in photoelectrochemical cells.

Understand

1. Mention the five different types of energy storage devices
2. Define the term battery
3. List any two differences between battery and cell.
4. Mention the three major components of cell.
5. Classify the batteries based on their cell reversibility.
6. Define cycle Life of a cell.
7. Explain the construction, cell reaction and applications of silver oxide batteries.
8. With a neat sketch explain the construction and working of phosphoric acid fuel cell.
9. Explain the major components and reactions of direct methanol fuel cell
10. Explain the production of hydrogen photobiochemical conversion cell.

Apply

1. Specific gravity is an indicator of charge in lead acid battery – Justify.
2. Illustrate the process of water electrolysis for the production of hydrogen.
3. How is the potential of an electrochemical cell calculated?
4. How is the potential of an electrochemical cell calculated?

Analyse

1. In the mid-winter car battery is not working –reason out.
2. Discuss the hydrogen energy strategies for sustainable development.
3. How galvanic cell is differing from electrolytic cell?
4. How batteries are rated?
5. Differentiate between primary and secondary batteries.

15GE0C3 POLYMER CHEMISTRY AND PROCESSING

3 0 0 3

Course Objectives

- Impart knowledge on the basic concepts of polymers and its mechanism
- Use the appropriate polymerization techniques to synthesize the polymers and its processing
- Select the suitable polymers for various applications

Course Outcomes (COs)

1. Understand the basic concepts of polymer chemistry and mechanism of polymerization reactions
2. Acquire knowledge of polymerization techniques
3. Identify the structural, mechanical and electrical features of polymers
4. Apply the polymer processing techniques to design polymer products
5. Realize the applications of specialty polymers

UNIT I **10 Hours**

POLYMERS AND ELASTOMERS

Classification of polymers - Mechanism: Addition polymerization - free radical polymerization - cationic, anionic and co-ordination (Ziegler-Natta) polymerization, copolymerization, condensation polymerization (nylon-6,6) ring opening polymerization (nylon-6). Elastomers: Natural rubber - vulcanization - synthetic rubber: styrene -butadiene rubber (SBR), butyl, neoprene, thiocol rubbers. High performance polymers: polyethers, polyether ether ketone(PEEK), polysulphones, polyimides.

UNIT II **8 Hours**

POLYMERIZATION TECHNIQUES

Homogeneous and heterogeneous polymerization - bulk polymerization (PMMA, PVC) solution polymerization - polyacrylic acid, suspension polymerization (ion-exchange resins) - emulsion polymerization (SBR) - advantages and disadvantages of bulk and emulsion polymerization. Melt solution and interfacial poly-condensation.

UNIT III **8 Hours**

CHARACTERIZATION AND TESTING

Characterization of polymers by Infrared Spectroscopy (IR) and Nuclear Magnetic Spectroscopy (NMR) - Thermal properties by TGA and DSC, Testing tensile strength, Izod impact, Compressive strength, Rockwell hardness, Vicot softening point. Test for electrical resistance, dielectric constant, dissipation factor, arc resistance and dielectric strength - water absorption.

UNIT IV **9 Hours**

POLYMER PROCESSING

Moulding: Compression - injection - extrusion and blow mouldings. Film casting - calendering. Thermoforming and vacuum formed polystyrene - foamed polyurethanes. Fibre spinning: melt, dry and wet spinning. Fibre reinforced plactics fabrication: hand-layup - filament winding and pultrusion.

UNIT V **10 Hours**

SPECIALITY POLYMERS

Preparation and properties of heat resistant and flame retardant polymers. Polymers for electronic applications: liquid crystalline, conducting and photosensitive polymers. Polymer for biomedical applications: artificial organs, controlled drug delivery, hemodialysis and hemofiltration.

FOR FURTHER READING

Biodegradable polymers

Total: 45 Hours

Reference(s)

1. V. R. Gowarikar, N. V. Viswanathan and Jayadev Sreedhar, Polymer Science, New Age International (P) Ltd., New Delhi, 2015.
2. Joel R. Fried, Polymer Science and Technology, Prentice Hall of India (P). Ltd., 2014
3. F. W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, New York, 2007
4. Barbara H. Stuart, Polymer Analysis, John Wiley & Sons, New York, 2008
5. George Odian , Principles of Polymerization, John Wiley & Sons, New York, 2004
6. R. J. Young and P. A. Lovell, Introduction to Polymers, CRC Press, New York, 2011

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	1	1	3		2	2	3		2	2	3		1	1	1										22
2	1	1	4		1	1	3		1	1	3		1	1											18
3	1	1	1		1	1			1	2	2			2			1	1	4						18
4	1				1	2	2		3	2	2		2	2	1								2		20
5	1	1	1		2	2	1		2	2	3		2	2	3										22
																								Total	100

Assessment Questions

Remember

1. Recall two factors that govern termination of cationic polymerization.
2. Identify the monomers used in styrene -butadiene rubber.
3. Give an examples for the thermosetting and thermoplastic polymers.
4. What is copolymerization? Give an example
5. Name two synthetic polymers which are used for making textile fibres.
6. Define the role of Ziegler – Natta catalysts
7. List the examples of Ziegler – Natta catalysts.
8. Identify the four types of polymerization technique.
9. List any two disadvantages of suspension polymerization.
10. Point out the advantages of bulk polymerization technique.
11. Why does natural rubber need compounding?
12. List any four applications of injection moulding process.
13. List the various additives in processing of plastics.
14. List the two properties of heat resistant polymers .
15. Mention the application of flame retardant polymers.

Understand

1. Classify the polymers based on source
2. Discuss the addition and chain growth polymerization with example
3. Compare addition and condensation polymerization reaction with example for each type .
4. Explain homogeneous and heterogeneous polymerization.
5. Explain the mechanism involved in addition polymerization of vinylChloride
6. Explain the condensation polymerization method taking nylon 6,6,nylon synthesis as a representative example.
7. Discuss the preparation method and any three properties of Polysulphone.
8. Summaries the salient features, advantages and disadvantages of bulk and emulsion polymerization techniques.
9. Compare the homogeneous and heterogeneous polymerization method.
10. With a neat sketch, discuss the functioning of melt, dry and wet spinning process.
11. Illustrate the compression and extrusion moulding of plastics with diagram neat diagram.
12. Explain the coordination polymerization mechanism using a sutable example.

Apply

1. Relate the various steps involved in anionic and cationic polymerisation using suitable examples.
2. Select the suitable polymerization techniques for synthesis of PMMA and SBR
3. Assess the characterisation techniques used to find the structure of polymer .
4. Find the method to process the composite materials with example.
5. Execute the filament – winding Technique for manufacturing of rocket motor bodies.

Analyse / Evaluate

1. Distinguish between addition and condensation polymerisation.
2. Natural rubber need vulcanization –Justify.

3. Compare the salient features, advantages and disadvantages of solution and suspension polymerization techniques.
4. Bring out the differences between thermoforming and vacuum-forming process.
5. Outline the applications of polymer in controlled drug delivery and artificial organs.
6. Judge the biomedical applications of polymers in Hemo dialysis and hemo filtration.
7. Choose the suitable moulding Technique for polyvinyl chloride.

OPEN ELECTIVES

15FT0YA FASHION CRAFTS 2 0 2 3

Course Objectives

- To impart theoretical and practical knowledge about various handi-craft techniques.
- To enhance innovative skills on hand crafts.
- To build confidence on doing handicrafts.

Course Outcomes (COs)

1. Gain knowledge on various handicraft materials.
2. Produce various decorative and appealing products
3. Produce various decorative and appealing products

UNIT I **6 Hours**

TECHNIQUES OF HANDICRAFT MATERIALS

Definition of Handicraft, Classification: Reusable, Non reusable. Raw materials used in various craft materials: printed, embroidered, stitched and hand made. Criteria for selection of raw materials; material type and end uses.

UNIT II **6 Hours**

SOURCING OF MATERIALS

Designing and Construction procedures for following various decorative and appealing products: Wall pieces, Wraps, Shawls, Ties, Tapestrys, Scarves, Interiors, Purses, Vestments.

UNIT III **6 Hours**

DECORATIVE AND APPEALING PRODUCTS - INTERIOR

Designing and Construction procedures for following various decorative and appealing products: Exhibition pieces, Coasters, Bracelets Fabric lengths, Toys wooden, clay, Paper, Cushions, Fashion Trims, Public art, Knitwear, Handbags, Necklaces.

UNIT IV **6 Hours**

DECORATIVE AND APPEALING PRODUCTS TOYS AND ORNAMENTS

Designing and Construction procedures for following various decorative and appealing products: Hats/headpieces, Hair accessories, Brooches, Tablemats, Garlands, Paintings Fabric, Paper, Wood, Glass, Bowls, Wood carving, Braids.

UNIT V **6 Hours**

DECORATIVE AND APPEALING PRODUCTS FANCY ITEMS

Designing and Construction procedures for following various decorative and appealing products: Furniture, Home décor items, Jewelry Box, Utility Holder, Hanging Wall Pictures, Gift items, Fancy Electrical fittings Garlands.

FURTHER READING

Centers of manufacture in India, Cards -Greeting and Wedding cards, Pendants, Paper cutting arts crafts.

3 Hours

EXPERIMENT 1

Block printing of fabric materials

3 Hours

EXPERIMENT 2

Saree and pillow cover embroidery

3 Hours

EXPERIMENT 3
Preparation of tapestry using painting technique and weaving technique

3 Hours

EXPERIMENT 4
Preparation of various lace samples

3 Hours

EXPERIMENT 5
Development of wooden pendent, key holder

3 Hours

EXPERIMENT 6
Design and development of hand bags using fabric material and resins

3 Hours

EXPERIMENT 7
Preparation of decorative materials for doors and windows

3 Hours

EXPERIMENT 8
Design a glass pot using oil painting techniques

3 Hours

EXPERIMENT 9
Design and development of wall photos using wood carving techniques

3 Hours

EXPERIMENT 10
Design and development of table mats and garlands

Total:60Hours

Reference(s)

1. Handmade in India: A Geographic Encyclopaedia of India Handicrafts. Abbeville press; 1 edition (October 20,2009)
2. Encyclopaedia of Card making Techniques (Crafts), Search Press Ltd, illustrated edition, 2007
3. All about Techniques in Illustration, Barrons Educational Series, 2001
4. Printing by Hand: A Modern Guide to printing with Handmade stamps, Stencils and Silk Screens, STC Craft/A Melanie Falick Book, 2008
5. Materials & Techniques in the Decorative Arts: An Illustrated Dictionary, University of Chicago Press, 2000.
6. www.fashioncraft.com/

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2	2				2				4				4				4				2			20
2	2	2			2	2					4				4				2				2		20
3	2	2			2	2					4				4				2				2		20
4	2	2			2	2					4				4				2				2		20
5	2	2			4						4				4			1	1				2		20
																								Total	100

Assessment Questions

Remember

1. DefineHandicraft.
2. Listany fivecraftmaterialsusedinPrinting.
3. Statethepreparationprocedureof Fabricforpainting.
4. Labeltherawmaterialforvariousapplications in Handicraft.
5. StateHandicraft.
6. LabelthevariousfeaturesofrawmaterialselectedforpaintingofGlassandWood carvings.
7. State thesimplestepsusedinfurnituremakingusingfabrics.
8. Listany two manufacturingcentresofhandicrafts.
9. Statethevariouscriteriausedinselectionofrawmaterialinpaintedhandicrafts.
10. Listany fournon-reusableitems.

Understand

1. Identify thefabricsthat aresuitablefordecoratingfurniture.
2. Illustratethevariouskindoftrims usedinmakingtoys.
3. Select suitablepaintsforfabricpainting
4. Indicate the importance ofoilcoloursinglasspainting.
5. IllustrateBroochanditsuses.
6. Selectthe suitablerawmaterialforties.
7. Identify therawmaterialsforvariouskindofhandicrafts.
8. Illustrate necklace.
9. Identify the construction procedure for jewelery box.
10. Indicate the functions of utility holder.

Apply

1. Find the way of designingthenecklacesandbraceletswithappropriatesketches.
2. Assess the selection of rawmaterial for handicraft items.
3. Demonstartethesteps involved inposterpainting.
4. Predicttheuse of variousrawmaterialinHeadgearsandvestments.
5. Choose the rightrawmaterialsusedinHandicraftsandgiveitsprosandcons.
6. Choose appropriate design for wall hanging
7. Combine a pendent design with rubystones and create Wedding card with suitable accessory.
8. Demonstrate the construction procedure of table mat swith wall hangings.
9. Predict the importance of hair accessories

Analyze / Evaluate / Create

1. Justify the selection criteria for fabrics.
2. Justify the features of non-reusable items
3. Compare the Construction procedure of Ties and Scarves
4. Resolve the steps used in designing and constructing the Hand Bags and Purses
5. Justify the steps involved in making fabric and wood paintings with appropriate sketches

15FT0YB FASHION ACCESSORIES 3 0 0 3

Course Objectives

- To impart knowledge about Fashion accessories and their uses in enhancing the personality of the wearer.
- To develop student?s knowledge on selection of suitable accessories.

Course Outcomes (COs)

1. Understand the importance of Fashion accessories and Selection of appropriate raw materials for various Fashion accessories.
2. Understand the various end uses of Fashion accessories
3. Demonstrate the beauty and aesthetics of each Fashion accessory by appropriate sketches

UNIT I **9 Hours**

INTRODUCTION TO ACCESSORIES

Definition and importance of accessories in fashion design, classification, accessory design; Sketching accessories sketching of basic shapes of various accessories, the concept of three-dimensional sketching and relation to accessories design.

UNIT II **9 Hours**

GARMENT ACCESSORIES

Selection of materials, design, functional and aesthetic performance, advantages Ribbons, Braids, Laces, Appliqués, Buttons, Zippers, Snap fasteners, Hooks and Eyes, Hook and loop tape (Velcro), Eyelets, Tie, Scarves, Stoles, Umbrella, Socks, Stockings, Veils.

UNIT III **9 Hours**

LEATHER ACCESSORIES

Selection of materials, design, functional and aesthetic performance, advantages and various styles? footwear, belts, gloves, hand bags, hats, wallets, and other personal leather goods. Concepts of pattern making techniques, basic machinery and equipment used for these accessories.

UNIT IV **9 Hours**

ORNAMENTAL ACCESSORIES

Selection of materials, design, functional and aesthetic performance, advantages and various styles? Pendants, Waist Bands, Wrist Bands, Necklaces, Head Bands, Neck Ties, Bows, Key Chain, Sunglass, Wrist watches, Rings, Ear rings, Bangles, Bracelets, Anklets, Pony Tail Holder, Pen.

UNIT V **9 Hours**

SPECIAL ACCESSORIES

Tie clips, walking sticks, wigs, mask, handkerchiefs, Hand fans, Electronic gadgets, Torch lights. `

FOR FURTHER READING

Sketching of objects in a 3D view, Designing of any one accessory mentioned above with suitable materials, Designing of a small leather accessory, Designing of a single piece of a jewelry using various non precious stones and metals.

Total: 45 Hours

Reference(s)

1. Stacy LoAlbo, Vintage Fashion Accessories, Krause Publications, China,2009
2. Ritu Bhargav, Design Ideas and Accessories, Om Books International, 2004.
3. Patty Brown and JanettRice, Ready? To? Wear Apparel Analysis, PrenticeHall, NewDelhi, 2000.
4. Phyllis Tortora, Encyclopedia of Fashion Accessories, OmBooksInternational, NewDelhi, 2003.
5. LucyPratt and LindaWoolley, Shoes (V&AFashionAccessories), Victoria and AlbertMuseum, UK, 1999.
6. Lannoo,Fashion and Accessories(Fashion),LannooInternational,Belgium,2007.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					5				5				3	2			3							20
2		2				2	2			2	2			3				3					4		20
3		2				2	2			2	2			3				3					4		20
4		2				2	2			2	2			3				3					4		20
5		2				3	2				3				3			2						5	20
																								Total	100

Assessment Questions

Remember

1. Define the term accessories.
2. State the term“vel-cro”
3. List any three methods of tanning leather.
4. State the hardness in a natural gem
5. Label parasol
6. List four different types of shoes.
7. State the use ofjewelsinwristwatches
8. State the use of hand fans
9. Label the types of handkerchiefs
10. List any five ornamental accessories

Understand

1. Indicate the basic principles involved in 3D sketching
2. Formulate the accessories required for sketching.
3. Select the criteriaforgarmentaccessories.
4. Illustrate the special finishes that are applied on leather
5. Represent the aesthetic value of an individual improves by wearing jewelry
6. Illustrate ponytail holder
7. Identify the functions of hooks
8. Select a suitable leather accessorie for men during party
9. Indicate the role of zipper in handbags
10. Illustrate pendant

Apply

1. Assess the way of calculating the Button number
2. Find the method to obtain soft finish on leather
3. Predict the importance of computer in designing accessories.
4. Demonstrate the requirements for a quality presentation medium.
5. Choose the right material for garment accessories

6. Combine the ornamental accessories and special accessories to develop a portfolio
7. Demonstrate a 3D model of shoe in obliques pose
8. Construct a symbolic sketch of acessories featuring bohemian look
9. Predict the possibilities of coordinating color schemes in pairing accessories
10. Demonstrate the look of minimalistic features noticed in accessories

Analyze / Evaluate / Create

1. Justify tanning of leather
2. How the degree of hardness of natural gem expressed?
3. Compare appliqués and patch work
4. Compare carrot and karat.
5. Determine the concepts of pattern making in leather footwear.

15FT0YC FASHION VISUAL MERCHANDISING 3 0 0 3

Course Objectives

- To elucidate the basics of human structure and measurements.
- To develop knowledge about fabric selection and styles for intimate apparels.
- To impart technical knowledge about fabric properties that deals with the functional aspect of intimate apparels.

Course Outcomes (COs)

1. Determine the importance signs and communication and their development.
2. Determine the types of retailers, locations and their presentations.
3. Analyze and develop the suitable layout for stores

UNIT I **9 Hours**

DISPLAY AND PRESENTATION

Different kinds of images, image changes for men, women and children wear. The four Ps of marketing, Display Types of display, Exhibitions, Types of Display settings, Elements of display, store display. Store Types of retailers, locations of retailers, presentations in different types of retail stores. Fashion merchandise presentation The American general store Indian departmental stores and fashion centres. Design composition Two composition methods, basic design methods, creating attention, creating displays, design solutions, and the purpose of design.

UNIT II **9 Hours**

STORE LAYOUT

Objectives of store layout, types and selection of layout, merits and demerits, allocation of store space.Exterior store design Planning store exterior kinds of store fronts, elements of store exterior Signage, Banners, Marque, lighting, Types of window display areas. Interior store design Planning of store, kinds of displays..

UNIT III **9 Hours**

COLOUR AND STORE LIGHTING

The color wheel, color planning for the selling floor, colour communication - customers, season, merchandise, Display properties Properties, choosing properties, rent, buy, or build, Supplies-setting up shop The display hop studios, the toolbox, shop materials. Lighting phases, light sources, types of lamps, lighting fixtures, light planning light and shadow, lighting all store types, electrical receptacles.

UNIT IV **9 Hours**

THE MERCHANDISE FIXTURES AND MANNEQUIN

Merchandise Fixtures role of fixtures, types, selection of fixtures. The mannequin, abstract mannequin, display forms, mannequin chronology, the function of mannequins, rigging forms, shirt and blouse forms, dressing mannequins, business highlights, mannequin features, body perfect. Importance of flower arrangements in stores, the florist, flower motifs, giant floral supply wholesalers.

UNIT V **9 Hours**

SIGNS AND COMMUNICATION

Need for signs, types of signage, Directional signs, Merchandise signs, Departmental signs, Sign production in supermarkets and fashion stores. Sign sizes - selection of colours. Sign maintenance, Vendors and markets? Finding display materials, the national association of display industries, other shows and sources, antique shops, flea markets, and auctions.

FURTHER READING

Errors of Display, Elements of store interior, merchandise walls, floors, ceilings, colour and lighting, Creation - museum look, super market, boutique, warehouse clubs, Budgets and repairs of mannequin, Fashion news and communication

Total: 45 Hours

Reference(s)

1. Sarah Bailey,Jonathan Baker, Visual Merchandising for Fashion, Fairchild Books , NewDelhi, 2014
2. Swati Bhalla, Anuraag S, Visual Merchandising ,Tata McGraw-Hill Education,NewDelhi, 2010
3. Tony Morgan, Visual Merchandising: Windows and In-Store Displays for Retail, Laurence King Publishing,Australia,2008
4. Jay Diamond and Ellen Diamond, Contemporary Visual Merchandising and Environmental Design, PrenticeHall, NewDelhi, 2007.
5. ElaineStone, Fashion Merchandising, BlackwellScience Ltd., 2000.
6. Robert Colborne, Visual Merchandising: The Business of Merchandise Presentation, Delmar Learning, 1996.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					5				2	3			3	2			3							20
2		2			2	2				2	2				3				3				4		20
3		2			2	2				2	2				3			3					4		20
4		2			2	2				2	2				3			3					4		20
5		2			2	3					3				3				2					5	20
																							Total		100

Assessment Questions

Remember

1. Define Visual merchandising
2. List four different kinds of images
3. List any 2 types of display settings.
4. State 4P’s of Marketing.
5. List any two kinds of displays.

6. Define design composition
7. List any four types of window displays.
8. List two display composition methods.
9. List four elements of display
10. State any three importance of selection of colours.

Understand

1. Identify the elements of a store interior
1. Select suitable method to achieve the optimum floor planning in a retail store.
2. Illustrate the method to arrange garment styles in a sequence in a showroom.
3. Illustrate riggig forms
4. Interpret the influencial factors of sales promotion in visual merchandising influence.
5. Exemplify Indian departmental stores and fashion centres.
6. Infer on the elements of store exterior influence customers
7. Illustrate a good color planning for the selling floor.
8. Indicate errors in display
9. Exemplify dressing the mannequin.

Apply

1. Demonstrate proper floor planning is necessary
2. Compute the floor plan for a Girls Long frock and Gent's trousers
3. Find the best method of presentation on fashion merchandise
4. Predict the significance of Exhibitions.
5. Construct the objectives of store layout
6. Show the importance of flower arrangements in stores.
7. Show a store with proper selection of store layout, lighting, fixtures and mannequin with appropriate signs.
8. Demonstrate the method of selecting fixtures for merchandise in the store
9. Construct a display theme for one of akind store
10. Choose the functional requirements of mannequins while procuring for a budget store.

Analyze / Evaluate / Create

1. Justify the material movement according to the style of the garment
2. Attribute the material movement in the store according to the floor planning
3. Differentiate the stock rate according to the style and department wise per day
4. Conclude on what basis store interior design is been selected
5. Defend sign production in supermarkets and fashion stores influences the growth of business.

3 0 0 3

15FT0YD INTERIOR DESIGN

Course Objectives

- To impart knowledge on interior design.
- To improve the design skills, sustainable with socially-conscious designs

Course Outcomes (COs)

1. Visualize and interpret other people's ideas
2. Effectively utilize principles of designing in interior design
3. Analyze the raw materials for interior designer.

UNIT I **9 Hours**

INTRODUCTION

Interior designing definition, importance, requirements and types Structural design, Decorative Design Designing interiors, Good taste; Design themes, types and application. Personality of the Home Art elements Line: types, characteristics and importance; form: size and shape, characteristics; Colour sources, qualities, emotional effects, colour wheel and schemes. Application of colour in interiors; Texture types and significance; Pattern: types and effects; Light importance. Importance of Furniture Design for Interiors- Ancient Age / Middle Age / Contemporary.

UNIT II **9 Hours**

GRAPHIC PRESENTATION AND ORTHOGRAPHIC PROJECTION

Graphic Presentation Free Hand Drawing Lines, Curves, Waves- Compositions in pencil, Colours and pasting-3D compostion; Isometric and Axonometric- Still life- Furniture Sketching- Object Drawing with color rendering - Interior elements, Lighting, plants. Graphic Presentation (Advance)- Colour wheel- Rendering in ink- Interior Finishes (B/W and colour)- Dotting- illusions- Interior rendering and stubbing- Stained Glass. Orthographic Projection - Lettering- Use of Scale- Solid Geometry- Introduction for sciography- Perspective, Axonometric Isometric drawing. Orthographic Projection - Lifts and escalators- Acoustics and their application in interiors, water proofing, fire safety.

UNIT III **9 Hours**

INTERIOR DESIGN PLANNING

Introduction to concept of ID- Planning of Interior Space and circulation- Residential project Principles of Hotel interiors.

UNIT IV **9 Hours**

ELEMENTS OF DESIGN AND CONSTRUCTION TECHNIQUES

Elements of Design-Interior Design as a Visual Art-Elements of Design- colours, Accessories and their significance- Project Analysis and Design Development- Design source- Interior space and flow chart, A good design. Construction Techniques (Basic)-Building Components, Basic idea of Construction, Foundation and superstructure. Doors, Windows, Staircase R.C.C., Timber-Construction Techniques (Advance)- False Ceiling, Partitions, Wall Paneling, Comics, Mosaic, Cladding- Flooring and Wall Cladding

UNIT V **9 Hours**

ROLES AND RESPONSIBILITY INTERIOR DESIGNER

Role of an Interior Designer- Responsibility towards society and need of an Interior Designer to better the environment- Ethics and Code of Conduct- Responsibility towards client, contractor and supplier, Estimation. Professional Fees- Work of an Interior Designer- Making of portfolio, JD Annual Design Awards.

FURTHER READING

Professional Practice- The Client Practice, Procedure of execution- P.E.R.T/ C.P.M. Arbitration.

Total: 45 Hours

Reference(s)

1. Tomris Tangaz, Interior Design Course: Principles, Practices, and Techniques for the Aspiring Designer, Barron's Educational Series, New Jersey, 2006.
2. V. Mary. Knackstedt, The Interior Design Business Handbook: A Complete Guide to Profitability, Wiley, New Jersey; 2006.
3. M. G. Shah, C. M. Kale, and S.Y. Patki, Building Drawing with an Integrated Approach to Build Environment, Tata McGraw Hill, 2002.
4. John F. Pile, Interior Design, Prentice Hall 2003.

5. Maureen Mitton, Interior Design, Visual Presentation: A Guide to Graphics, Models & Presentation Techniques, Wiley, New Jersey, 2007.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2					5				5				3	2			3							20
2		2			2	2				2	2			3				3					4		20
3		2			2	2					2			3				3					4		20
4		2			2	2				2	2			3				3					4		20
5		2			2	3				2	3				3			2				5			20
																								Total	100

Assessment Questions

Remember

1. Define Interior Design
2. List the characteristics of colors used in Interior Designs
3. Mention the limitations of manual designing in Interior Designing.
4. State the types of lightings used in Interior Designing
5. What is ergonomics?
6. What are the various features of acoustical boards?
7. State acoustics
8. Define lighting fixtures
9. Label the illumination measurement units
10. State space planning

Understand

1. Compare carpets and rugs in floor coverings
2. Interpret the Design of Large commercial Complex's.
3. Compare the factors that are to be considered for Colors meant for various kinds of emotions.
4. Summarize the roles and responsibilities of an interior designer.
5. Formulate the interior design planning concepts.
6. Represent the features of layering concepts in lighting
7. Classify the different types of lamps
8. Indicate the necessity of following task lighting principles in kitchen
9. Identify the reflectance and luminance requirements of restaurant
10. Classify the types of windows

Apply

1. How to determine the amount of light required in various locations?
2. Compute how the various factors influence the designing of commercial space
3. Demonstrate the varieties of Texture based on types and significance.
4. Construct a 3D Model of Interior decoration for shopping complex using Modeling system.
5. Execute a scheme of building design suitable for climate.
6. Predict the Lighting requirements for different locations and activities
7. Show the different techniques of arranging furniture
8. Demonstrate the aspects of color communication in interiors
9. Carry out a plan for implementing space planning rules
10. Show the importance of orientation in planning the exterior architecture

Analyze / Evaluate / Create

1. Analyze the various features of paneling and cladding.
2. Criticize the relationship of cost versus quality in Interior Decoration.
3. Justify the importance of Boolean operation
4. Create a 3D Model of Interior decoration for shopping complex using Modeling system.
5. Create Design themes based on types and application.

15FT0YE SURFACE EMBELLISHMENT 2 0 2 3

Course Objectives

- To familiarize the students about the various techniques of surface embellishment with relevance to garment embellishments.
- To aware of various types of embroidery and methods of producing it.
- To make the students confident about doing surface embellishment work

Course Outcomes (COs)

1. Develop the skills to establish the importance of surface embellishment
2. Gain knowledge about the hand & machine embroideries and its applications.
3. Interpret the purpose of traditional and special embellishment techniques.

UNIT I **6 Hours**

INTRODUCTION TO SURFACE EMBELLISHMENT

Introduction, Definition, Need, Types, Raw materials, Importance of surface embellishment, Selection of needle, thread and fabric for hand embroidery and machine embroidery. various methods of surface embellishment embroidery and surface ornamentation.

UNIT II **6 Hours**

HAND EMBROIDERY

General rules for hand embroidery. Types of hand embroidery stitches-Running, Couching, Button hole, Satin, Long & Short, Wheat, Chain, Stem, Herringbone, Cross stitch, Knotted stitches, Fish bone, Fly stitch, Braids, Back, Hem, Seed, Needle weaving, Whip stitches.

UNIT III **6 Hours**

MACHINE EMBROIDERY

General rules for machine embroidery. Types of frames and methods of transferring the designs. Attachments to sewing machines for embroidery, Types of machine embroidery stitches- Eyelet work, Cutwork, Richelieu work, Lace work, drawn thread and fabric work, patch work, Mirror work, Appliqué, Shaded embroidery, Shadow work, Badla work, Bead and Sequins work, Couched thread embroidery, Satin stitch, Vermicelli, Zigzag, Wavy stitch, Granite stitch. Computerized embroidery machine- Concept of design and development, software used in embroidery machines, process of designing, method and types of stitch application, punching and digitizing.

UNIT IV **6 Hours**

EMBELLISHMENT TECHNIQUES

Materials used and Applications. Types of embellishment techniques- Ribbon work, Appliqué work, quilting work, patch work, smocking, honey comb, gathered with embroidery, fabric painting ? hand, Stencil ? dabbing and Spraying. Dyeing and printing? advanced tie and dye techniques, batik and block printing. Trimmings and decorations? Laces , Pompons, Fringes, Tassels, Tucks, Show buttons, Eyelet and cord, Bead and Sequins work, Cut work, Crocheting.

UNIT V **6 Hours**

TRADITIOANL EMBROIDERIES OF INDIA AND CARE

Care and maintenance of embroidered articles care and maintenance methods for embroidered apparel, pressing. Traditional Embroideries of India ? Phulkari, Kasuti, Kashmiri embroidery, Kutch work, Chikkankari, Kantha. Quality control in Embroidery - Quality parameters, Quality control systems.

FOR FURTHER READING

STUDY OF POPULAR WORLD EMBROIDERY

Aari and Zardozi work of India- Definition, importance, types and method of application. Tribal Embroideries,

Embroidery techniques of turkey, Greece- cretan stitch, Scottish cretan stitch, open cretan stitch, closed cretan stitch and knotted cretan stitch.

3 Hours

EXPERIMENT 1

Design and develop a sample using running, couching, button hole and granite stitch.

3 Hours

EXPERIMENT 2

Design and develop a sample using satin, long and short, wheat and satin stitch.

3 Hours

EXPERIMENT 3

Design and develop a sample using chain, stem, herringbone, cross stitch and vermicelli stitch.

3 Hours

EXPERIMENT 4

Design and develop a sample using knotted, fish bone,fly stitch ,zig zag and wavy stitches.

3 Hours

EXPERIMENT 5

Design and develop a sample using braids, back, hem and seed stitches.

3 Hours

EXPERIMENT 6

Design and develop a sample using needle weaving stitches, whip stitches and eyelet work.

3 Hours

EXPERIMENT 7

Design and develop a sample using drawn thread and fabric work; patch work and mirror work.

3 Hours

EXPERIMENT 8

Design and develop a sample using applique, shaded embroidery, shadow work,badla work.

3 Hours

EXPERIMENT 9

Design and develop a sample using bead and sequins, couched thread embroidery and machine embroidery stitches.

3 Hours

EXPERIMENT 10

Design and develop a sample using cutwork, richelieu work, lace work and computerised machine embroidery.

Total: 60 Hours

Reference(s)

1. Ruth Chandler, Modern Hand Stitching-Dozens of stitches with creative free-form variations,2014
2. Sophie Long, Mastering the Art of Embroidery: Traditional Techniques and Contemporary Applications for Hand and Machine Embroidery, Heritage Publishers, London, 2013
3. Christen Brown ,Embroidered & Embellished, C&T Publishing, 2013
4. Sheila Paine, Embroidered Textiles, Thames and Hudson Publisher, UK, 1990.
5. Gail Lawther, Inspirational Ideas for Embroidery on Clothes & Accessories, Search Press Ltd, UK, 1993.
6. Jacqueline Farrell, Needlework: Hand & Machine Embroidery (Needlework), Hamlyn, UK, 2000.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	2						5			5				3				3							20
2		2				2	2			2	2			3				3					4		20
3		2				2	2			2	2			3	2			3					4		20
4		2				2	2			2	2			3				3					4		20
5		2				3	2				3				3			2					5		20
																								Total	100

Assessment Questions

Remember

1. Define Embroidery.
2. List the various methods of surface ornamentation.
3. What is Needle weaving?
4. What is purpose of backing materials?
5. List out the Importance of surface ornamentation.
6. Why the special attachment in embroidery machines is important?
7. How the Machine Embroidery is classified?
8. What is digitizing?
9. State chain stitch
10. List the stitches used in zardosi embroidery

Understand

1. Classify the difference between Machine Embroidery & Computerized Machine Embroidery and individual fashion.
2. Interpret the basic principles that have to be adopted to create embroidery using multi-head computer controlled embroidery machines?
3. Classify the difference between appliqué work and patch work
4. Relate the functions of walking foot and tailor’s tacking foot in machine embroidery?
5. Illustrate the double back stitch of Lucknow.
6. Explain why bees wax is added to paraffin wax as resist in batik printing?
7. Infer the general rules for hand and machine embroidery.
8. Explain the process of aari embroidery
9. Represent the aesthetic features of pipli appliques
10. Infer the concept of making a satin stitch

Apply

1. Predict the raw materials required for Surface ornamentation?
2. Select the raw material quality requirements for surface ornamentation?
3. Choose the types of stitches followed in surface ornamentations?
4. How will you evaluate the embroidery designs on the basis of aesthetics?
5. Construct the quality analysis procedure of embroidery materials.
6. Choose a ornamentation appropriate for childrens wear
7. Predict a fancy wear with hand work.
8. Predict a fancy wear for children
9. Demonstrate the smoothness achieved in hand embroidery that is very unique.
10. Show a scheme of stitches appropriate for fine fabric applications

Analyze / Evaluate / Create

1. Assess the factors that affect selection of needle, threads and fabrics for embroidery?
2. List the importance of maintenance of embroidered articles.
3. Distinguish between Shaded embroidery and Shadow work?
4. Explain the process of designing, method and types of stitch application, punching and digitizing.
5. Evaluate the performance of backing materials?
6. Design a party wear by applying any one type of embroidery using bead and sequins work.

ONE CREDIT COURSES

15FT0XA LEAN MANUFACTURING - - - 1

Course Outcomes (COs)

1. Students will be able to understand the concepts related to lean manufacturing.
2. Understand the implementation procedure for lean manufacturing.
3. Students will be able to understand the implementation procedure for lean manufacturing.

UNIT I **20 Hours**

LEAN MANUFACTURING

Benefits of lean manufacturing-Performing a strategic business analysis Methodology to transform facility into lean manufacturing-Understand Product, Process and Demand-Line layout, process linking and balancing-Kanban strategy-Team Establishment-Lean Implementation Milestone checklist-Managing lean manufacturing line

Total: 20 Hours

Reference(s)

1. Dennis P Hobbs, Lean Manufacturing Implementation, J Ross Publishing Inc, USA, 2004.

15FT0XB INTELLECTUAL PROPERTY RIGHTS - - - 1

Course Outcomes (COs)

1. Students will be able to Understand various types of intellectual property rights
2. Students will be able to Apply the patent searching strategies
3. Students will be able to Read, Understand and interpret a patent draft

UNIT I **20 Hours**

INTELLECTUAL PROPERTY RIGHTS (IPR):

Intellectual Property Rights(IPR): Introduction, Purpose, Benefits, categories- Industrial Property and Copyrights. Industrial Property: Patents, trademarks, industrial designs, and geographic indications of source. Pattern- Types, Conditions and purpose of patents, procedure of application of pattern, history of patent act, Indian and International patents, powers of government under IPR, Patent Registration Forms. Case studies relating to IPR.

Total: 20 Hours

Reference(s)

1. NR Subbaram, Demystifying Intellectual Property Rights, ISBN:9788180385780, LexisNexis, 2011
2. Sharon Givoni, Owning It: A Creative's Guide to Copyright, Contracts and the Law, Creative Minds Publishing, 2015.
3. www.ipindia.nic.in/

15FT0XC BUYERS MANUAL - - - 1

Course Outcomes (COs)

1. Students will be able to Understand and Interpret a spec sheet
2. Students will be able to Create a SOP of buyer practices

UNIT I **20 Hours**

BUYERS MANUAL

Buyers- domestic and international buyers requirements and standards test procedures special requirements 3rd party testing final approval

Total: 20 Hours

Reference(s)

1. www.nike.com
2. www.hm.com
3. www.marksandspencer.com
4. www.zara.com

15FT0XD BIO-MIMICRY IN FASHION - - - 1

Course Outcomes (COs)

1. Students will be able to Appreciate the nature
2. Students will be able to Apply the nature in the development of textures, draping, life style accessories

UNIT I **20 Hours**

BIO-MIMICRY IN FASHION

Introduction to bio-mimicry, Fashion draping*, Texture development -Replication of Biomimicry inspired texture- Geometry for fashion styling and vsual display techniques - Life style accessory design inspired from nature

* Wokshop on draping for an additional 8 hours.

Total: 20 Hours

Reference(s)

1. www.nventorspot.com
2. www.ecouterre.com

15FT0XE DRAPING AND FITTING - - - 1

Course Outcomes (COs)

1. Students will be able to Gain practical exposure on draping techniques
2. Students will be able to Solve problems related to fitting problems

UNIT I **20 Hours**

DRAPING AND FITTING

Definition - standards of good fit, Fitting techniques, Fitting problems and their remedies Steps in preparing a garment for proper fit (various styles of garments, Checking the fit of the garment

Total: 20 Hours

Reference(s)

1. Hilde Jaffe, Nurie Relis, Draping for Fashion Design , Pearson Education/Prentice Hall, 2012
2. Helen Joseph-Armstrong, Pattern Making for Fashion Design, Pearson Education/Prentice Hall, 2010
3. Mary Mathews, Practical clothing construction part I and II, cosmic Press, Chennai. (1986).

15FT0XF KNOWLEDGE OF EMERGING MARKETS - - - 1

Course Outcomes (COs)

1. Course Outcomes 1.Gain current scenario of markets across the globe. 2.Understand the emerging markets and their requirements

UNIT I **20 Hours**

KNOWLEDGE OF EMERGING MARKETS

Traditional markets- present scenario emerging global markets China, Brazil, Vietnam, Bangladesh, Srilanka, African countries etc advantages for the Indian and global industry

Total: 20 Hours

Reference(s)

1. www.marketwatch.com
2. www.apparelresources.com
3. www.vogue.com
4. leading news papers / magazines/tradefairs

15FT0XG PRODUCT CERTIFICATION IN GARMENT INDUSTRY - - - 1

Course Outcomes (COs)

1. Course Outcomes Students will be able to
2. Understand know-how of different product certifications in garment industry.
3. Understand the implementation procedures for the same.
4. Identify the various product certifications and its implementation procedures in garment industry.

UNIT I **20 Hours**

PRODUCT CERTIFICATION

Types of product certification, Principles and Implementation procedures- Wool mark / Wool blend mark, Oeko-tex, Organic clothing / GOTS, Handloom mark, Silk mark, LEAF certification(eco-conscious apparel), Fair Trade Certified Clothing, Global Recycling Standard, Worldwide responsible accredited production (WRAP), label.

Total: 20 Hours

Reference(s)

1. http://www.etad.com/
2. www.global-standard.org/
3. www.oeko-tex.com/
4. http://www.tuv-sud.com/industry/consumer-products-retail/softlines/textile-clothing

15FT0XH DENIM FABRICS AND GARMENTS - - - 1

Course Outcomes (COs)

1. Students will be able to Gain knowledge on denim dyeing
2. Students will be able to Expand knowledge on various finishing and washing treatments for denim fabrics And denim garments

UNIT I **20 Hours**

DENIM FABRICS AND GARMENTS

Yarn Requirements and Characteristics for Denim- Weaving of Denim Fabrics-Physical properties of Denim Fabrics. Dyeing of Warp Yarn- Indigo Dyeing- Indigo &Sulphur dye combinations. Finishing of denim fabrics process conditions, machineries and chemicals used, Stone and Stoneless Washing of Denim Garments. Bleaching of Denim Garments using Oxidative and Enzyme Treatments-Backstaining of Garments and Remedies.

Total: 20 Hours

Reference(s)

1. M. S. Parmar, S. S. Satsanji and Jai Prakash, Denim A Fabric for All, NITRA Publications, 1996.
2. J. V. Rao, Denim Washing, Northern India Textile Research Association, Ghaziabad, 2006.
3. Wolfgang D. Schindler, Peter J.Hauser, Chemical Finishing of Textiles, Woodhead Publishing , UK,2004
4. https://textlnfo.wordpress.com/2011/11/03/fabric-and-garment-finishing-basic-washes-in-denim-fabric/

15FT0XI 3-D FASHION - - - 1

Course Outcomes (COs)

1. Students will be able to 1.Gain understanding of 3D in fashion industry. 2. Understand the emerging trends and technology applications.

UNIT I **20 Hours**

FASHION: TECHNIQUES AND APPLICATIONS

3D Data Capture using various body scanners - Industry applications of 3D data capture and analysis - Interaction of 3D to 2D to 3D in product development. Applications of 3D in Fashion: Visualization of design and pattern, Virtual Fit analysis, Virtual simulation of drape, interaction of fabric surface and structural properties. 3D Printing application in fashion. Applications of 3D in fashion.

Total: 20 Hours

Reference(s)

1. http://bodyscan.human.cornell.edu/scene0037.html
2. http://www.just-style.com/
3. http://www.3dbodyscanning.org/
4. http://3dprintingindustry.com/fashion/
5. Leading Trade Journals / papers / magazines/trade fairs

15FT0XJ FABRIC DEVELOPMENT AND SOURCING - - - 1

Course Outcomes (COs)

1. Students will be able to 1.Understand and Interpret a spec sheet 2.Analyse the buyer requirements 3.Execute the fabric development and sourcing

UNIT I **20 Hours**

FABRIC DEVELOPMENT AND SOURCING

Trade shows, Knowing geographical location of fabric sources, Development of fabric, Fabric specifications- Colour matching and quality approval, Sampling, Pricing, Garment making, Bulk fabric execution- Bulk approvals, Meeting Buyer requirements and Practical analyses of different garments and know how on fabric sourcing

Total: 20 Hours

Reference(s)

1. www.ralphlauren.com
2. http://apacpoloexpress.polo.com
3. www.caionline.org

15FT0XK SKILL DEVELOPMENT ON APPAREL PRODUCTION PLANNING PACKAGE

- - - 1

Course Outcomes (COs)

1. To understand the concepts in apparel production planning package 2.To utilize the various techniques in apparel production planning package 3.To understand the material management and their movement in the production.

UNIT I **20 Hours**

SKILL DEVELOPMENT ON APPAREL PRODUCTION PLANNING PACKAGE

Industrial Engineering Productivity- Work study Production Planning Software for Garment Manufacturing - An overview, Evolve by Fast React, Plan-IT by Gemserp, Production Planning and Control module by APPS, MAE by Parallax, Stage Production Planning Management, Pro-Plan by Methods Apparel, Apparel Connect

Total: 20 Hours

Reference(s)

1. Paula J. Myers-McDevitt, Apparel Production Management and the Technical Package, 2010
2. George Kanawaty, ILO, Introduction to Work Study, Universal Publishing Corporation , Mumbai, 2005
3. http://www.fastreact.ru/onlinepics/9_Australian_Country_Spinners.pdf
4. http://www.onlineclothingstudy.com/2011/12/production-planning-software-for.html

15FT0XL SKILL DEVELOPMENT ON ERP PACKAGE

- - - 1

Course Outcomes (COs)

1. Students will be able to 1.Understand and Interpret the features of ERP 2.Develop and execute various orders like PO, JO etc.

UNIT I **20 Hours**

SKILL DEVELOPMENT ON ERP PACKAGE

Basics of information systems Modules of ERP - Financial Accounting (FI)- Controlling (CO)- Sales and Distribution (SD)-Production Planning (PP)- Materials Management (MM)- Quality Management (QM)- Human Capital Management (HCM)- Creation of order - Execution of order- Status checking

Total: 20 Hours

Reference(s)

1. www.sap.in/
2. www.capterra.com/apparel-management-software/
3. www.fastreact.com
4. http://perfectfit.net/

ADDITIONAL ONE CREDIT COURSES (I – III SEM)

15GE0XA HEALTH AND FITNESS

- - - 1

Course Objectives

- To understand the fundamental concepts about physical fitness & its types, training and assessment of physical fitness.

Course Outcomes (COs)

1. Acquire the knowledge and training of the individual physical, mental and social concepts.
2. Understand the fundamental concepts of yogic practice and physical fitness.
3. To acquire the knowledge about nutrition and health consciousness.

Fitness: Meaning & Definition – Need & importance of Physical fitness – Types Physical fitness - Exercise, Training and Conditioning and it is important.

Yoga: Meaning and definition – Principles of practicing – Basic Asana and it important – Pranayama and Meditation - Relaxation Techniques.

Nutrition and Balance Diet: Needs and Important – Significant of Nutritional Food - Tips for balance diet.

Common Diseases for IT professionals: Common diseases - cause – prevention – First aid for common sports injuries.

Total: 15 hours

References

1. Anderson, Bob., Pearl, Bill.,&Burke, Edmund R., (2001). *Getting in Shape Workout Programs for Men&Women*. Mumbai: Jaico Publishing House.
2. Baechle, Thomas. R, & Earle, Roger. W., (2000). *Essentials of Strength Training and Conditioning*. Champaign: Human Kinetics.
3. Iyengar, BKS., (2003). *The Art of Yoga*. New Delhi: Harper Collins Publishers.
4. Singh, Hardayal, (1995). *Science of Sports training*. New Delhi: D.V.S. Publications.
5. Begum, Raheena. M., (2002). A Textbook of Foods, Nutrition and Dietetics. New Delhi: Sterling Publishers Private Limited.

15GE0XB FOUNDATION COURSE IN COMMUNITY RADIO TECHNOLOGY

- - - 1

Course Objective

The course focuses on community radio technology and various program productions techniques for radio broadcasting.

Course Outcomes (COs)

1. Understand the hardware required for field recording and setting up a studio and carry out studio and field recording
2. Examine the available options for telephony interfaces for radio
3. Demonstrate proper techniques of wiring, fixing of connectors, soldering and use of tools and equipment for studio work.

INTRODUCTION TO COMMUNITY RADIO

Evolution of Community Radio (CR) in India- principles behind setting up of CR- policy guidelines and their impact on technology and content of a CR station- fundamental principles behind deciding the technology for a CR station.

STUDIO TECHNOLOGY

Properties and components of sound-difference between analogue and digital audio-hardware required for field recording and setting up a studio-fundamental principles for setting up an audio studio

AUDIO PRODUCTION

Concept of recording and storing audio-hardware related to audio recording-open source software solutions for audio production- telephony interfaces for radio- audio Post Production

STUDIO OPERATIONS

Wiring, fixing of connectors, soldering and use of tools and equipment- preventive and corrective maintenance of studio and equipment.

RADIO TRANSMISSION TECHNOLOGY

Components of the FM transmission chain- FM transmitter-different types of FM antenna - coaxial cable- propagation and coverage of RF signals-FM transmitter setup

Total: 15 Hours

Reference(s)

1. UNESCO (2001). Community Radio Handbook.
2. Vinod Pavarala, Kanchan K Malik, “Other Voices: The Struggle for Community Radio in India”, SAGE Publications India,2007.
3. Steve Buckley, Mark Raboy, Toby Mendel, Kreszentia Duer, Monroe E. Price, Seán Ó Siochrú, “Broadcasting, Voice, and Accountability: A Public Interest Approach to Policy, Law, and Regulation”, University of Michigan Press, 2008.
4. www.floridasound.com
5. www.mediacollege.com

15GE0XC VEDIC MATHEMATICS - - - 1

Course Objectives

- To improve their calculation speed, analytical thinking and numerical skills.

Course outcome (CO)

1. Solve problems creatively in mathematics and its applications.

Vedic Mathematics

Addition- Subtraction- System of Multiplication- Squaring numbers- Cube roots- Square roots- Solution of simultaneous equations- Solutions of Quadratic equations-

Total: 15 Hours

References

1. Dhaval Bathia, Vedic Mathematics, JAICO Publishing House, 29th Edition, Mumbai, 2014.
2. Jagadguru Swami Sri Bharathi Krsna Tirthaji Maharaja, Vedic Mathematics, Motilal Banarsidass Publishers Private Limited, New Delhi, 1997.

15GE0XD INTRODUCTION TO ALGORITHM

- - -1

Course Objectives

- To analyze the asymptotic performance of algorithms, Divide and conquer and Dynamic Problems.
- To use Sorting and Searching algorithms for arranging the data.
- To apply important algorithmic techniques to solve the real world Problems.

Course Outcomes (COs)

1. Apply Divide and conquer and Dynamic Programming Algorithm techniques to Provide the solutions for simple Problems.
2. Design algorithms for Performing Sorting and Searching of data.
3. Construct the Graph, Heap and BST for the given Data information.

Algorithm Design Techniques: Divide and Conquer, Dynamic Programming, Sorting and Searching, Basic graph algorithms –Simple Data Structures: Heaps, Balanced Search Trees.

Total: 15 Hours

References

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 2015.
2. Thomas H. Cormen. Charles E. Leiserson. Ronald L. Rivest. Clifford Stein, Introduction to Algorithms, Second Edition, MIT Press, 2014.
3. J.P.Tremblay and P.G.Sorenson, An Introduction to Data Structures with Application II Edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2008.

15GE0XE ETYMOLOGY

- - - 1

Course Objectives

- To increase vocabulary and enhance use, knowledge, and understanding of the English language;
- To stimulate an appreciation for the English language, including how it developed, how new wordsenter the language, and how it continues to be dynamic;
- To demonstrate the importance of a broad-based vocabulary for effective oral and writtencommunication; and

Course Outcomes (COs)

1. Examine prefixes, roots, and suffixes of Latin, Greek, Germanic, and Anglo-Saxon origin.
2. Explore the historical aspects of language, including the infusion of Indo-European languages, semantic changes, and the influence of world events.

CONVENTIONS &VOCABULARY

Acronyms – Abbreviations – Initialisms – Jargon – Neologisms - Idiomatic Expressions – Euphemisms – Spoonerisms – Malapropisms – Mondegreens - Words Derived from Latin - Words Derived from Greek - Words Derived from - Germanic/Anglo-Saxon - Abstract word Acronym - Affix Analogy - Antonym – Apheresis - Blend word Assimilation - Colloquial language Clipped word

WORD ANALYSIS

Concrete word Derivative - Dialect Diminutive suffix - Dissimilation Doublet - Etymology Euphemism - Figurative word Homonym - Hybrid word Inflection - Informal language Infusion - Jargon Linguistics - Loan words Metathesis – Modify - Philology Onomatopoeia - Romance language Prefix - Semantics - Root-base word - Suffix Slang - Word component Synonym

Total : 15 hours

Reference(s)

1. Norman, Lewis. *Word Power Made Easy*,Goyal Publisher. Edition 2.2014.
2. C T Onions. *The Oxford Dictionary of English* Etymology.Volume 11, Issue 1.70, Wynford Drive, Don Mills, Ont.Oxford University Press.1965.
3. Nurnberg W, Maxwell and Rosenblum, Morris, How to build a better Vocabulary, Completely Revised and Updated, Popular Library.1961

15GE0XF HINDUSTANI MUSIC - - - 1

Course Objectives

- To have an awareness on aesthetic and therapeutic aspects of Hindustani music
- To identify and differentiate the various styles and nuances of Hindustani music
- To apply the knowledge accumulated throughout the duration of the course by way of improvisation, composition and presentation

Course Outcome (CO)

1. Have Basic knowledge of aesthetic and therapeutic value of Hindustani Music

Aesthetics

Introduction to music - Aesthetics of Hindustani Music - Classification (Raga, instruments, style as per the presentation and the gharaanaas) - Folk music, Dhamaar, Dhrupad

Composition and Therapeutic Value

Taal and Raga - Bandeesh, Taraanaa – Madhya and drut laya, Vilambit khyaal as demonstration - Therapeutic benefits of Hindustani music - Stage performance

Total : 20 hours

Reference(s):

1. Devdhar B.R., *Raga bodh (Part 1 & 2)*, Devdhar School of Indian Music, Mumbai, 2012.
2. Vasant, *Sangeet Vishaarad* , Hathras, Uttar Pradesh, 2015.

Websites:

1. *raag-hindustani.com/*
2. *play.raaga.com/Hindustani*
3. *raag-hindustani.com/Scales3.html*
4. *www.poshmaal.com/ragas.html*
5. *www.soundofindia.com/raagas.asp*
6. *https://www.quora.com/Which-is-the-toughest-raga-in-Indian-classical-music*
7. *www.likhati.com/2010/10/20/popular-ragas-for-the-beginner-ear-durga*

15GE0XG CONCEPT, METHODOLOGY AND APPLICATIONS OF VERMICOMPOSTING

- - - 1

Course Objectives

- To understand the importance of safe methods of treating solid wastes generated through various human activities
- To appreciate the skills / devices / practices associated with the compact proceedures of biodegradation of unwanted solid residues

Course Outcomes (COs)

1. Understand the role of recycling of garbage leading to the sustenance of our health and environment.
2. Recognize the organic farming practices and production of healthy food products.
3. Prepare and maintain tips for small scale compost units and thereby becoming more environmentally conscious.

Vermicomposting Technology

Ecological roles and economic importance of earthworms - need for earthworm culture – scope and importance of vermiculture – limiting factors - types of worm culturing and the relative benefits – Small scale and commercial methods: process & advantages – Vermicomposting equipments, devices – Design and maintenance of vermi bed - Products from vermiculture (matter & humus cycle) – vermicastings in organic farming/horticulture - Marketing the products of vermiculture – quality control, market research, marketing techniques – Applied vermiculture: use of urban solids & farm/ industrial residues for vermicomposting - Constraints of vermiculture and its future perspectives – Artificial Earthworm as a standalone biodegradation assembly.

Total: 15 Hours

Reference(s)

1. Sultan Ahmed Ismail, 2005. The Earthworm Book, Second Revised Edition. Other India Press, Goa, India.4
2. Vermiculture Technology; Earthworms, Organic Wastes and Environmental Management, 2011, Edited by Clive A Edwards, Norman Q Arancon & Rhonda Sherman, CRC Press
3. www.organicgrowingwithworms.com.au
4. New York Times – Scientists Hope to Cultivate and Immune System for Crops

15GE0XH AGRICULTURE FOR ENGINEERS

- - - 1

Course Objectives

1. To impart the basic knowledge of agricultural and horticultural crops, cropping systems
2. To study the weed and nutrient management, irrigation water requirement and its quality

Course Outcomes (COs)

1. Understand the science of Agriculture
2. Summarize and apply the methodologies needed in agriculture based on the field conditions.
3. Develop enough confidence to identify the crop patterns in real world and offer appropriate solutions.

Agronomical practices and Crops **5 Hours**

Definition and scope of agronomy , Classification of Crops, agricultural and horticultural crops Effect of Different Weather Parameters on Crop Growth and Development , Principal of Tillage, Tilth and Its Characteristics, Role of Water in Plant and Its Absorption, Conduction and Transpiration of Water and Plant Processes, Soil Water Extraction Pattern and Plant Response. Introduction to weeds, Weeds Control.

Crop rotation, cropping systems, relay and mixed cropping **5 Hours**

Crop Rotation, Different Cropping Systems – I, Different Cropping Systems – II, Scope of Horticultural Crops, Soil Requirement for Fruits, Vegetables and Flowers Crops, Climatic Requirement for Fruits, Vegetables and Flowers Crops.

Plant nutrients **5 Hours**

Essential Plant Nutrients, Nutrient Deficiency, Toxicity and Control Measures. Chemical fertilizers, fertilizer Reaction in Soil and Use Efficiency

Quality of irrigation water and irrigation methods **5 Hours**

Quality of Irrigation Water, Poor Quality of Irrigation Water and Management Practices. Surface Irrigation methods, and micro irrigation methods

Total : 20 hours

References

1. SP. Palaniappan, and S. Sivaraman, Cropping systems in the tropics- Principles and Management, New Age international publishers, New Delhi, (2nd edition), 1998.
2. S.Sankaran and V.T Subbaiah Mudaliar, Principles of Agronomy, The Bangalore Printing and Pubg Co, Bangalore, 1993.
3. P.Balasubramain and SP. Palniappan, Principles and Practices of Agronomy, Agrobios publishers, Ludhiana, 2001.
4. T.Yellamanda Reddy and G.H. Sankara Reddi, Principles of Agronomy, Kalyani publishers, Ludhiana, 2005
5. B.Chandrasekaran, B. , K. Annadurai and E. Somasundaram, A Text book of Agronomy, Scientific publishers, Jodhpur, 2007
6. George Acquaah, Horticulture-principles and practices, Prentice-Half of India Pvt. Ltd., New Delhi, 2002.

15GE0XI INTRODUCTION TO DATA ANALYSIS USING SOFTWARE - - - 1

Course Objectives

- To familiarize students on the features of MS Excel.
- To enable the students to use Excel in the area of critical evaluation.
- Facilitate the student to construct graphs.

Course Outcomes (COs)

1. Create versatile Excel document.
2. Apply built in functions for data analysis.
3. Prepare dynamic Charts.

Excel Fundamentals and Editing **4 Hours**
Starting and Navigating a Worksheet– Entering Information – Hyperlinks – Saving – Editing Techniques – Entering a Series of Labels, Numbers and Dates – Checking Errors.

Formatting **4 Hours**
Formatting Cells – Changing Column Widths and Row Heights – Creating Conditional Formatting – Using Styles – Creating and Modifying Templates – Changing Page Breaks.

Power Organizing and Customizing Excel **4 Hours**
Managing Worksheets – Referencing Cells in Other Worksheets – Using More than One Work Book – Managing Shared Work Books – Protecting Worksheets and Workbooks.
Adjusting Views – Setting Printing Options – Using Multiple Panes – Customizing Excel Using the Options Dialog Box.

Crunching Numbers **5 Hours**
Building a Formula – Using Basic Built-in Functions – Using Functions to Analyze Data – Using Names in Functions – Array Functions

Work Sheet Charts **3 Hours**
Planning a Chart – Creating Chart – Formatting a Chart – Adding Labels and Arrows.

Total: 20 Hours

References

1. Michael J. Young, Michael Halvorson, "Office System 2007 Edition", Prentice-Hall of India (P) Ltd., New Delhi, 2007
2. John Walkenbach, "Microsoft Office Excel 2007", Wiley Publishing, Inc. 2007
3. Curtis D. Frye, Microsoft Office Excel 2007 Step by Step, Microsoft Press, 2007
4. Mark Dodgeand Craig Stinson, "Microsoft Office Excel 2007 Inside Out", Microsoft Press, 2007

15GE0XJ ANALYSIS USING PIVOT TABLE - - - 1

Course Objectives

- To familiarize students on the features of Pivot Table.
- To enable the students to use Pivot Table in the area of data analysis.
- Facilitate the student to construct the charts for visualization of data.

Course Outcomes (COs)

1. Able to construct the Pivot Table and Group, Sort, Filter the Data to do the analysis.
2. Able to do the Calculation with in Pivot Table for advance analysis.
3. Capable of Constructing Pivot Charts to make visual presentation.

Pivot Table Fundamentals **4 Hours**
Introduction about Pivot Table, Why and When to use the Pivot Table, Anatomy of the Pivot Table, Limitations, Preparing the Source Data, Creating the Pivot Table.

Grouping Pivot Table Data **4 Hours**
Grouping the Items in a Report Filter, Grouping Text Items, Grouping Dates by Month, Grouping Dates Using the Starting Date, Grouping Dates by Fiscal Quarter, Grouping Dates by Week, Grouping Dates by Months and Weeks, Grouping Dates in One Pivot Table Affects Another Pivot Table, Grouping Dates Outside the Range.

Sorting and Filtering Pivot Table Data **4 Hours**

Sorting a Pivot Field: Sorting Value Items, Sorting Text Items, Sorting Items in a Custom Order. *Filtering a Pivot Field:* Manual Filter, Label Filter, Value Filter, Multiple Filters.

Calculations within the Pivot Tables **5 Hours**

Using Formulae: Creating a Calculated Field with and without "IF Condition, Calculated Item, Using Custom Calculations: % of Column, % of Row, % of Total, % Of, Running Total, Difference From, % Difference From, Index.

Pivot Charts **3 Hours**

Creating a Normal Chart from Pivot Table Data, Filtering the Pivot Chart, Changing the Series Order, Changing Pivot Chart Layout Affects Pivot Table, Changing Number Format in Pivot Table Affects Pivot Chart, Converting a Pivot Chart to a Static Chart, Refreshing the Pivot Chart, Creating Multiple Series for Years

Total: 20 Hours

Reference(s)

1. Debra Dalgleish, "Excel 2007 - PivotTables Recipes A Problem-Solution Approach", Apress, 2007, (ISBN-13 (pbk): 978-1-59059-920-4)
2. Bill Felen and Michael Alexander, "Pivot Table Data Crunching for Microsoft Office 2007", Pearson Education, Inc., QUE Series.
3. Wayne L. Winston, "Microsoft Office Excel 2007: Data Analysis and Business Modeling", Microsoft Press, 2007
4. John Walkenbach, "Microsoft Office Excel 2007", Wiley Publishing, Inc. 2007
5. Mark Dodgeand Craig Stinson, "Microsoft Office Excel 2007 Inside Out", Microsoft Press, 2007
6. Curtis D. Frye, Microsoft Office Excel 2007 Step by Step, Microsoft Press, 2007

BRIDGE COURSES

15FTB01 FIBRE SCIENCE

Course Objectives

- Students will have fundamental knowledge on natural and man-made fibres.
- Students will know the manufacturing process for different textile fibres
- Students will know the physical and mechanical properties of fibres.

Course Outcomes (COs)

1. Understand the cultivation and production of natural fibres and man-made fibres
2. Understand the mechanical, comfort, optical and frictional properties of natural and man-made fires.
3. Select suitable fibres for various end uses / applications.

UNIT I **9 Hours**

NATURAL FIBRES

Introduction to fibres: Definition of Staple fibre and Filament, Yarn, and Thread. Classification - Natural fibres, Man-made fibres. Properties - essential properties, desirable properties. Production, cultivation and chemical properties of Natural Fibers: Cotton, Silk, Wool, Jute. Application of natural fibres. Linear density: systems of expression - tex, decitex, millitex, denier, micronaire.

UNIT II **9 Hours**

MAN-MADE FIBRES

Production sequence of Regenerated Fibers: Viscose Rayon, Acetate Rayon, Modal, Bamboo fibres, Soybean. Production Sequence and chemical properties of Synthetic Fibers: Polyester, Nylon, Acrylic and Polypropylene. Introduction to spin finishes, texturisation and heat setting. Features of Speciality fibres: FR fibres, elastane - microdenier fibres, nanofibres, hollow fibres. Application of man-made fibres.

UNIT III **9 Hours**

MECHANICAL PROPERTIES

Degree of order, degree of orientation of molecular chains - Ordered and disordered regions -Density. Definitions: breaking strength, breaking extension, tensile stress and strain, mass specific stress, yield point, initial modulus, secant modulus, work of rupture and work factor. Stress-strain curves for various textile fibres and their significance. Factors influencing tensile properties of fibres. Elastic properties - elasticity, elastic recovery - work recovery. Torsional and flexural rigidity.

UNIT IV **9 Hours**

COMFORT PROPERTIES

Definitions: humidity - Absolute humidity - Relative humidity - Moisture content. Hygroscopic nature of fibres - Regain curves. Factors influencing moisture regain - Conditioning of fibres. Swelling of fibres. Static electricity - generation of static charge, problems encountered during processing, elimination techniques - Triboelectric series. Thermal properties -specific heat - Thermal conductivity - Thermal transitions

UNIT V **9 Hours**

OPTICAL AND FRICTIONAL PROPERTIES

Reflection of light, Luster index, factors influencing luster. Refractive index and Birefringence. Introduction to fibre friction: Theories of friction, measurement of friction and factors influencing fibre friction. Friction in wool -directional frictional effect.

FOR FURTHER READING

Natural fibres, High Performance Fibres, Industrial Application of fibres, Production and Consumption data of natural and man-made fibres, Latest fibre manufacturing techniques.

Total: 45 Hours

Reference(s)

1. H. V. Sreenivasa Murthy Introduction to Textile Fibres, Woodhead Publishing Pvt Ltd, New Delhi 2015
2. Sara J. Kadolph, Textiles, Dorling Kindesley India Pvt Ltd., 2009
3. W. E. Morton and J. W. S. Hearle , Physical Properties of Textile Fibres, Woodhead Publication Ltd., England, 2008
4. S. P. Mishra, Fibre Science & Technology, New Age International Publishers, 2000.
5. V. B. Gupta, Textile Fibres: Developments and Innovations, Vol. 2, Progress in Textiles: Science & Technology, IAFL Publications, 2000.
6. http://nptel.ac.in/courses/116102006/

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	4	2			3	2					2				2				2					3	20
2	3	4			3	3					3				2				1					1	20
3	2	3			3	3					1				2				3					3	20
4	3	3			2	3					3				2				1					3	20
5	2	3			3	3					1				3				1					4	20
																								Total	100

Assessment Questions

Remember

1. Write the chemical structure of cotton.
2. What is the role of oil and wax in cotton fibres?
3. Elaborate the production process of wool fibre.
4. Elaborate the production process of silk fibre.
5. Define torsional and flexural rigidity.
6. List the factors that influence the torsional and flexural rigidity.
7. State the advantages of amorphous region in a fibre.
8. State the advantages of crystalline region in a fibre.
9. What is specific heat?
10. What is thermal absorption index?
11. List the fibres that have either zero or negative birefringence values.
12. What are the theoretical extreme values of dichroic ratio?

Understand

1. What are the significances of physical and chemical properties of cotton on cotton garments and fabrics that we use every day?
2. Classify the natural fibre.
3. What is linear density?
4. Classify the manmade fibre
5. What is Tex?
6. What is denier?
7. State the composition of wool.
8. State the chemical composition of silk
9. What are the essential properties of fibre?
10. Prepare a table showing various physical and chemical properties of cotton fibres.
11. When is the initial modulus considered to be particularly important?
12. Why are the flexural and torsional rigidities of fibres important?
13. Why Initial modulus rigidity is so important?
14. Why Specific torsional rigidity is so important?
15. What are the advantageous of friction in textiles?
16. What is felting?
17. What are the two kinds of fiber frictions?
18. Elaborate the practical significance of flexural and torsional rigidity of fibres.
19. Draw an ideal stress-strain curve and explain why textile fibres deviate from ideal one.
20. Why is tensile stress and strain of fibre properties so importance?
21. State the advantages and disadvantages of Elastic properties of fibre.
22. Elaborate the Degree of order and degree of orientation of molecular chains cotton fibre.
23. Elaborate Stress-strain curves for natural textile fibres and their significance.
24. Elaborate the elongation-at-break and elastic values of polyester fibre.

Apply

1. Identify the various application of wool fibres.
2. How do you apply the elastic fibre materials in apparel industry?

3. How do you produce the high luster fibres and justify?
4. Demonstrate the various methods of Jute fibre production
5. Predict the methods to assess the fibre friction and factors influencing fibre friction?
6. Demonstrate the fine structure of hemp fibre.
7. Predict the factors affecting the regain of textile materials?
8. Show why Relative Humidity is very important in textile industry?
9. Demonstrate the importance of arresting static electricity
10. Predict the requirements of thermal properties of fibre with respect to end use.

Analyse / Evaluate

1. Analyse the wool fibre structure and properties.
2. Analyse jute fibre structure and properties.
3. Analyse cotton fibre structure and properties
4. Analyse the advantages and disadvantages of natural fibre.
5. Analyse the various factors influencing tensile properties of fibres.
6. Analyse the various elasticity properties of textile fibres.
7. Analyse the fine structure of cotton fibre.
8. Analyse the fine structure of wool fibre.
9. Analyse the fine structure of silk fibre.
10. How do you minimizing static electricity in textile industry?
11. Analyze the effects of regain on mechanical properties of fibres.
12. Analyze the effects of regain on electrical properties of fibres.
13. Analyze the effects of regain on dimensional stability of fibres.
14. Analyze the effects of regain on thermal properties of fibres.
15. Analyse the cross-sections of normal and mercerized fibres and comment on their lustre levels.

15FTB02 ENGINEERING PHYSICS

Course Objectives

- To impart knowledge in properties of matter, crystallography and ultrasonics
- To understand the applications of lasers and fiber optics
- To implement the principles of quantum physics in the respective engineering fields

Course Outcomes (COs)

1. Realize the concept of properties of matter and apply the same for practical applications
2. Identify the suitable laser source for fiber optic communication applications
3. Determine the velocity of ultrasonic waves and apply the same for day today applications
4. Classify the different types of crystal structures and analyze their properties
5. Comprehend the efficacy of quantum equations in modern areas

UNIT I **8 Hours**

PROPERTIES OF MATTER

Elasticity: elastic and plastic materials - Hooke's law - elastic behavior of a material -stress -strain diagram- factors affecting elasticity. Three moduli of elasticity- Poisson's ratio-torsional pendulum-twisting couple on a cylinder. Young's modulus- uniform bending -non- uniform bending. Viscosity: coefficient of viscosity -streamline and turbulent flow -experimental determination of viscosity of a liquid -Poiseuille's method.

UNIT II **6 Hours**

APPLIED OPTICS

Interference: air wedge- theory- uses- testing of flat surfaces- thickness of a thin wire. Laser: introduction- principle of laser- characteristics of laser- types: CO2 laser -semiconductor laser (homo junction). Fiber optics: principle of light transmission through fiber- expression for acceptance angle and numerical aperture- types of optical fibers (refractive index profile and mode)- fiber optic communication system (block diagram only).

UNIT III **5 Hours**

ULTRASONICS

Ultrasonics: introduction- properties of ultrasonic waves-generation of ultrasonic waves-magnetostriction- piezo electric methods- detection of ultrasonic waves. Determination of velocity of ultrasonic waves (acoustic grating). Applications of ultrasonic waves: SONAR- measurement of velocity of blood flow -study of movement of internal organs.

UNIT IV **5 Hours**

SOLID STATE PHYSICS

Crystal Physics: lattice -unit cell -crystal systems- Bravais lattices- Miller indices- 'd' spacing in cubic lattice- calculation of number of atoms per unit cell, atomic radius, coordination number and packing density for SC, BCC, FCC and HCP structures- X-ray diffraction: Laue's method - powder crystal method.

UNIT V **6 Hours**

QUANTUM MECHANICS

Quantum Physics: development of quantum theory- de Broglie wavelength -Schrodinger's wave equation- time dependent and time independent wave equations- physical significance. Application: particle in a box (1d)- degenerate and non-degenerate states. Photoelectric effect: quantum theory of light work function- problems.

FOR FURTHER READING

Neutrions - expanding universe

2 Hours

INTRODUCTION

Exposure to Engineering Physics Laboratory and precautionary measures

4 Hours

EXPERIMENT 1

Determine the moment of inertia of the disc and calculate the rigidity modulus of a given wire using torsion pendulum (symmetrical masses method).

4 Hours

EXPERIMENT 2

Find the elevation of the given wooden beam at the midpoint by loading at the ends and hence calculate the Youngs modulus of the material.

4 Hours

EXPERIMENT 3

Find the depression at the midpoint of the given wooden beam for 50g, 100 g, 150 g, 200 g and 250 g subjected to non-uniform bending and determine the Youngs modulus of the material of the beam.

4 Hours

EXPERIMENT 4

Determine the coefficient of viscosity of the given liquid by Poiseulles method.

4 Hours

EXPERIMENT 5

Form the interference fringes from the air wedge setup and calculate the thickness of the given wire.

4 Hours

EXPERIMENT 6

By applying the principle of diffraction, determine the wavelength of given laser and the average particle size of lycopodium powder using laser source.

4 Hours

EXPERIMENT 7

Determine the
(i) wavelength of ultrasonics in a liquid medium,
(ii) velocity of ultrasonic waves in the given liquid
(iii) compressibility of the given liquid using ultrasonic interferometer.

Total: 60 Hours

Reference(s)

1. D. S. Mathur, Elements of Properties of Matter, 5th edition, S Chand & Company Ltd., New Delhi, 2012.
2. Charles Kittel, Introduction to Solid State Physics, 8th edition, Wiley India Pvt. Ltd., New Delhi, 2012.
3. Arthur Beiser, Shobhit Mahajan and S Rai Choudhury, Concepts of Modern Physics, 6th Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2010.
4. B. K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning India Pvt. Ltd., New Delhi, 2012.
5. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011.
6. Ian Morison, Introduction to Astronomy and Cosmology, John Wiley and Sons, Ltd., 2013.

Assessment Pattern

Unit/RBT	Remember				Understand				Apply				Analyse				Evaluate				Create				Total
	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	F	C	P	M	
1	3	2			4	5				1			1	3				1							20
2	4	1			4	7							1	2				1							20
3	3				4	6	2		1	1			1	1				1							20
4	1	2			3	8	1			4			2	4											25
5	1	2			2	5				1			1	3											15
																								Total	100

Assessment Questions

Remember

1. Reproduce Hooke's law
2. Name the three types of moduli of elasticity
3. List the two applications of air wedge
4. Recall the two conditions required for achieving total internal reflection
5. Define magnetostriction effect

6. Recognize the four applications of ultrasonics in medical field
7. Write the Bragg's condition necessary for obtaining X-ray diffraction in crystals
8. Retrieve the seven types of crystal system
9. Recall four physical significance of wave function
10. Define photoelectric effect

Understand

1. Explain the procedure adopted for determining the Young's modulus of the given material by non-uniform bending method
2. Illustrate the effect of temperature on elasticity of a material
3. Classify the fiber optics based on refractive index profile
4. Indicate the role of optical resonators in the production of laser
5. Compare the merits of magnetostriction and piezo-electric oscillators
6. Summarize the four applications of ultrasonic waves in day-today life
7. Identify the closely packed cubic crystal structure with an example
8. Compare Laue method and powder crystal method used in X-ray diffraction
9. Infer the significance of photoelectric effect
10. Represent the two assumptions involved in solving the Schrödinger time dependent wave equation.

Apply

1. Show that when a cylinder is twisted the torsional couple depends on torsional rigidity
2. Using torsional pendulum, explain the rigidity modulus of the wire
3. Design an experimental setup used for determining the thickness of a thin material
4. A silica optical fiber has a core refractive index of 1.50 and a cladding refractive index of 1.47. Find the numerical aperture for the fiber.
5. Construct the piezo electric oscillator circuit and explain the generation of ultrasonic waves
6. Find the depth of submerged submarine if an ultrasonic wave is received after 0.33 s from the time of transmission.(given v=1400 m/s)
7. Show that the axial ratio for an ideal HCP structure is 1.633
8. Sketch the planes having Miller indices (100) and (111).
9. Assess the various energy levels of an electron enclosed in a one dimensional potential well of finite width 'a'
10. Compute the relation between de Broglie wavelength and velocity of a particle

Analyse

1. Differentiate uniform bending from non-uniform bending
2. Straight lined fringes are formed only in flat glass plates. Justify.
3. Conclude that the thickness of thin wire is influenced by band width of a material
4. Outline the merits and demerits of magnetostriction oscillator method.
5. Five fold symmetry is not possible in crystal structures. Justify your answer.
6. Compare the degenerate state with non-degenerate state

Evaluate

1. Determine the viscosity of a given liquid using Poiseuille's method (Given: water, burette, stop clock, capillary tube, stand and travelling microscope)
2. When ultrasonic waves are passed through liquids, cavitations are produced. Criticize the statement
3. Check the packing factor for a simple cubic structure is 0.52
4. Evaluate the expression for time dependent Schroedinger's wave equation