# B.Tech. (Fashion Technology) 2022 Regulations, Curriculum & Syllabi



BANNARI AMMAN INSTITUTE OF TECHNOLOGY

An Autonomous Institution Affiliated to Anna University - Chennai • Approved by AICTE • Accredited by NAAC with "A+" Grade
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### **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

- I. Graduates will be having successful careers in industry, academics and research in the fields of apparel technology and fashion design with a fundamental knowledge and skill in basics of science, technology, arts, mathematics, computers and apparel manufacturing processes.
- II. Graduates will be globally competent in fashion industry project management and entrepreneurship through effective communication, design and technology skills and also be able to appraise social and environmental issues.
- III. Graduates will demonstrate spirit of ethics, leadership and engage in professional practice throughout their career.

#### **PROGRAMME OUTCOMES (POs)**

- a. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- b. 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 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. 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. 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. 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. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- h. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- i. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- j. 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. 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.

1. 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.

### PROGRAMME SPECIFIC OUTCOMES (PSOs)

- Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories.
- 2. Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

					Prog	ramme	Outcom	nes(s)				
PEO(s)	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(1)
Ι	X	X	х	х	X		х				х	х
II			х			х	Х	х	х	x		х
III			x	X		X	X	X	X	x	X	x

## MAPPING OF PEOs AND POs



	l Minimu	DEPAH m Cree	RTME	NT: F1 be Ear	ր ned: 10	63				
		I SF	EMEST	TER						
	C	Ŧ	т	D	G	Hours/	Maxi	imum N	Jarks	<b>C</b> (
Code No.	Course	L	Т	Р	C	Week	CA	ES	Total	Category
22MA101	Engineering Mathematics I	3	1	0	4	4	40	60	100	BS
22PH102	Engineering Physics	2	0	2	3	4	50	50	100	BS
22CH103	Engineering Chemistry I	2	0	2	3	4	50	50	100	BS
22GE001	Fundamentals of Computing	3	0	0	3	3	40	60	100	ES
22HS001	Foundational English	1	0	2	2	3	100	0	100	HSS
22GE003	Basics of Electrical Engineering	2	0	2	3	4	50	50	100	ES
22GE005	Engineering Drawing	1	0	2	2	3	100	0	100	ES
22FT108	Comprehensive Work	0	0	2	1	2	100	0	100	EEC
	Total	14	1	12	21	27	-	-	-	-
		II SI	EMES	ГER						
Code No	Course	т	т	р	C	Hours/	Maximum Marks		Aarks	Catagory
Code No.	Course	L	1	1	C	Week	CA	ES	Total	Category
22MA201	Engineering Mathematics II	3	1	0	4	4	40	60	100	BS
22PH202	Electromagnetism and Modern Physics	2	0	2	3	4	50	50	100	BS
22CH203	Engineering Chemistry II	2	0	2	3	4	50	50	100	BS
22GE002	Computational Problem Solving	3	0	0	3	3	40	60	100	ES
22GE004	Basics of Electronics Engineering	2	0	2	3	4	50	50	100	ES
22HS002	Startup Management	1	0	2	2	3	100	0	100	EEC
	Language Elective	1	0	2	2	3	100	0	100	HSS
22HS003	தமிழர் மரபு /Heritage of Tamils	0	0	2	1	2	100	0	100	HSS
	Total	14	1	12	21	27	-	-	-	-

		III S	EMES	TER						-
<b>G</b> L N	<u> </u>	Ŧ	T	D	G	Hours/	Maxi	mum N	<b>/Iarks</b>	<b>G</b> (
Code No.	Course	L	T	P	C	Week	CA	ES	Total	Category
22FT301	Numerical Methods and Operation Research	3	1	0	4	4	40	60	100	BS
22FT302	Fashion Language and Techniques	3	0	2	4	5	50	50	100	EC
22FT303	Fibre and Yarn Manufacturing	3	0	2	4	5	50	50	100	PC
22FT304	Fabric Formation Technology	3	0	2	4	5	50	50	100	PC
22FT305	Apparel Design and Development I	3	0	2	4	5	50	50	100	PC
22HS004	Human Values and Ethics	2	0	0	2	2	100	0	100	HSS
22HS005	Soft Skills and Effective Communication	0	0	2	1	2	100	0	100	EEC
22HS006	தமிழரும் தொழில்நுட்பமும் /Tamils and Technology	0	0	2	1	2	100	0	100	HSS
	Total	17	1	12	24	26	-	-	-	-
		IV S	EMES	TER						
	G	-	T		G	Hours/	Maxi	mum N	<b>/larks</b>	
Code No.	Course	L	Т	Р	C	Week	CA	ES	Total	Category
22FT401	Probability and Statistics	3	1	0	4	4	40	60	100	ES
22FT402	Advanced Fashion Culture and Studies	3	1	0	4	4	40	60	100	PC
22FT403	Structure and Design of Woven Fabrics	3	0	2	4	5	50	50	100	PC
22FT404	Textile Chemical Processing	3	0	2	4	5	50	50	100	PC
22FT405	Apparel Design and Development II	3	0	2	4	5	50	50	100	PC
	Professional Elective I	3	0	0	3	3	40	60	100	PE
22HS007	Environmental Science	2	0	0	-	2	-	-	-	HSS
22HS008	Advanced English and Technical Expression	0	0	2	1	2	50	50	100	EEC
	Total	20	2	8	24	30	-	-	-	-

		V SI	EMES'	TER						
Code No	Comme	т	Т	D		Hours/	Maxi	imum N	Marks	Catal
Code No.	Course	L	1	P	C	Week	CA	ES	Total	Category
22FT501	Apparel Merchandising and Cost Management	3	1	0	4	4	40	60	100	PC
22FT502	Apparel Design and Development III	3	0	2	4	5	50	50	100	PC
22FT503	Fashion Portfolio	3	0	2	4	5	50	50	100	PC
22FT504	Apparel CAD	0	0	4	2	6	100	0	100	PC
	Professional Elective II	3	0	0	3	3	40	60	100	PE
	Open Elective	3	0	0	3	3	40	60	100	PE
22FT507	Mini Project I	0	0	2	1	2	100	0	100	EEC
	Total	15	1	12	21	28				-
		VI S	EMES	TER	•					
<b>G</b> I N		T	т			Hours	Maxi	imum N	Marks	
Code No.	Course	L	1	P	C	/Week	CA	ES	Total	Category
22FT601	Apparel Production Planning and Control	3	0	0	3	3	40	60	100	PC
22FT602	Fashion Retail Management	3	0	0	3	3	40	60	100	PC
22FT603	Quality Assurance in Garment Production	3	1	0	4	4	40	60	100	PC
	Professional Elective III	3	0	0	3	3	40	60	100	PC
	Professional Elective IV	3	0	0	3	3	40	60	100	PE
	Professional Elective V	3	0	0	3	3	40	60	100	PE
22FT607	Mini Project II	0	0	2	1	2	100	0	100	EEC
	Total	18	1	2	20	21	-	-	-	-

		VII S	SEMES	STER						
C. I. N.	Comme	Ŧ	т	n	C	Hours	Maxi	Marks	Catal	
Code No.	Course	L	1	P	C	/Week	CA	ES	Total	Category
22FT701	Operation Research and Export Documentation	3	1	0	4	4	40	60	100	PC
22FT702	Garment Testing Performance and Sustainability	3	0	2	4	5	50	50	100	PC
	Professional Elective VI	3	0	0	3	3	40	60	100	
	Professional Elective VII	3	0	0	3	3	40	60	100	PC
	Professional Elective VIII	3	0	0	3	3	40	60	100	PE
	Professional Elective IX	3	0	0	3	3	40	60	100	PE
22FT707	Project Work I	0	0	4	2	4	50	50	100	EEC
	Total	18	1	6	22	25				-
		VIIIS	SEME	STER						
	G		т	D	C	Hours	Maxi	imum N	Marks	C (
Code No.	Course	L	1	P	C	/Week	CA	ES	Total	Category
22FT801	Project Work II	0	0	20	10	20	50	50	100	EEC
	Total	0	0	20	10	20				-

DISCIPI	LINE ELECTIVES									
Vertical	I - Apparel Marketing									
22FT001	Trend Analysis and Fashion forecasting	3	0	0	3	3	40	60	100	PE
22FT002	Visual merchandising	3	0	0	3	3	40	60	100	PE
22FT003	Essential of Apparel Marketing	3	0	0	3	3	40	60	100	PE
22FT004	Apparel Retail Management	3	0	0	3	3	40	60	100	PE
22FT005	Fashion Brand management	3	0	0	3	3	40	60	100	PE
22FT006	Digital Marketing and E-Business	3	0	0	3	3	40	60	100	PE
Vertical	II – Apparel Product Development		I				I			
22FT007	Knit Wear Development	3	0	0	3	3	40	60	100	PE
22FT008	Clothing Comfort	3	0	0	3	3	40	60	100	PE
22FT009	Fashion Accessories	3	0	0	3	3	40	60	100	PE
22FT010	Garment finishing and care	3	0	0	3	3	40	60	100	PE
22FT011	Home Furnishing	3	0	0	3	3	40	60	100	PE
22FT012	Advanced Product Development.	3	0	0	3	3	40	60	100	PE
Vertical	III- Garment Manufacturing		I				I			
22FT014	Automations in Apparel manufacturing	3	0	0	3	3	40	60	100	PE
22FT015	Lean manufacturing	3	0	0	3	3	40	60	100	PE
22FT016	Supply chain management for Apparel Industry	3	0	0	3	3	40	60	100	PE
22FT017	Social compliances and quality assurance in apparel industry	3	0	0	3	3	40	60	100	PE
22FT018	Advanced Technologies for Apparel Industry	3	0	0	3	3	40	60	100	PE
22FT019	Computer Applications In Apparel Manufacturing	3	0	0	3	3	40	60	100	PE
Vertical	IV – Apparel Management		<u>I</u>		<u> </u>	L	<u>I</u>	<u>I</u>	<u> </u>	<u> </u>

22FT020	Operation research in Apparel Industry	3	0	0	3	3	40	60	100	PE
22FT021	Enterprise Resource Planning in Apparel industry	3	0	0	3	3	40	60	100	PE
22FT022	International Business in Apparel Industry	3	0	0	3	3	40	60	100	PE
22FT023	Entrepreneurship in apparel manufacturing	3	0	0	3	3	40	60	100	PE
22FT024	Sustainable apparel Business Management	3	0	0	3	3	40	60	100	PE
22FT025	Apparel production management	3	0	0	3	3	40	60	100	PE
Vertical	V – Specialty Apparel		I			1	I	I		
22FT026	Technology of Non-Wovens	3	0	0	3	3	40	60	100	PE
22FT027	Protective Garments	3	0	0	3	3	40	60	100	PE
22FT028	Intimate apparels	3	0	0	3	3	40	60	100	PE
22FT029	Smart Textiles and Garments	3	0	0	3	3	40	60	100	PE
22FT030	Sports Textiles and Garments	3	0	0	3	3	40	60	100	PE
22FT031	Medical Textiles and Garments	3	0	0	3	3	40	60	100	PE
Vertical	VI – Fashion Design									I
22FT032	History of Clothing and fashion	3	0	0	3	3	40	60	100	PE
22FT033	Fashion Styling and Modelling	3	0	0	3	3	40	60	100	PE
22FT034	Fashion Photography and Choreo	3	0	0	3	3	40	60	100	PE
22FT035	Fashion Communication	3	0	0	3	3	40	60	100	PE
22FT036	Fashion Visage	3	0	0	3	3	40	60	100	PE
22FT037	Fashion in Fiction	3	0	0	3	3	40	60	100	PE
22FT038	Textile Heritage	3	0	0	3	3	40	60	100	PE
Vertical	VII – IT Application For Fashion Business					1				
22FT039	Data Management Techniques	3	0	0	3	3	40	60	100	PE
22FT040	Principles of Web Design	3	0	0	3	3	40	60	100	PE
22FT041	E-Commerce in Fashion	3	0	0	3	3	40	60	100	PE

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22FT042ERP For Fashion Business	3	0	0	3	3	40	60	100	PE
22FT043 Introduction to AI Application	3	0	0	3	3	40	60	100	PE
22FT044 IoT in Fashion	3	0	0	3	3	40	60	100	PE

#### 22MA101 ENGINEERING MATHEMATICS I 3104

#### **Course Objectives**

- To impart mathematical modeling to describe and explore real-world phenomena and data.
- To provide basic understanding on Linear, quadratic, power and polynomial, exponential, and multi variable models
- Summarize and apply the methodologies involved in framing the real world problems related to fundamental principles of polynomial equations

#### **Course Outcomes (COs)**

- 1. Implement the concepts of mathematical modeling based on linear functions in Engineering.
- 2. Formulate the real-world problems as a quadratic function model
- 3. Demonstrate the real-world phenomena and data into Power and Polynomial functions
- 4. Apply the concept of mathematical modeling of exponential functions in Engineering
- 5. Develop the identification of multivariable functions in the physical dynamical problems

### UNIT I

#### MATHEMATICS MODELING OF LINEAR FUNCTIONS

The geometry of linear equations - Formation of linear equations: Method of least squares and method of regression - Vector spaces: Basic concepts with examples - Linear combination - Eigen values and vectors

#### UNIT II

#### MATHEMATICAL MODELING OF QUADRATIC FUNCTIONS

General form of a quadratic function - Basic relationships between the equation and graph of a quadratic function - Sum of squares error and the quadratic function of best fit - Quadratic forms: Matrix form -Orhtogonality - Canonical form and its nature

#### UNIT III

#### MATHEMATICAL MODELING OF POWER AND POLYNOMIAL FUNCTIONS

Characteristics of the graphs of power and polynomial functions - Fitting of power and polynomial functions using the method of least squares - Local maxima and local minima of power and polynomial functions - Power series of functions with real variables, Taylors series, radius and interval of convergence - Tests of convergence for series of positive terms - comparison test, ratio test

#### UNIT IV

#### MATHEMATICAL MODELING OF EXPONENTIAL FUNCTIONS

Concept of exponential growth - Graphs of exponential functions - Relationship between the growth factor and exponential growth or decline - Exponential equations have a variable as an exponent and take the form y= abx through least square approximation - Calculus of exponential functions -**Exponential series - Characteristics** 

#### UNIT V

#### MATHEMATICAL MODELING OF MULTIVARIABLE FUNCTIONS

Graphing of functions of two variables -Partial derivatives - Total derivatives - Jacobians - Optimization of multivariable functions with constraints - Optimization of multivariable functions without constraints **Tutorial: 15 Hours** 

15

#### 9 Hours

9 Hours

9 Hours

9 Hours

#### 9 Hours

Total: 60 Hours

#### **Reference**(s)

- 1. Erwin Kreyszig , Advanced Engineering Mathematics, Tenth Edition, Wiley India Private Limited, New Delhi 2016
- 2. B. S. Grewal, Numerical Methods in Engineering & Science: With Programs in C, C++ & MATLAB, Khanna, 2014
- 3. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics ,Sultan Chand & Sons2020
- 4. Thomas and Finney, Calculus and analytic Geometry, Fourteenth Edition, By Pearson Paperback, 2018

#### 22PH102 ENGINEERING PHYSICS 2023

#### **Course Objectives**

- Understand the concept and principle of energy possessed by mechanical system
- Exemplify the propagation and exchange of energy
- Identify the properties of materials based on the energy possession

#### **Course Outcomes (COs)**

- 1. Illustrate the concept and principles of energy to understand mechanical systems
- 2. Exemplify the types of mechanical oscillations based on vibrational energy
- 3. Infer the concept of propagation of energy as transverse and longitudinal waves
- 4. Analyze the exchange of energy and work between the systems using thermodynamic principles
- 5. Apply the concept of energy and entropy to understand the mechanical properties of materials

#### UNIT I

#### **CONSERVATION OF ENERGY**

Concept of energy - types of energy-conservation of energy. Mechanical energy: - translation - rotation -vibration - Kinetic and potential energies - conservation - work and energy - laws of motion minimization of potential energy - equilibrium - dissipative systems - friction

#### UNIT II

#### VIBRATIONAL ENERGY

Periodic Motion - Simple Harmonic Motion - Energy of the SHM - Pendulum types - Damped oscillations - forced oscillations - natural frequency - resonance

#### **UNIT III**

#### **PROPAGATION OF ENERGY**

Transfer of energy - material medium - Transverse wave - Longitudinal wave - standing wave interference - Doppler effect. Sound waves and its types - characteristics - human voicere - reflection refraction-beats

#### **UNIT IV**

#### **EXCHANGE OF ENERGY**

Energy in transit - heat - Temperature - measurement - specific heat capacity and water - thermal expansion Heat transfer processes Thermodynamics: Thermodynamic systems and processes - Laws of thermodynamics - Entropy entropy on a microscopic scale -maximization of entropy

#### UNIT V

#### **ENERGY IN MATERIALS**

Elastic energy - Structure and bonding - Stress - strain - Tension and compression - elastic limit - Elastic Modulus - Stress - strain diagram - ductility - brittleness - rubber elasticity and entropy

### 1

### **EXPERIMENT 1**

Determination of resultant of system of concurrent coplanar forces-Parallelogram law of forces

#### **6 Hours**

**5** Hours

7 Hours

#### **6 Hours**

**5 Hours** 

2 EXPERIMENT 2 Determination of moment of inertia-Torsional pendulum	5 Hours
<b>3</b> <b>EXPERIMENT 3</b> Determination of thickness of a thin wire using interference of light-Air wedge method	5 Hours
4 EXPERIMENT 4 Determination of ac frequency using Meldes apparatus	4 Hours
5 EXPERIMENT 5 Determination of thermal conductivity of a bad conductor using Lees disc method	3 Hours
<b>6</b> <b>EXPERIMENT 6</b> 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	4 Hours
7 EXPERIMENT 7 Determination of Youngs modulus of a given material- Non uniform bending method	4 Hours
<ul> <li>Reference(s)</li> <li>1. 1. C J Fischer, The energy of Physics Part I: Classical Mechanics and Thermo Cognella Academic Publishing, 2019.</li> <li>2. 2. P G Hewitt, Conceptual Physics, Pearson education, 2017</li> <li>3. 3. P. A Serway and LW Jawitt, Physics for Scientists and Engineers, Themson Press, Pres</li></ul>	odynamics,

- 3. 3. R A Serway and J W Jewitt, Physics for Scientists and Engineers, Thomson Brooks/Cole, 2019
- 4. 4. J Walker, D Halliday and R Resnick, Principles of Physics, John Wiley and Sons, Inc, 2018
- 5. 5. H C Verma, Concepts of Physics (Vol I & II), Bharathi Bhawan Publishers & Distributors, New Delhi, 2017

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22CH103 ENGINEERING CHEMISTRY I 2023

#### **Course Objectives**

- Understand the origin of elements from the universe
- Outline the properties of elements in the periodic table
- Analyse the different types of bond formed during chemical reactions and its reaction thermodynamics
- Summarize different states of matter based on atomic arrangement

#### **Course Outcomes (COs)**

- 1. Understand nuclear transmutation reactions that lead to the formation of elements in the universe
- 2. Illustrate atomic structure of elements in the periodic table and interpret the periodic trends in properties of elements with its anomaly
- 3. Apply the conditions for the formation of different types of chemical bonds and predict the minimum energy required for a reaction to occur
- 4. Analyse endothermic and exothermic processes and exchange of energy during chemical reactions
- 5. Analyse whether the given matter is a solid, liquid, gas, or plasma and interpret the arrangement of atoms

### UNIT I

#### **ORIGIN OF ELEMENTS**

Hydrogen - Elements and Sun - fusion - hypernova - supernova - dying stars - man-made elements

### UNIT II

#### ATOMIC STRUCTURE AND PERIODICITY

Atomic Structure - Electronic configuration - Periodic Table - Periodic trends in properties of elements - Anomalous behaviour in periodicity

#### UNIT III

#### **CHEMICAL BONDING**

Octet rule & its limitations - types of chemical bonds - bond energy - bond cleavage - activation energy of reactions

#### UNIT IV

#### **REACTION THERMODYNAMICS**

Conservation of energy - Endothermic reactions & exothermic reactions - Exchange of energy involved in chemical reactions

#### UNIT V

1

#### **STATES OF MATTER**

Solid - liquid - gas - plasma - arrangement of atoms/ions/molecules in different phases

**EXPERIMENT 1** 

Lab safety rules and guidelines for students - OSHA Guidelines

**5 Hours** 

## 6 Hours

#### **6 Hours**

#### 1 Hours

## 7 Hours

2	3 Hours
<b>EXPERIMENT 2</b> Estimation of dissolved oxygen content in water sample(s) by Winkler's method	
<b>3</b> <b>EXPERIMENT 3</b> Estimation of chloride present in the given water sample by argentometric method	3 Hours
<b>4</b> <b>EXPERIMENT 4</b> Determination of nitrogen content in the given soil sample using kjeldahl method	3 Hours
<b>5</b> <b>EXPERIMENT 5</b> Conductometric titration of strong acid (HCl) Vs strong base (NaOH)	3 Hours
6 EXPERIMENT 6 Preparation of salt of fatty acid by saponification process	2 Hours
7 EXPERIMENT 7 Determination of variation in melting point of the given sample(s)	3 Hours
8 EXPERIMENT 8 States of matter - Recrystallization of aspirin from water/ethanol	3 Hours
9 EXPERIMENT 9 Estimation of magnesium ions in given solution by EDTA method	3 Hours
10 EXPERIMENT 10 Determination of Fe(II) in a sample using spectrophotometer	3 Hours
11 EXPERIMENT 11 Determination of rate constant of acid catalysed hydrolysis of ester	3 Hours
Reference(s)	Total: 60 Hours
<ol> <li>Peter Atkins, Physical Chemistry, Oxford university press, 2019</li> <li>Rose Marie Gallagher and Author Paul Ingram, Complete Chemistry Can Oxford university press, 2020</li> <li>P L Soni, Text book of inorganic chemistry, Chand publishers, New Delhi, 2020</li> </ol>	mbridge IGCSE, )17

- 4. J.D. Lee, Concise inorganic chemistry, Blackman Science Ltd, France, Wiley-India, 5th edition (Reprint), 2016
- 5. Gareth Price, Thermodynamics of chemical processes, Oxford university press, 2019
- 6. D Tabor, Gases, liquids and solids and other states of matter, Oxford University press, 2018

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#### 22GE001 FUNDAMENTALS OF COMPUTING 3003

#### **Course Objectives**

- Understand the fundamental digital logics behind computations of computer systems.
- Develop simple assembly language programs with respect to arithmetic operations.
- Understand the program execution process and basics of software development methodologies.

#### **Course Outcomes (COs)**

- 1. Infer the hidden languages and inner structures of computer hardware and software through codes and combinations.
- 2. Interpret the organizational and architectural issues of a digital computer with concepts of various data transfer techniques in digital computers and the I/O interfaces.
- 3. Analyze programming problems and apply assembly instructions to solve simple problems.
- 4. Infer the fundamentals of operating system and System programs basics.
- 5. Apply the software development methodologies to various real life scenarios.

#### UNIT I

#### **CODES AND COMBINATIONS**

Communication using Mores and Braille binary codes - Digitizing letters, numbers and objects using binary codes - Performing simple operations: addition through binary codes.

#### **UNIT II**

#### **COMPUTATION USING COMPUTER**

Communication to computing devices through various input sources - Computational operation - its flow, functions and control - communication to output devices - Basic communication protocol.

#### UNIT III

#### ASSEMBLY LANGUAGE PROGRAMMING

Little Man Computing (LMC) Model - Instruction Set - Labels - Calculation -Branching - Input- Output - Loops - Simple programs.

#### UNIT IV

#### **OPERATING SYSTEM AND APPLICATION GENERATION**

BIOS - Device Drivers - Resources - Scheduler - Applications Generation and Creation - Stages of Compilation - Linkers, Loaders and Libraries.

#### UNIT V

#### SOFTWARE DEVELOPMENT

Phases of application life cycle management - Software Development Methodologies - Web Page development.

#### **Reference**(s)

- 1. Charles Petzold, "Code: The Hidden Language of Computer Hardware and Software", Microsoft Press books, 2009.
- 2. David D. Riley, Kennya. Hunt, "Computational thinking for the modern problem Solver", CRC Press Taylor & Francis Group, 2014.
- 3. Andrew Eliaz, "Little Man Computer Programming: For The Perplexed From The Ground Up", The Internet Technical Bookshop; 1st edition, 2016.

#### 8 Hours

9 Hours

## **11 Hours**

#### to ano - f

9 Hours

#### 8 Hours

Total: 45 Hours

### 5003

- 4. Abraham Silberschatz, "Peter Baer Galvin and Greg Gagne, Operating System Concepts", 9th Edition, John Wiley & Sons Pvt. Ltd, 2015.
- 5. Roger S.Pressman, "Software Engineering: A Practitioner"s Approach", McGraw Hill International edition, Seventh edition, 2010

• Fluency and comprehensibility in self-expression

• Prowess in interpreting complex texts

• Improve reading fluency and increased vocabulary

Heighten awareness of grammar in oral and written expressionImprove speaking potential in formal and informal contexts

- Develope abilities as critical readers and writers
- Improve ability to summarize information from longer text, and distinguish between primary and supporting ideas

22HS001 FOUNDATIONAL ENGLISH

#### **Course Outcomes (COs)**

**Course Objectives** 

- 1. Express themselves in a professional manner using error-free language
- 2. Express in both descriptive and narrative formats
- 3. Understand and make effective use of the English Language in Business contexts
- 4. Actively read and comprehend authentic text
- 5. Express opinions and communicate experiences.

#### UNIT I

#### **UNIT 1 - SELF-EXPRESSION**

Lesson Plan 1: Self-Introduction-Recreating Interview Scenarios (with a focus on verbal communication)-Subject Verb Concord-Tenses-Common Errors in verbal communication Be-verbs-

Lesson Plan 2: Self-Introduction-Recreating interview scenarios-Haptics-Gestures-Proxemics-Facial expressions-Paralinguistics/Vocalics- Body Language- Appearance-Eye Contact-Artefacts Lesson Plan 3: Self-Introduction-Powerful openings and closings at the interview-Effective stock phrases - Modified for spontaneity and individuality-Question tags, framing questions including WH-questions-Prepositions-Listening to Ted talks-Listening for specific information

#### UNIT II

#### **UNIT 2 - CREATIVE EXPRESSION**

Lesson Plan 4: Descriptive Expression-Picture Description and Blog Writing -Vocabulary-One word substitution-Adjectives-Similes, Metaphors, Imagery & Idioms -Link words language language

Lesson Plan 5: Narrative Expression- Travelogue and Minutes of Meeting - Verbal analogy-Sequence & Time order words

Jumbled paragraph, sentences, Sequencing-Text & Paragraph completion-Past tense -Using quotation marks

#### UNIT III

#### **UNIT 3 - FORMAL EXPRESSION**

Lesson Plan 6: Formal Letters and Emails-Writing: E-mails and Letters of apology, Requisition and Explanation, and Letters to newspapers-Speaking: Tendering verbal apologies, and explanations, persuading a listener/ audience-Hierarchy in Business correspondence- Subject of a mail, Header, Body (Salutation) and Footer of a mail. Conjunctional clause Punctuation-Formal Idioms-Phrases-Articles - Definite & Indefinite-Types of sentences-Modal verbs Lesson Plan 7: Precision in comprehension, Summary writing, Selective summary-Reading: Active reading- short paragraphs, excerpts, articles and editorials-Skimming and Scanning

### **15 Hours**

#### 1022

### **15 Hours**

& QP/ Reading comprehension analysis-Tenses, PQ approach. Identifying the central themes/ crux-Interpreting tone - formal/informal/semi-formal-Note-taking-Listening: Listening for data, for specific information, for opinion-Active and passive Listening-Transcription-Paraphrasing and summarising information-Agreeing & disagreeing-Note-taking-Writing: Summary writing, selective summary, paraphrasing, note-making, opinion pieces-Finding synonyms the context in Paraphrasing-Sentence Transformation - simple, compound, complex. Sentence substitution-Sentence completion- Interpreting paragraphs

#### **Reference**(s)

#### **Total: 45 Hours**

- 1. Sasikumar, V, et.al. A Course in Listening & Speaking Foundation Books, 2005.
- 2. Murphy, Raymond. English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Students: with Answers. Cambridge: Cambridge University Press, 1985.
- 3. Prasad, Hari Mohan. A Handbook of Spotting Errors. Mcgraw Hill Education, 2010
- 4. Reynolds, John. Cambridge IGCSEÃ,® First Language English. 2018th ed., Hodder Education, 2018.
- 5. Wiggins, Grant P., and Jay McTighe. Understanding by Design. Association for Supervision and Curriculum Development, 2008.

22GE003 BASICS OF ELECTRICAL

ENGINEERING

### **Course Objectives**

- To understand the basic concepts of electrical charge and its properties
- To interpret the formation of electric field due to electric charges
- To illustrate the concept of magnetic fields due to revolving electron
- To illustrate the force on moving charges in electric and magnetic field
- To understand the energy transfer in electro mechanical conversion

#### **Course Outcomes (COs)**

- 1. Interpret the behavior of electric charges in different medium using coulombs law.
- 2. Analyse the electric field due to different charge distributions.
- 3. Analyse the magnetic field intensity due to long conductor, solenoid, toroid and magnetic dipoles.
- 4. Analyze the force on conductors due to the moving charges.
- 5. Interpret the energy conversion concepts in electromagnetic fields.

#### UNIT I

#### ELECTRIC CHARGE

Properties of charge, additivity of charges, quantization of charge, conservation of charge, Forces between multiple charges, Electric charge in conductors, Drift of Electrons, Charges in Clouds.

#### UNIT II

#### ELECTRIC FIELD

Electric field due to system of charges, Significance of Electric field line. Electric Dipole and its significance, Continuous charge distribution, Field in infinite long uniform straight conductors, field in uniform charged uniform infinite plane sheet, field due to uniform thin spherical sheet.

#### UNIT III

#### MAGNETIC FIELDS

Concept of magnetic field, magnetic fields in infinitely long straight wire, straight and toroidal solenoids, Magnetic dipole moment of a revolving electron, Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to axis, Induced Electric field due to changing Magnetic Field.

#### UNIT IV

#### FORCE ON CHARGES

Force on a moving charge in uniform magnetic and electric fields, Force on a current carrying conductor in a uniform magnetic field, Force between two parallel current carrying conductors.

#### UNIT V

1

#### ELECTRO MECHANICAL ENERGY CONVERSION

Energy transfer in electromagnetic fields, Energy storage in magnetic field, Electromagnetic induction, induced emf, Eddy currents. Self and mutual inductance Linear Momentum and Angular Momentum carried by Electromagnetic Fields.

#### 7 Hours

7 Hours

## 6 Hours

**5 Hours** 

## 5 Hours

2023

### **EXPERIMENT 1**

Analyze and design of Electromechanical energy conversion system.

#### 2

### **EXPERIMENT 2**

Develop an electrical machine and analyze its performance with supplied input of AC from 0 V to 230 V.

#### **Total: 60 Hours**

**15 Hours** 

### **Reference**(s)

- 1. Mathew N. O. Sadiku, Principles of Electromagnetics, 6th Edition, Oxford University 2020
- 2. William H. Hayt and John A. Buck, Engineering Electromagnetics, McGraw Hill 2020
- 3. Kraus and Fleisch, Electromagnetics with Applications, McGraw Hill International Editions, 2017
- 4. S.P.Ghosh, Lipika Datta, Electromagnetic Field Theory, First Edition, McGraw Hill Education(India) Private Limited 2017

#### 22MA201 ENGINEERING MATHEMATICS II 3104

#### **Course Objectives**

- To impart and analyze the concepts of differential equations to describe in real-world phenomena
- To provide basic understanding on differential equation models and vector field models
- Summarize and apply the methodologies involved in framing the real world problems related to fundamental principles of complex functions

#### **Course Outcomes (COs)**

1. Interpret the concept of differential equations through mathematical modeling and analyze its applications in engineering

2. Formulate the real world problems as second order linear differential equations and give solutions for the same

3. Demonstrate the real-world phenomena with magnitude and direction in the form of vector functions

4. Apply the concept of vector fields and line integrals through mathematical modeling in engineering

5. Determine complex functions and apply them to formulate problems arising in engineering

#### UNIT I

#### FIRST ORDER LINEAR DIFFERENTIAL EQUATIONS

Formation of differential equations- Solutions of first order linear ODE: Leibnitzs and method of separation of variables- Cooling/Heating of an object - A falling object- Modeling of electric circuits: RL and RC circuits - Modeling of population dynamics: Exponential growth and decay - Logistic growth model

#### UNIT II

#### SECOND ORDER LINEAR DIFFERENTIAL EQUATIONS

Methods of solving second order linear ordinary differential equations -Models for linear oscillators: Simple harmonic motion - Mechanical vibrations with and without damping - Electric circuit system: RLC circuits

#### UNIT III

#### **VECTOR DIFFERENTIAL CALCULUS**

Vector and scalar functions - Fields - Derivative of vector function and geometrical interpretation-Velocity and acceleration - Gradient and its properties- Tangent and normal vectors - Directional derivative- Divergence of a vector field - Curl of a vector field - Projectile motion

#### **UNIT IV**

#### **VECTOR INTEGRAL CALCULUS**

Line integrals of vector point functions - Surface integral of vector point functions - Applications of line and surface integrals - Greens theorem in a plane - Stokes theorem - Gauss divergence theorem

UNIT V COMPLEX FUNCTIONS

#### 9 Hours

9 Hours

9 Hours

#### 9 Hours

Basic concepts of Complex numbers Geometrical representation of complex number - Analytic functions and its properties - Construction of Analytic functions: Fluid flow Electric flow - Mapping of complex functions

Tutorial: 15 Hours Total: 60 Hours

#### **Reference**(s)

1. Richard E. Williamson, Introduction to Differential Equations and Dynamical Systems, McGraw Hill Companies. Inc, 1997

2. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018

3. George B.Thomas, Maurice D. Weir and Joel Hass Thomas Calculus, 13/e, Pearson Publishers, 2013

4. Erwin Kreyszig, Advanced Engineering Mathematics Wiley, 10th editi5. J. Stewart, Essential Calculus, Cengage, 2nd edition, 2017on, 2015

5. J. Stewart, Essential Calculus, Cengage, 2nd edition, 2017

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### 22PH202 ELECTROMAGNETISM AND MODERN PHYSICS

## **Course Objectives**

- Understand the principles and mechanisms of electricity and magnetism
- Infer the classification of electromagnetic waves
- Analyze the theory of relativity and energy bands

## **Course Outcomes (COs)**

- 1. Understand the principles and mechanism of electrostatics and current
- 2. Illustrate the principles and mechanism of magneto statics
- 3. Classify electromagnetic waves and infer the characteristics of visible light
- 4. Outline the importance of theory of relativity and analyze the wave nature of particles
- 5. Exemplify the electrical properties of semiconductor based on the band theory

#### UNIT I

#### ELECTRICITY

Electric monopoles - Electric field- Electric flux - Electric potential - electrical energy- capacitorconductors and insulators-Electric dipole and polarization - electric current -voltage sources- resistance

### UNIT II

#### MAGNETISM

Sources of magnetism- monopoles-magnetic field and force-magnetic field and current distributionmagnetic dipole-magnetic potential energy-inductor- electric and magnetic field comparison

### UNIT III

### ELECTROMAGNETIC WAVES AND LIGHT

#### Electromagnetism: basic laws-electromagnetic energy-radiation. Electromagnetic waves: origin, nature spectrum-visible and light Principle of least time- geometrical optics-Human eye - Diffraction - Interference - polarization-LASER

### UNIT IV

### **MODERN PHYSICS**

Special theory of relativity - simultaneity and time dilation - length contraction - relativistic mass variation. Matter waves - de-Broglie hypothesis - wave nature of particles

#### UNIT V

#### **ENERGY BANDS IN SOLIDS**

Band theory of solids - classification of materials - semiconductors - direct and indirect semiconductor - fermi energy -Intrinsic and extrinsic semiconductor - carrier concentration - electrical conductivity

### 1

## **EXPERIMENT 1**

Determination of V-I characteristics of a solar cell

## 2 **EXPERIMENT 2**

## 6 Hours

**6 Hours** 

#### **6 Hours**

## **6 Hours**

## **6 Hours**

**5 Hours** 

#### 30

## 2023

Determination of Hall voltage of a given specimen by Hall Effect method

EXPERIMENT 3 Determination of wavelength of a given laser source - Grating method 4 Hours EXPERIMENT 4 Determination of particle size using diode laser
Determination of wavelength of a given laser source - Grating method 4 Hours EXPERIMENT 4 Determination of particle size using diode laser
4 4 Hours EXPERIMENT 4 Determination of particle size using diode laser
4 4 Hours EXPERIMENT 4 Determination of particle size using diode laser
<b>EXPERIMENT 4</b> Determination of particle size using diode laser
Determination of particle size using diode laser
5 3 Hours
EXPERIMENT 5
Determination of refractive index of a given solid medium and liquid medium
6 4 Hours
EXPERIMENT 6
Determination of energy loss per cycle of a ferromagnetic material using hysteresis curve
7 4 Hours
EXPERIMENT 7
Determination of band gap energy of a given semiconducting material
Pafaranca(s)
1 C. J. Fischer, The surgers of Diseries Derf. H. Fischeider and Menertian. Consult. As derive
1. C J Fischer, The energy of Physics Part II: Electricity and Magnetism, Cognetia Academic Publishing 2019
2. P G Hewitt, Conceptual Physics, Pearson education, 2017
3. R A Serway and J W Jewitt, Physics for Scientists and Engineers, Thomson Brooks/Cole, 2019
4. J Walker, D Halliday and R Resnick, Principles of Physics, John Wiley and Sons, Inc, 2018

5. H C Verma, Concepts of Physics (Vol I & II), Bharathi Bhawan Publishers & Distributors, New Delhi, 2017

#### 22CH203 ENGINEERING CHEMISTRY II 2023

#### **Course Objectives**

- Understand the concept of electrochemistry for determination of electrode potential, pH and applications as energy storage devices
- Outline the chemistry of metal corrosion and analyze the methods of corrosion control
- Understand how catalyst increases the reaction rate
- Summarize the variation in properties and reactivity of isotopes

#### **Course Outcomes (COs)**

- 1. Apply the electrochemical principles to determine the electrode potential of a metal
- 2. Analyze the construction, cell reactions and working of energy storage devices

3. Analyze the specific operating conditions under which corrosion occurs and suggest a method to control corrosion

- 4. Illustrate reaction mechanisms and assess the role of catalyst in a chemical reaction
- 5. Analyze various types of nuclear transmutation including decay reactions

#### UNIT I

#### ELECTROCHEMISTRY

Origin of potential - electromotive force - electrical double layer - transport of charge within the cell cell description - prediction of cell potentials

#### UNIT II

#### **ENERGY STORING DEVICES**

Relation between electrical energy and energy content of a cell - reversible and irreversible cell charging and discharging reactions in a reversible cell - current challenges in energy storage technologies

#### UNIT III

#### METAL CORROSION AND ITS PREVENTION

Oxidation of metals: Electrochemical origin of corrosion - electromigration - electron transfer in the presence and absence of moisture - galvanic series. Strategies for corrosion control: Galvanic anode and impressed current.

#### **UNIT IV**

#### CATALYSIS

Energy profile diagram for a chemical reaction - activation energy - role of catalyst - homogeneous and heterogeneous catalysis - types

#### UNIT V

#### **NUCLEAR REACTIONS**

Radioactive and stable isotopes - variation in properties between isotopes - radioactive decay (alpha, beta and gamma) - half-life period - nuclear reactions - radiocarbondating

## 1

### **EXPERIMENT 1**

Electroplate copper on the given target object and estimate the amount of copper deposited at cathode

### **5** Hours

7 Hours

#### 6 Hours

## **3 Hours**

# **6 Hours**

4 Hours

Total: 60 Hours

2 EXIDED IN (EN/IL 2	3 Hours
<b>EXPERIMENT 2</b> Construct an electrochemical cell exhibiting valid output and compare its potential with the standard cell	given
3	3 Hours
EXPERIMENT 3	
Construct a microbial fuel using organic manure and measure its output	
4	4 Hours
EXPERIMENT 4	
Application of calomel electrode to determine the redox potential of Fe(II) solution	
_	
5	5 Hours
EXPERIMENT 5	
Determination of percentage of corrosion inhibition in iron/mild steel using a natural inhibit	or
	4 11
6	4 Hours
EXPERIMENT 6	
Determination of corrosion percentage of iron/steel by weight loss method /Tafel polarization	on method
_	
	4 Hours

#### **EXPERIMENT 7**

Conductometric titration of mixture of acids (HCl and CH3COOH)

## 8

#### **EXPERIMENT 8**

Determination of strength of hydrochloric acid in a given solution using pH meter

#### **Reference**(s)

1. Jain and Jain, Engineering Chemistry, 16th Edition, Dhanpat Rai Publishing Company, New Delhi, 2013.

2. P.H. Rieger, Electrochemistry, Second Edition (Reprint), Springer, Netherland, 2012

3. E.McCafferty, Introduction to Corrosion Science, Springer; 2010 Edition, January 2010

4. S. Vairam, Engineering Chemistry, John Wiley & Sons, 2014

5. H.J. Arnikar, Essentials of Nuclear Chemistry, 4th edition, (revised) New Age International Publishers, 2011

6. U. Hanefeld, L. Lefferts, Catalysis: An Integrated Textbook for Students, Wiley- VCH, 2017

#### **Course Objectives**

- Analyze the algorithm design techniques and development principles in solving the real life problems.
- Illustrate the different ways of organizing and storing the data in computing systems.
- Understand the basic network configuration and setup connections among different device systems.

#### **Course Outcomes (COs)**

1. Analyze a problem and formulate algorithms, pseudocodes and flowcharts.

2. Develop algorithmic solutions to simple computational problems and explore algorithmic approaches to problem solving.

3. Design and apply appropriate data structures for solving computing problems.

4. Compare the various storage devices used in a computer system.

5. Analyze the requirements for a given organizational structure and establish the connection between two or more computers to form a network.

#### UNIT I

#### VISUAL PROCESS MODELING

Scenario decomposition - logical sequencing - drawing flowchart - preparing visual process model.

#### UNIT II

#### ALGORITHMIC DESIGN THINKING

Analysis - Verification - Brute force - Divide and conquer - Greedy - Backtracking.

#### UNIT III

#### **DATA ORGANIZATION**

Elementary Data Organization - Abstract Data Types - Fundamentals of Linear and Non Linear Data Structures.

#### UNIT IV

#### **DATA STORAGE**

Flat File and Relational database- Data Read & Write in Local Storage, Server Storage and Cloud storage - Database Query Methods.

#### UNIT V

#### **NETWORKING ESSENTIALS**

Networking Components and Services - IP Addressing - Configuring and Managing the Campus Network - Network Security - Firewalls.

#### **Reference**(s)

1. David D. Riley, Kennya. Hunt, "Computational thinking for the modern problem Solver", CRC Press Taylor & Francis Group, 2014.

2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education Asia, 2011.

3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 2016.

#### **12 Hours**

12 Hours

7 Hours

# 8 Hours

**Total: 45 Hours** 

4. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, "Database System Concepts", McGraw Hill, 2015.

5. Behrouz A.Forouzan, "Data Communication and Networking", 5th Edition, Tata McGraw-Hill, 2014.

### 22GE004 BASICS OF ELECTRONICS ENGINEERING

#### **Course Objectives**

- To Understand the concept of energy transmission through mechanical, electrical and electromagnetic form.
- To Analyze the use of PN Junction Diode and BJT for signal conditioning.
- To apply the working principle of PN Junction Diode and BJT for the design of basic Digital Logic.
- To analyze the working and characteristics of Special Purpose Semiconductor Electronic Devices.

#### **Course Outcomes (COs)**

1. Understand the need for electrical and electromagnetic signal transmission.

- 2. Analyze the working principle and characteristics of PN junction diode.
- 3. Analyze the working principle and characteristics of Bipolar Junction Transistor.

4. Apply the working principle of PN Junction diode and BJT for designing basic Digital Logic functions.

5. Analyze the energy conversion needs and working principle of Special purpose electronic devices.

#### UNIT I

#### **ENERGY TRANSFER AND SIGNALS**

Energy Transmission through Mechanical, Electrical and Electromagnetic means, Signal as Energy Transmission,

Complexity in signal transmission (Volume of Information, Distance and Time taken), Limitations of Mechanical

Energy Transmission, Electrical and Electromagnetic Signal Transmission, Need for Conversion Electrical between

and Mechanical Signals.

#### UNIT II

#### SIGNAL CONDITIONING USING DIODE

Need for Vacuum Tubes in the Evolution of Electronics, Overview of Vacuum Tubes, Diode and Triode. Limitations

of Vacuum Tubes. Semiconductor Group in Periodic Table, Overview of Semiconductor Materials, Flow electrical of

energy through PN Junction Diode, Signal Clipping, Signal Clamping and Signal Multiplication using Junction PN

Diode, Limitations of PN Junction Diode.

#### UNIT III

#### SIGNAL CONDITIONING USING TRANSISTOR

Need for controlling electrical signals, Principle of Bipolar Junction Transistor operation, Signal Switching and

Amplification using BJT, Limitations of BJT, Principle of Field Effect Transistor operation.

### UNIT IV

### LOGIC SYNTHESIS USING DIODE AND TRANSISTORS

#### **6 Hours**

**6 Hours** 

8 Hours

**6 Hours** 

2023
Overview of Logic Gates, PN Junction and BJT as electronic switches, Digital Logic Synthesis using Diode and

Transistor: Diode Logic, Resistor Transistor Logic, Diode Transistor Logic, Transistor Logic.

#### UNIT V

#### **DEVICES FOR SPECIAL REQUIREMENTS**

Voltage Regulation using Zener Diode, Variable Capacitance using Varactor Diode, Electrical Energy Light to Energy conversion using Light Emitting Diode, Light to Energy to Electrical Energy conversion using Solar Cell.

1 4 Hours **EXPERIMENT 1** Design and Implement a simple device to communicate basic information between two different small distance points

using wired and wireless methods.

#### 2

#### **EXPERIMENT 2**

Design and Implement different wave shaping Circuits using PN Junction Diodes.

#### 3

4

#### **EXPERIMENT 3**

Design and Implement Voltage Multiplier Circuit using PN Junction Diodes and Capacitors.

### **EXPERIMENT 4** Design and Implement t a three Stage Circuit to convert 220V 50Hz AC mains supply to 12V DC supply.

5 4 Hours

#### **EXPERIMENT 5**

Design and Implement a BJT Amplifier Circuit to amplify audio input signal.

#### 6

### **EXPERIMENT 6**

Design and Implement Basic Logic Gates using PN Junction Diodes.

### 7

#### **EXPERIMENT 7**

Design and Implement Basic Logic Gates using BJTs.

#### **Reference**(s)

1. Thomas L. Floyd, Electronic Devices: Electron Flow Version, Ninth Edition, Prentice Hall, 2012. 2. J Millman, C. Halkias & Satyabrata JIT, Electronic Devices and Circuits, Tata McGraw-Hill, 2007.

3. L Robert Boylestead, Louis Nashelsky, Electronic Devices and Circuit Theory, Pearson Education 2006.

### 4 Hours

#### **6 Hours**

#### 4 Hours

#### 4 Hours

#### 4 Hours

### 4 Hours

### **Total: 60 Hours**

4. David A. Bell, Electronic Devices and Circuits, Prentice Hall of India, 2003.

5. Adel S. Sedra & Kenneth C. Smith, Micro Electronic Circuits Theory and Applications, Sixth Edition, Oxford University Press, 2013.

6. Behzad Razavi, Microelectronics, Wiley India Pvt. Ltd.; 2nd edition (2018)

#### **Course Objectives**

- Promote entrepreneurial spirit and motivate to build startups
- Provide insights on markets and the dynamics of buyer behaviour
- Train to develop prototypes and refine them to a viable market offering
- Support in developing marketing strategies and financial outlay
- Enable to scale up the porotypes to commercial market offering

#### **Course Outcomes (COs)**

- 1. Generate valid and feasible business ideas
- 2. Create Business Model Canvas and formulate positioning statement
- 3. Invent prototypes that fulfills an unmet market need
- 4. Formulate business strategies and create pitch decks
- 5. Choose appropriate strategies for commercialization

#### UNIT I

#### **BUSINESS MODELS AND IDEATION**

Startups: Introduction, Types of Business Modes for Startups. Ideation: Sources of Ideas, Assessing Ideas, Validating Ideas, Tools for validating ideas, Role of Innovation and Design Thinking

#### UNIT II

#### UNDERSTANDING CUSTOMERS

Buyer Decision Process, Buyer Behaviour, Building Buyer Personas, Segmenting, Targeting and Positioning, Value Proposition (Business Model Canvas), Information Sourcing on Markets, Customer Validation

#### **UNIT III**

#### **DEVELOPING PROTOTYPES**

Prototyping: Methods-Paper and Digital, Customer Involvement in Prototyping, Product Design Sprints, Refining Prototypes

#### **UNIT IV**

#### **BUSINESS STRATEGIES AND PITCHING**

Design of Marketing Strategies and Campaigns, Go-To-Market Strategy, Financial KPIs Financial Planning and Budgeting, Assessing Funding Alternatives, Pitching, Preparing Pitch Decks

#### UNIT V

#### **COMMERCIALIZATION**

Implementation: Prototype to Commercialization, Test Markets, Institutional Support, Registration Process, IP Laws and Protection, Legal Requirements, Type of Ownership, Building and Managing Teams, Defining role of investors

#### 1

#### **EXPERIMENT 1**

Analysis of various business sectors

# **3 Hours**

#### **3 Hours**

**3 Hours** 

#### **3 Hours**

#### 1 Hours

2	2 Hours
EXPERIMENT 2	
Developing a Design Thinking Output Chart	
3	1 Hours
EXPERIMENT 3	
Creating Buyer Personas	
4	3 Hours
EXPERIMENT 4	
Undertake Market Study to understand market needs and assess market potential	
5	2 Houng
	2 Hours
EXPERIMENT 5 Propagation of Pusinges Model Conves	
reparation of Business Model Calivas	
6	15 Hours
EXPERIMENT 6	
Developing Prototypes	
7	2 Hours
EXPERIMENT 7	
Organizing Product Design Sprints	
8	2 Hours
EXPERIMENT 8	
Preparation of Business Plans	
9	2 Hours
EXPERIMENT 9	
Preparation of Pitch Decks	
	Total: 45 Hours
Kelerence(s)	
1. Rashmi Bansal, Connect the Dots, Westland and Tranquebar Press, 2012	

2. Pavan Soni, Design Your Thinking: The Mindsets, Toolsets and Skill Sets for Creative Problemsolving, Penguin Random House India, 2020

3. Ronnie Screwvala, Dream with Your Eyes Open: An Entrepreneurial Journey, Rupa Publications, 2015

4. Stephen Carter, The Seed Tree: Money Management and Wealth Building Lessons for Teens, Seed Tree Group, 2021

5. Kotler Philip, Marketing Management, Pearson Education India, 15th Edition

6. Elizabeth Verkey and Jithin Saji Isaac, Intellectual Property, Eastern Book Company, 2nd Edition, 2021

#### UNIT I

#### **UNIT I LANGUAGE AND LITERATURE**

Language Families in India - Dravidian Languages - Tamil as aClassical Language- Classical Literature in Tamil- Secular Nature of Sangam Literature- Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

#### UNIT II

#### **UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART - SCULPTURE**

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

#### **UNIT III**

#### **UNIT III FOLK AND MARTIAL ARTS**

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

#### UNIT IV

#### UNIT IV THINAI CONCEPT OF TAMILS

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature -Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

#### UNIT V

#### UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India - Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine - Inscriptions & Manuscripts - Print History of Tamil Books.

#### **Reference**(s)

- 1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL
- 2. Social Life of the Tamils The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies
- 3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies)
- 4. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

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#### **3 Hours**

#### **3 Hours**

#### **3 Hours**

#### Total: 15 Hours

#### **3 Hours**

#### 22HS201 COMMUNICATIVE ENGLISH II

#### **Course Objectives**

- Command over the English language for day-to-day transactions.
- Improve listening and reading skills
- Increase ability to comprehend complex content
- Enhance confidence in expressing with clarity and elegance
- Enthusiastic and reflective use of the language through sufficient and focused practice
- Articulate fluently and confidently in challenging situations

#### **Course Outcomes (COs)**

- 1. Engage with the English language in functional contexts
- 2. Express in both descriptive and narrative formats
- 3. Understand and make effective use of the English Language in Business contexts
- 4. Actively read and comprehend authentic text
- 5. Express opinions and communicate experiences.

#### UNIT I

#### UNIT 1 - SELF-EXPRESSIONRESSION

Lesson Plan 1: Personal Goals and Values - Being a Team Player-Expressing strengths and weaknesses-Abstract nouns

Adjectives-Active Listening skills-Note making-Pronunciation and Accent Lesson Plan 2: Personal goals and values - Reading for Gist and Details-Professional ethics-Reported Speech-Conjunctions

Reading skills - phonemics, word/phrase recognition, sight words Lesson Plan 3: Personal Goals and Values-Conditional clauses- Hypothetical questions and answers-Sentence Structure-Simple Present Tense-Perfect tense

#### UNIT II

#### **UNIT 2 - CREATIVE EXPRESSION**

Lesson Plan 4: Instructive and Expository Expression Creating brochures, catalogues, and manuals for products/ services, Giving directions, Process writing, Sequencing experiments, Concept explanation-Reported speech-Voice Sentence equivalence-Proofreading

#### UNIT III

#### **UNIT 3 - FORMAL EXPRESSION**

Lesson Plan 5: Notices and Announcements-Writing: Creating notices and circulars for events, announcing college tours and lost and found-Varied Vocabulary - Gender Sensitive Vocabulary, Nondiscriminatory Vocabulary, Concise Vocabulary-Paragraph writing - Effective titles, topics and supporting sentences, calling in registrations and queries. Effective communication- Understanding purpose, reach and target audience, achieving complete communication

Punctuation - Capitalization, Numeration, Use of proper nouns and articles-Spelling-Reading: Analyzing and interpreting notices and circulars-Understanding the gist of short real-world notices, and messages.Culling out keywords Information words vs Supporting words-Interpreting Abbreviations, Acronyms and Short-forms-Listening: Analyzing and interpreting announcements

#### **15 Hours**

#### **15 Hours**

**15 Hours** 

#### 1022

Decoding - Screening for salient points-Note making-Raising queries for clarification-Speaking: Announcements-Giving complete information-Pronunciation and Enunciation Intonation, Pitch-Pace, and Lesson Plan 6: Conducting Events-Speaking: Master of ceremonies, Short speeches - welcome thanks/ valedictory speech, the vote of speech, award-acceptance speech Writing: Invitations, Preparation of script/draft after interviewing someone. Adjectives-Pronunciation/ Punctuation

Precision and Concision-Politeness markers

#### **Reference**(s)

#### **Total: 45 Hours**

- 1. Sasikumar, V, et.al. A Course in Listening & Speaking FoundationBooks, 2005.
- 2. Murphy, Raymond. English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Students: with Answers. Cambridge: Cambridge University Press, 1985.
- 3. Prasad, Hari Mohan. A Handbook of Spotting Errors. Mcgraw Hill Education, 2010.
- 4. Reynolds, John. Cambridge First Language English. 2018th ed., Hodder Education, 2018.
- 5. Wiggins, Grant P., and Jay McTighe. Understanding by Design. Association for Supervision and Curriculum Development, 2008.

#### 22HSH01 HINDI

#### **Course Objectives**

- Construct simple sentences and use vocabulary required for day- to -day conversation.
- Distinguish and understand the basic sounds of Hindi language.
- Appear for Hindi examinations conducted by Dakshin Bharat Hindi Prachar Sabha. •

#### **Course Outcomes (COs)**

- 1. To help students acquire the basics of Hindi
- 2. To teach them how to converse in Hindi on simple day- to -day situations
- 3. To help students acquire the ability to understand a simple technical text in Hindi

#### **UNIT I** Hindi Alphabet:Introduction (Self introduction) - Vowels - Consonants - Plosives - Fricatives - Nasal sounds - Vowel Signs - Chandra Bindu & Visarg - Table of Alphabet - Vocabulary.

UNIT II UNIT II		1' 0	Familia	Des l'as Es				9 Hours
Nouns: Gei	iders -ivias	cuine &	Feminine	-Reading Ex	ercises			
UNIT III								9 Hours
UNIT III								
Pronouns	and	Ten	ses-Catego	ories of	Pronoun	8	-Personal	Pronouns
Second	person	(you	&	honorific)	-Definite	&	Indefinite	pronouns
Relative	pronou	ns	-Present	tense	-Past	tense	-Future	tense

Assertive & Negative Sentences -Interrogative Sentences.

#### **UNIT IV**

UNIT I

UNIT IV

Classified Vocabulary: Parts of body -Relatives Spices Eatables -Fruit & Vegetables -Clothes -Directions -Seasons -Professions.

### UNIT V

#### UNIT V -Telling -Saying Numbers 50-Speaking the times the from 1 to Speaking practice for various occasions.

#### **Total: 45 Hours**

#### **Reference**(s)

- 1. B.R. Kishore, Self Hindi Teacher for Non-Hindi Speaking People, Vee Kumar Publications (P) Ltd., New Delhi, 2009.
- 2. Hindi Prachar Vahini 1
- 3. Videos, Stories, Rhymes and Songs.

#### S

9 Hours

1022

# 9 Hours

#### 43

### **Course Objectives**

- Listen and identify individual sounds of German •
- Use basic sounds and words while speaking
- Read and understand short passages on familiar topics •
- Use basic sentence structures while writing •
- Understand and use basic grammar and appropriate vocabulary in completing language tasks •

22HSG01 GERMAN

### **Course Outcomes (COs)**

- 1. To help students appear for the A1 level Examination
- 2. To teach them how to converse fluently in German in day-to-day scenarios

#### UNIT I

**UNIT I** 

Introduction to the German language-Alphabets-Numbers Greetings -Days and Seasons-Working with Dictionary.

#### **UNIT II**

#### UNIT II

Nouns -articles-Speaking about oneself-Listening to CD supplied with books-paying special attention to pronunciation

#### UNIT III UNIT III

Regular & Irregular verbs -Personal pronouns-family-Introduction to types of sentences

#### **UNIT IV**

#### UNIT IV

Question words -Types of Questions -Nominative case-Verb Conjugation -country -nationalities

#### UNIT V

#### UNIT V

Verbs to be & to have -conjugation -Hobbies -Framing basic Questions and answers

#### **Reference**(s)

- 1. Kursbuch and Arbeitsbuch, NETZWERK A1 DEUTSCH ALS FREMDSPRACHE, Goyal Publishers & Distributers Pvt. Ltd., New Delhi, 2015.
- 2. Langenscheidt Eurodictionary, German English / English German, Goyal Publishers & Distributers Pvt. Ltd., New Delhi, 2009.
- 3. Grundkurs, DEUTSCH Lehrbuch Hueber Munichen, 2007.

# 9 Hours

#### 9 Hours

#### 9 Hours

### 9 Hours

### **Total: 45 Hours**

#### 1022

#### 22HSJ01 JAPANESE

#### **Course Objectives**

- To train students for N5 Level Examination
- To teach them use basic Japanese sentences in day-to-day conversation

#### **Course Outcomes (COs)**

- 1. Recognize and write Japanese alphabet
- 2. Speak using basic sounds of the Japanese language
- 3. Apply appropriate vocabulary needed for simple conversation in Japanese language
- 4. Apply appropriate grammar to write and speak in Japanese language
- 5. Comprehend the conversation and give correct meaning

### UNIT I

UNIT I

Introduction to Japanese Japanese script -Pronunciation of Japanese(Hiragana (Katakana) Long vowels -Pronunciation of in,tsu,ga -Letters combined with ya,yu,yo -Daily Greetings and Expressions -Numerals.

Speaking: Self Introduction-Listening: Listening to Greetings, Listening to specific information: Numbers, Time

UNIT II 9 Hours

Introduction to time-Introduction of verbs -Listening to specific information

#### UNIT III UNIT III

Word Sentence-Introduction to Adjectives-Technical Japanese Vocabulary -Pair Activity Day to day situational conversation-Listening to Japanese Alphabet Pronunciation-Simple Conversation

#### UNIT IV

#### UNIT IV

Past tense of Noun sentences and Na adjective sentences-Past tense of ii adjective sentences houga adjective desu-Technical Japanese Vocabulary-Individual Activity Listening to conversation with related particles

#### UNIT V

UNIT V

N gahoshidesu-V masu form tai desu-Verb te form-Technical Japanese Vocabulary Listening to different Counters, simple conversations with verbs and adjectives

#### **Reference**(s)

- 1. Minna no Nihongo Japanese for Everyone Elementary Main Textbook1-1, Goyal Publishers and Distributors Pvt. Ltd., Delhi, 2007.
- 2. Minna no Nihongo Japanese for Everyone Elementary Main Textbook 1-2 Goyal Publishers and Distributors Pvt. Ltd., Delhi, 2007.

9 Hours

#### 9 Hours

9 Hours

# 9 Hours

Total: 45 Hours

#### $1 \ 0 \ 2 \ 2$

#### 22HSF01 FRENCH

#### **Course Objectives**

- To prepare the students for DELF A1 Examination •
- To teach them to converse fluently in French in day-to-day scenarios

#### **Course Outcomes (COs)**

- 1. Help students acquire familiarity in the French alphabet & basic vocabulary
- 2. Listen and identify individual sounds of French
- 3. Use basic sounds and words while speaking
- 4. Read and understand short passages on familiar topics
- 5. Understand and use basic grammar and appropriate vocabulary in completing language tasks

#### UNIT I

#### **ENTRER EN CONTACT**

La langue fran $\tilde{A}f\hat{A}$ saise, alphabets, les num $\tilde{A}f\hat{A}$ ©ros, les jours, les mois. Grammaire Les verbes s appeler, etre, avoir, les articles definis, indefinis Communication Saluer, s informer sur quelqu un, demander de se presenter Lexique L alphabet, les nationalites, l age, les pays, les couleurs, les jours de la semaine, les mois de l annee, les professions

#### UNIT II

#### **PARTAGER SON LIEU DE VIE**

Les francais leur habitat, des habitations insolites et Grammaire Verbes Conjugaison Present (Avoir / Etre / ER, IR, RE Regulier et Irregulier) Adjectifs les propositions de lieu Communication Chercher un logement, decrire son voisin, s informer sur un logement Lexique L habitat, les pieces, l equipement, la description physique

#### **UNIT III**

#### VIVRE AU OUOTIDIEN LES LOISIRS DES FRANCAIS, LES GOUTS DES AUTRES, LES ACTIVITES **OUOTIDIENNES**

Grammaire Articles contractes, verbes vouloir, pouvoir, devoir, adjectifs interrogatifs, future proche Communication Exprimer ses gouts, parler de ses loisirs, justifier un choix, exprimer une envie Lexique le temps libre et les loisirs, les saisons, les activites quotidiennes, le temps (le matin, le soir, la nuit)

#### UNIT IV

#### **COMPRENDRE SON ENVIRONNEMENT SOUVRIR A LA CULTURE**

Grammaire Verbes Finir, Sortir, les adjectifs demonstratifs, le passe compose, l imparfait Communication Propose a quelqu un de faire quelque chose, raconter une sortie au passe, parler d un film

Lexique Les sorties, la famille, l art, les vetements et les accessoires

#### UNIT V

#### **GOUTER A LA CAMPAGNE**

Grammaire La forme negative, les verbes acheter, manger, payer, articles partitifs, le pronom en de quantite

#### 9 Hours

#### 9 Hours

#### 9 Hours

9 Hours

1022

Communication Accepter et refuser une invitation, donner des instructions, commander au restaurant Lexique Les services et les commerces, les aliments, les ustensiles, l argent

#### **Reference**(s)

**Total: 45 Hours** 

- 1. Grammaire Progressive du Francais, CLE International, 2010
- 2. Saison1, Marie Noelle Cocton et al, Didier, 2014.
- 3. Preparation a l examen du DELF A1 Hachette
- 4. Reussir le DELF A1 Bruno Girardeau
- 5. Website: Francais Linguaphone Linguaphone Institute Ltd., London, 2000.
- 6. Francais Harrisonburg : The Rosetta Stone : Fairfield Language Technologies, 2001

#### **Course Objectives**

- Understand the basic concepts of probability and the distributions with characteristics and also two dimensional random variables
- Apply different statistical inference techniques in testing of hypothesis in a real time fashion industry.
- Analyse the design in identifying the suitable product by comparing the characteristics of the material in industries

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

#### **Course Outcomes (COs)**

- 1. Demonstrate the basic probability axioms and concepts, Probability distributions of the random variables in designing process.
- 2. Identify the relationship and properties of two dimensional random variables using Correlation techniques in textile manufacturing.
- 3. Implement the basic statistical inference techniques, including confidence intervals and hypothesis testing to science/engineering problems.
- 4. Design an experiment for an appropriate situation using ANOVA technique.
- 5. Compare statistical data in quality control by various control chart techniques.

#### **Articulation Matrix**

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	PO10	PO11	<b>PO12</b>	PSO1	PSO2
1	2	1												
2	2	2												
3	2	1												
4	2	2												
5	1	2												

#### **UNIT I**

#### **PROBABILITY THEORY**

Axioms of probability - Conditional probability - Bayes theorem - Random variable: Probability mass function - Probability density function: Moment Generating function-Binomial, Poisson and Normal distributions.

#### UNIT II

#### **TWO DIMENSIONAL RANDOM VARIABLES**

Joint distributions - Marginal and Conditional distributions -Covariance - Correlation and Regression analysis in textile manufacturing.

#### UNIT III **TESTING OF HYPOTHESIS**

9 Hours

9 Hours

# 3104

Sampling distributions - Estimation of parameters -Statistical hypothesis - Large sample test based on Normal distribution for single mean and difference of means -Small sample tests: t-test for mean-F-test - Chi-square test for Goodness of fit and Independence of attributes.

#### UNIT IV

#### **DESIGN OF EXPERIMENTS**

One way and Two way classifications -Completely randomized design- Randomized block design - Latin square design.

#### UNIT V

#### STATISTICAL QUALITY CONTROL

Control charts for measurements (X and R charts) -Control charts for attributes (p, c and np charts)-Tolerance limits- Acceptance sampling.

#### **Reference**(s)

- 1. Milton J. S. and Arnold Jesse C., Introduction to Probability and Statistics: Principles and Applications for Engineering and The Computing Sciences, McGraw Hill Inc, 3rd Edition, 1995.
- 2. S.C. Gupta, V. K. Kapoor, Fundamentals of Statistics, Sultan chand & sons, 1R, 2010.
- 3. Johnson Richard A, Probability and Statistics for Engineers, 6th Edition, Prentice hall of India, 2002..
- 4. S. Bhasker, S. Narayana Moorthy, Statistical Quality Control and Reliability Engineering, 1st Edition, ANURADHA AGENCIES, 2000.

#### 9 Hours

9 Hours

# Total: 60 Hours

#### 22FT402 ADVANCED FASHION CULTURE AND **STUDIES**

#### **Course Objectives**

- Explain the impact of fashion body types through fashion illustration principles and texturing • techniques.
- Execute the designing silhouettes of fashion history based on the type of silhouette.
- Apply fashion terminologies in real time fashion industry.

#### **Programme Outcomes (POs)**

c. PO3: 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. PO4: 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.

j. PO10: 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.

1. PO12: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.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

n. PSO2: Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

#### **Course Outcomes (COs)**

- 1. Implementation of body aesthetics to different body shapes and related genre of clothing.
- 2. Show the influence of fashion illustration to communicate the effect of style creation or development.
- 3. Differentiate the principles and classification of silhouettes for the ornate of style development.
- 4. Critiquing the silhouettes of fashion history to learn the inspired creation of popular trends from past to present fashion world.
- 5. Show the use of fashion terminologies from research to design execution.

Articula	Articulation Matrix													
CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1			1									2	2	
2										3		1		2
3			2										1	3
4				1								2	3	
5				1									3	2

UNIT I **FASHION BODY TYPES**  Golden mean: Appreciation of body aesthetics, Body types: Ectomorph, Mesomorph and endomorph, Female body types: Triangle, Inverted triangle, Pear shape, Hourglass, Rectangle, Plus size, androgynous. Genre of clothing: Formal wear, Casuals- smart casuals, rugged casuals, Sporty casuals, Dressy casuals, Active casuals, sportswear, Evening wear and lounge wear.

#### UNIT II

#### **FASHION ILLUSTRATION AND TECHNIQUES**

Fashion illustration principles: 8 head, 10 head and 12 head theory, plum lines, Sketching faces, Hairs. Highlights, shadows, Mid tones. Texturing techniques: Chiffons, sequins, furs, corduroy, knits, Jeans, Lace, printed fabrics. Introduction to flat sketches: Elements of flat sketch, purpose of flat sketch, Details to be present in a flat sketch.

#### UNIT III

#### SILHOUETTES CLASSIFCATIONS

Principles of silhouette: Drape (Gathers, pleats, tucks, flares, flounces), Fall, Stance, fold effects (Half lock, cowl, pipe, zig zag, Spiral, drop, Diaper). Classification of silhouettes: Structured Silhouettes, Tailored silhouette, Compression silhouette, Exaggerated silhouettes, Draped silhouette, Flagging silhouette and layered silhouette.

#### UNIT IV

#### **PRINCIPLES OF FASHION SILHOUETTES**

Principles of silhouettes: Embellishments, asymmetric forms, biomorphic forms. Pattern, motifs, textures. Defining silhouettes in fashion history: Victorian dress, Gibson girl look, Flapper dress, Coco Channel"s: Women"s suit, LBD, Christian Dior: New look, Paul Poiret: Eastern inspired modern silhouettes. Elsa Schiaparelli: Knitted and surrealistic dresses, Paco Rabanne: Seven Unwearable dress, DKNY: Capsule collection.

#### UNIT V

#### **FASHION TERMINOLOGIES**

Fashion terminologies: Fashion cycle. Categorization of fashion and its elements: Avant garde, Haute couture, Preto porter, High Street fashion. Fashion runways, Fashion season. Fast fashion, slow fashion and sustainable fashion. Fashion theory: Trickle up, trickle down and trickle across.

#### **Reference**(s)

- 1. Anna Kiper, Fashion Illustration-Inspiration and Technique, David & Charles publisher, November 2016.
- 2. C. Melody Edmondson, The Guide Book, Your Fashion Guide Based on Body Shape & the Space of the Waist, Create Space Independent Publishing Platform, 12 August 2015.
- 3. Heather Vaughan Lee, JosÃf© Blanco F., Mary Doering, Patricia Kay Hunt-Hurst, Clothing and Fashion, ABC-CLIO-publisher, 23 November 2015.
- 4. Andrew Reilly, Key Concepts for the Fashion Industry, Bloomsbury Publishing, 28 August 2014.
- 5. Laura Volintesta, language of fashion design: 26 principles every fashion designer should know, Rockport publishers, 2014.
- 6. Macarena San martin, Fashion Details: 1000 ideas from neckline to waistline, pockets to pleats, Rockport publishers, 2011

#### 9 Hours

#### 9 Hours

9 Hours

**Total: 75 Hours** 

#### 22FT403 STRUCTURE AND DESIGN OF WOVEN FABRICS

#### **Course Objectives**

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

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering

fundamentals, and an engineering specialization to the solution of complex engineering problems. c. PO3: Design/development of solutions: Design solutions for complex engineering problemsanddesignsystemcomponentsorprocesses that meet the specified needs with appropriate

consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. PO4: 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. PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodernengineeringandITtoolsincludingpredictionandmodelingtocomplex engineering activities with an understanding of the limitations.

f. PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

j. PO10: 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. PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply the set one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

n. PSO2: Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

### Course Outcomes (COs)

- 1. Explain the elements of woven fabric structure and analyze their construction parameters
- 2. Classify the special rib and cord woven structures and analyze their construction parameters.
- 3. Identify the suitable looms to produce the various types of woven fabric structures
- 4. Analyze the formation techniques of pile fabric structures
- 5. Analyze the formation techniques of pile fabric structures and double cloth

CO No	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1			2									3	
2	2		3			1				2				1
3	1			3							3			1
4	2			1							1		3	

#### **Articulation Matrix**

5 2	1		3

#### UNIT I

#### **BASIC WEAVES**

Elements of woven design, Construction of elementary weaves - plain, warp rib, weft rib, mat. Twills - modification of twills. Satin - sateen and their derivatives. Ordinary and Brighton honey comb Huckaback. Crepe weaves. Bedford cords and Mock leno Plain faced - twill faced. Wadded modifications. Welt - piques: wadded piques - Loose back and fast back welts and piques. Mock leno -Distorted mock -leno.

#### UNIT II

#### **DOBBY AND JACQUARD**

Basic Dobby, Jacquard Design. Spot figuring-arrangement of figuring for dobby and jacquard.

#### UNIT III

#### **COLOR THEORY**

Light and pigment theory - modification of color - color combination - application of colors - color and weave effects.

#### UNIT IV

#### EXTRA FIGURED WEAVES AND BACKED FABRICS

Extra warp and extra weft figuring- Extra warp and extra weft figuring with two colors. Warp and weft back - reversible and non-reversible.

#### UNIT V

#### **PILE FABRICS**

Warp pile - fast wire pile - terry weaves - terry stripe - terry check- Weft pile: plain back - twill back velveteen - Lashed pile corduroy - Weft plush -Length, density and fastness of pile. 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.

1	3 Hours
EXPERIMENT 1	
Analysis of Plain Twill weave and Satin weaves	
That yes of Frank, F will weave and built weaves.	
2	2 11
2	3 Hours
EXPERIMENT 2	
Analysis of Huck-a-back and Honey Comb weaves	
5	
3	3 Hours
	5 110015
EXPERIMENT 3	
Design, Draft and Peg plan of Mock Leno, Bedford cords	
4	3 Hours
	5 110015
EXPERIMENT 4	
Analysis of Extra Warp and Extra Weft Figuring	
5	3 Hours
J	5 110018

#### 9 Hours

#### 9 Hours

9 Hours

# 9 Hours

9 Hours

**EXPERIMENT 5** 

Design, Draft and Peg plan of Double cloth, Pile Fabric

6		3 Hours
<b>EXPE</b> Valuat	ERIMENT 6 tion of Color and Weave Effect	
7		3 Hours
<b>EXPE</b> Design	ERIMENT 7 In the set of parameters of a woven fabric for the given specific end-use	
8		3 Hours
EXPE Analyz	ERIMENT 8 ze the knitted fabric and state the end-uses	
9		3 Hours
EXPE Sourci	ERIMENT 9 ing and analysis of the given woven fabrics	
10 EXPE	ERIMENT 10	3 Hours
Sourci	ing and analysis of the given woven fabrics.	<b>75</b> II
Refere	ence(s)	75 Hours
1.	Grosicki Z. J. Watson Textile Design and Colour Vol.1, Wood head Publications, C England, 2004	Cambridge
2.	E G Gilligan, Woollen and Worsted Woven Fabric Design, Wood head publication,	UK,2004
3.	Seyam A. M., Structural Design of Woven Fabrics, Theory and Practice Textile	Institute,

- Manchester, 2002
- 4. W. S. Murphy, Textile weaving & Design, Abhishek Publications, 2000
- 5. nptel.ac.in/courses/116102005/26

#### **Course Objectives**

- Apply fundamental knowledge on chemical processing of textiles.
- Learn and apply the method of application of pre-treatments / dyes / prints /finishing/ process.
- Demonstrate knowledge of the machinery used for pre-treatment / dyeing/printing/finishing/ process.

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex

engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. PO3: 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. PO4: 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. PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodernengineeringandITtoolsincludingpredictionandmodelingtocomplex engineering activities with an understanding of the limitations.

i. PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. PO10: 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.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

#### **Course Outcomes (COs)**

- 1. Explain the preparatory process and produce desized, scoured, bleached and mercerized fabric
- 2. Analyze the various dyeing machines and produce dyed fabrics with different dyes
- 3. Differentiate styles of printing, methods of printing and create printed fabrics.
- 4. Evaluate suitable mechanical and chemical finishing techniques for fabric
- 5. Analyze the color matching using spectrophotometer for measuring the quality of dyed material.

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3	2						2	2			1	
2	2	3	2		1				2	2			1	
3	2	3	2						2	2			1	
4	2	2	2	2	1								1	
5	2	2	2	2	1								1	

#### **Articulation Matrix**

#### 9 Hours

9 Hours

#### 9 Hours

#### 9 Hours

9 Hours

### **3 Hours**

### **3 Hours**

### **3 Hours**

3 Hours

# **EXPERIMENT 3**

Assessment of rubbing and perspiration fastness of cotton fabrics

#### 4 **EXPERIMENT 4**

#### **UNIT I PREPARATORY PROCESSES**

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

#### UNIT II

#### **DYEING AND DYEING MACHINERY**

Classification of dyes. Dyeing of cotton using natural, 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). Dyeing of silk and wool with Acid and basic dyes. Dyeing equipment - jigger, winch, soft flow, jet dyeing, J-box, padding mangles, package dyeing and garment dyeing machine.

### **UNIT III**

### PRINTING

Ingredients of print paste and their role in printing. Viscosity of print paste, Rheology properties and flow 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, khadi, leather, pearl and rubber. After treatments of printed goods. Troubleshooting in textile printing.

#### **UNIT IV**

### 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/ stain release, antimicrobial, UV protection finish. Denim washing stone washing, acid washing, enzymatic washing and sand blasting.

### UNIT V

### **COMPUTER COLOR MATCHING**

Colour perception, Electromagnetic spectrum - visible range, theories of colour vision, colour measurement. Types of Spectrophotometer- Spectrophotometer performance Parameter. The CIE color specifications. Metamerism & metameric index - Types of metamerism. Quality control using computerised color matching systems, color difference - pass / fail system.

#### 1 **EXPERIMENT 1**

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

## 2

### **EXPERIMENT 2**

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

3

Comparison of different ISO wash fastness tests on fabrics dyed with direct dyes

5		3 Hours
EXPE	ERIMENT 5	
Dyeing	g of cotton using direct / vat / reactive dyes	
6		3 Hours
EXPE	CRIMENT 6	
Dyeing	g of polyester, nylon, polyester/ cotton and polyester / viscose	
7		3 Hours
EXPF	CRIMENT 7	
Dyeing	g of silk yarn / fabric with acid dyes	
8		3 Hours
FXPI	TRIMENT 8	5 Hours
Printin	g of cotton fabric using direct, discharge or resist styles.	
9		3 Hours
, EXDI	PRIMENT 0	5 Hours
Bio po	lishing finish on denim fabric.	
10		3 Hours
FYPE	PRIMENT 10	5 Hours
Crease	resistant finishing of cotton fabrics and measurement of dry and wet CRA	
crease	Total:	75 Hours
Refere	ence(s)	
1.	D. Gopalakrishnan, Basics of Chemical Processing, Daya Publishing House, N 2016.	ew Delhi,
2.	E. R. Trotman, Dyeing and Chemical Technology of Textile Fibres, Charles Griffi Ltd., London. 1990.	n and Co.
3.	V. A. Shenai, Technology of Bleaching and Mercerzing - Vol. III, Sevak Pu Mumbai 1991.	blications,
4.	V. A. Shenai, Technology of Dyeing - Vol. VI, Sevak Publications, Mumbai, 2000.	

- 5. V. A. Shenai, Technology of Printing Vol. IV, Sevak Publications, Mumbai 1996.
- 6. V. A. Shenai, Technology of Textile Finishing, Sevak Publications, Bombay, 1995.

#### 22FT405 APPAREL DESIGN AND DEVELOPMENT II

#### **Course Objectives**

- Acquire knowledge on human body measurements and creating pattern from the measurements for male and female.
- Develop commercial pattern with design aspect by manipulating the basic pattern.
- Fabricate patterns of different sizes by grading the basic pattern & develop the products for graded patterns.

#### **Programme Outcomes (POs)**

a. a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. PO3: 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.

f. PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. PO7: 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.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

n. PSO2:Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

#### **Course Outcomes (COs)**

- 1. Resolve the methods for drafting basic block patterns for men & women.
- 2. Explain the procedure for drafting patterns for top wear garments (Men & Women) and predict the fine changes that need to be incorporated in real production patterns.
- 3. Explain the procedure for drafting patterns for bottom wear (Men & Women) and predict the fine changes that need to be incorporated in real production patterns.
- 4. Exemplify the factors affecting garment construction process and resolve the problems of making them.
- 5. Determine the pattern making adjustments and changes required for manufacturing functional wear.

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	<b>PO10</b>	PO11	<b>PO12</b>	PSO1	PSO2
1	3	2	3										2	2
2	3	2	3										2	2
3	3	2	3			2	1						2	2
4	3	2	3			2	1						2	2

#### **Articulation Matrix**

5	3	2	3		2	1			2	2
1										

#### **UNIT I**

#### PATTERN DRAFTING FOR KNIT WEARS AND TECH PACK

Knit Wear: Pattern drafting-factors to be considered. Tech pack: Introduction and development.

#### UNIT II

#### **SEWING MACHINERIES**

Parts and functions of SNLS, Overlock Lock, Flat Lock, Special purpose sewing machines -Embroidery machine, feed of arm, buttonhole sewing, button sewing, bar tack, blind stitch machines. Adjustments in machine parts. Special attachments in sewing machines - guides, folders, stackers, trimmers, ziggers.

#### UNIT III

#### SEAMS AND GARMENTING TECHNIQUES

Seams and stitches - Classification of seams, stitches and seam finishes. Remedial measures and causes seam and stitch defects. for Garmenting Techniques: Fullness - darts, tucks, pleats, gathers, flare, godets, shirring, frills, flounce. Hemming and neckline finishes.

#### **UNIT IV**

#### **COMPONENTS OF WEAR**

#### Types, pattern making and construction - Sleeves, yokes, collars, placket, sleeves, pockets, cuffs.

#### UNIT V

#### **KIDS WEAR**

Drafting and Construction: Baby set - jabla, panty, bib and bonnet. Frock, Baba suit, Rompers and Mittens.

#### 1 **EXPERIMENT 1**

Draft the patterns for knit wear - basic block - upper bodice and lower bodice.

#### 2

#### **EXPERIMENT 2**

Develop a tech pack for men's, women's and kids wear.

#### 3

#### **EXPERIMENT 3**

Determination of threading path and development of samples with variations using sewing machines.

#### 4

#### **EXPERIMENT 4**

Determination of threading path and development of samples using other special purpose sewing machines.

#### 5

### **EXPERIMENT 5**

Development of samples for seams and seam finishes.

### 9 Hours

#### 9 Hours

9 Hours

#### 9 Hours

#### 9 Hours

#### **3 Hours**

#### **3** Hours

#### **3 Hours**

#### **3 Hours**

# 3 Hours

**3 Hours** 

# Construct different types of samples for garmenting techniques.

#### 7

6

### **EXPERIMENT 7**

**EXPERIMENT 6** 

Develop patterns for sleeves, collars, cuffs and construct them with appropriate garmenting techniques.

#### 8

### **EXPERIMENT 8**

Develop patterns for plackets, pockets and construct them with appropriate garmenting techniques.

#### 9

### **EXPERIMENT 9**

Draft the patterns and construct baby set for the given design/ tech pack.

#### 10

### **EXPERIMENT 10**

Draft the patterns and construct baba suit for the given design/ tech pack.

#### **Reference**(s)

- 1. Helen Joseph Armstrong,-Pattern Making for Fashion Design- Pearson Education (Singapore)Pvt. Ltd.,2005
- 2. Winifred Aldrich-Metric Pattern Cutting-Blackwell Science Ltd., 1994
- 3. B. Claire and Shaeffer, Sewing for Apparel Industry, Pearson""s Prentice Hall, New Jersey, 2000
- 4. Leila Aitken, Step by Step Dress Making Course, Sterling Publishing Co. Inc. NewYork, 1994.
- 5. Marry Mathew, Practical Clothing Construction Part I, Basic Sewing Process, Cosmic Press, Chennai, 1999.

#### 3 Hours

**3 Hours** 

### **3 Hours**

### Total: 75 Hours

#### 22HS007 ENVIRONMENTAL SCIENCE

#### **Course Objectives**

- Understand the interdisciplinary and holistic nature of the environment
- Identify the significance of natural resources and environment on the quality of life and stimulate the quest for sustainable development
- Assess the socio-economic, political and ethical issues in environmental science

#### **Programme Outcomes (POs)**

a. a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

g. PO7: 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.

#### **Course Outcomes (COs)**

- 1. Examine the importance of interdisciplinary nature of environment studies, uses and exploitation of natural resources
- 2. Analyze the different types of ecosystems and biodiversity, its values and also role of professionals in protecting the environment from degradation
- 3. Impact the existing environmental challenges related to pollution and its management
- 4. Select suitable strategies for sustainable management of components of environmental science
- 5. Correlate the impacts of population and human activities on environment

#### **Articulation Matrix**

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	2												
2	1	1												
3	2	2					1							
4	1													
5	2													

#### UNIT I

#### 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). Energy resources: renewable (solar, wind, and hydro).

#### UNIT II

#### 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: desert ecosystem. Biodiversity - value of biodiversity - threats to biodiversity -

### 6 Hours

#### 2000

#### UNIT III

#### **ENVIRONMENTAL POLLUTION**

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

#### UNIT IV

#### SOCIAL ISSUES AND ENVIRONMENT

Sustainable development : Definition - Unsustainable to sustainable development - solid waste management - causes - effects - 5R Principles (landfills, incineration, composting). Water conservation - rain water harvesting - watershed management. Climate change - global warming - acid rain - ozone layer depletion. E-waste

#### UNIT V

#### HUMAN POPULATION AND ENVIRONMENT

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

#### **Reference**(s)

- 1. Anubha Kaushik, C.P. Kaushik, Environmental Science and Engineering , 4th Multi Colour Editon, New Age International Publishers, New Delhi, 2014
- 2. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons
- 3. T. G. Jr. Miller, S. Spoolman, New Environmental Science, 14th Edition, Wadsworth Publishing Co, New Delhi, 2014
- 4. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press
- 5. A. K. De, Environmental Chemistry, 7th Edition, New age international publishers, New Delhi, 2014

### 6 Hours

### 7 Hours

# 5 Hours

#### Total: 30 Hours

#### 22HS008 ADVANCED ENGLISH AND TECHNICAL EXPRESSION

#### **Course Objectives**

- To enable students to achieve proficiency in academic writing
- effectively use the language to persuade others
- appreciate the nuances of the language and engage an audience
- use advanced tools of language to improve communicative competence
- prepare for professional demands at the workplace
- give concrete expression to the plans and goals

#### **Programme Outcomes (POs)**

#### **Course Outcomes (COs)**

- 1. On the successful completion of the course, student will be able to:
- 2. 1 Understand the clarity in articulating the objectives and aims and improved proficiency in using the English language
- 3. Communicate effectively and with good interpersonal skills; speak in public, engage the audience, and lead a group discussion
- 4. Critically evaluate the ethics of persuasive appeals and confidence to influence opinion
- 5. Analyse a specific piece of information; take in what is read, and use good writing techniques with proper grammar and syntax in all formal situations
- 6. Create awareness and empathy to emotional signals in communication

#### **Articulation Matrix**

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1														
2														
3														
4														
5														
6														

#### 1

### UNIT 1

**5** Hours

Creative Expression Lesson Plan 1 Persuasive Discourse Proposals

#### 2

#### **LESSON PLAN 2**

Humor and satirical expression Creating Business Memes Comic Strips Stand-up comedy Caption writing Limericks

3

UNIT 2 Formal Expression Lesson Plan 3 Organizing Subject matter Writing Action plans, Mind-Mapping, Paragraph writing Logical reasoning Conditional Clause Opening and closing sentences

### 4

### **LESSON PLAN 4**

Talking about plans

Action plans, Anecdotal references, order of communication/ narration, complete communication-Wh-questions Effective beginning and closing Rhetorical questions Appraising target audience

### 5

### **LESSON PLAN 5**

Research Writing Writing:SOPs,Research Objectives, Thesis Statement, Indexing,Academic Writing,Executive Summary,Survey Questionnaires,List of References

### 6

### READING

Quantitative Analysis and paraphrasing of reference materials

### **Reference**(s)

- 1. Sangeeta Sharma et.al. Communication Skills for Engineers and Scientists, PHI Learning Pvt. Ltd, 2011
- 2. Murphy, Raymond. English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Students: with Answers. Cambridge: Cambridge University Press, 1985.
- 3. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001
- 4. Personality Development, Harold R. Wallace &L.Ann Masters, Cengage Learning, New Delhi
- 5. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi
- 6. English Grammar, Composition and Usage by N.K.Agrawal&F.T.Wood, Macmillan India Ltd., New Delhi

#### **10 Hours**

0 Hours

0 Hours

# 0 Hours

### Total: 15 Hours

#### 22FT501 APPAREL MERCHANDISING AND COST MANAGEMENT

#### **Course Objectives**

- To understand the apparel merchandising process in apparel business.
- To summarize the process flow in merchandising for order execution.
- To access the sourcing and overall apparel manufacturing costing process in apparel industry.

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex

engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. PO3: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. PO4: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.

g. PO7: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. PO8:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i. PO9:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. PO10: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.

n. PSO2:Articulate,collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

#### **Course Outcomes (COs)**

- 1. Analyse the roles and responsibilities of apparel merchandising processes with the terminologies and abbreviations used in the apparel industry.
- 2. Access the role of merchandiser in the product development process with the help of Market research.
- 3. Carry out the order execution activities of merchandiser in the apparel industry with examples.
- 4. Determine the sourcing process followed in the apparel industry.
- 5. Determine and compute the cost calculation methods used in apparel industry.

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	2					1	3	3				2
2	3	2	2	3			1	1	2	2				2
3	3	3	2				1	1	2	2				2

#### **Articulation Matrix**

4	2	2	3		1	1	2	2		2
5	3	2	2			1	3	2		2

#### UNIT I

#### INTRODUCTION TO MERCHANDISING

Introduction to Apparel Industry, Merchandising terminology-supplier, sub-contractor, direct order, merchant export, Evaluation of sub-contractors, CM and CMT. Merchandiser in apparel industry, Roles of a fashion merchandiser, Role of a production merchandiser, Role of a retail merchandiser. Samples in apparel Industry- Sampling process, samples and their importance. Responsibilities of a merchandiser, Merchandiser interface with other departments of apparel industry.

#### UNIT II

#### FORECASTING AND PRODUCT DEVELOPMENT

Line Planning, Line development- Fashion forecasting process, Market research, Fashion research. Product Development- Role of merchandiser in product development process. Line adoption, Apparel analysis Process- style description, positioning strategy, sizing and fit Material specifications, garment component assembly, Final assembly and finishing, style presentation. Customer profiling for apparel merchandisers- customer profiling methods, benefits of customer profiling.

#### UNIT III

#### MERCHANDISING PLANNING AND ORDER EXECUTION

Time and action plan for merchandisers, Development of time and action plan- Gantt chart, network charts. Raw material consumption estimations- Fabric and yarn weight calculations, size wise-colourwise order quantity breakup identification, yarn or fabric consumption calculations, sewing threads-consumption calculations, other raw material consumptions. Factory capacity planning-Sewing department capacity calculation-Line efficiency and capacity, capacity calculation for other departments.

#### UNIT IV

#### SOURCING

# Classifications of sourcing process, sourcing strategies for decision making, sourcing process in an apparel industry, Role of merchandiser in sourcing process. Factors affecting sourcing process-Lead time, Minimum order Quantity (MOQ), Logistics facilities, Quality parameters, sourcing costs. Supplier or vendor management- supplier/vendor selection criteria, supplier evaluation process. Types of supplier for apparel industry. Vendor/supplier evaluation, Vendor Evaluation methods.

#### UNIT V

#### **APPAREL COSTING**

Elements of cost- Material cost, Labour cost, Expenses, Overheads. Factors influencing the costing process. Calculation of fabric cost-yarn cost calculation, process cost calculation. Fabric cost calculation. Cost calculation in apparel production departments- cutting department costs, sewing department costs, Trimming and checking department cost, packing department costs, calculation of shipping and forwarding cost. Calculation of overall apparel manufacturing cost (Cut-Make-Trim/Pack and shipping).

#### **Reference**(s)

- 1. Dr. V.R. Sampath, Garment Marketing and Merchandising, Published by Kalaiselvi Pathippakam.
- 2. Elaine Stone, Fashion Merchandising -An Introduction, Fourth Edition.
- 3. Virginia Grose, Basics Fashion Management 01: Fashion Merchandising, AVA publiser, switerland, 2011

#### 9 Hours

9 Hours

# 9 Hours

#### 9 Hours

#### 9 Hours

#### Total: 60 Hours

- 4. Rathinamoorthy, Surjit, Apparel Merchandising, Woodhead Publishing India Pvt. Ltd., 2018
- 5. Vasanth Kothari , A series of Articles on Fashion Merchandising , 2011.

#### 22FT502 APPAREL DESIGN AND DEVELOPMENT III

#### **Course Objectives**

- Acquire knowledge on human body measurements and creating pattern from the measurements for male and female.
- Develop commercial pattern with design aspect by manipulating the basic pattern.
- Fabricate patterns for different men's and women's wear.

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering

fundamentals, and an engineering specialization to the solution of complex engineering problems.

b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural

sciences, and engineering sciences.

c. PO3: 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.

f. PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. PO7: 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.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

n. PSO2:Articulate, collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

#### **Course Outcomes (COs)**

- 1. Outline the material selection for woven and knitted fabrics.
- 2. Develop patterns and construct men's knit wear according to the given/ designed wear or tech pack
- 3. Create patterns and construct women's knit wear according to the given/ designed wear or tech pack
- 4. Develop patterns and construct functional wear according to the given/ designed wear or tech pack
- 5. Outline the product development process in apparel industry.

CO No	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	3			2	1						2	2
2	3	2	3			2	1						2	2
3	3	2	3			2	1						2	2
4	3	2	3			2	1						2	2
5	3	2	3			2	1						2	2

#### Articulation Matrix

UNIT I MATERIAL SELECTION Material selection (Raw Material - Fabric) - Parameters of Fabric - Factors to be considered pattern making of knitted fabric & woven Fabric. Trims & Accessories selection and properties	9 Hours lered for es.
<b>UNIT II</b> <b>MEN'S KNIT APPARELS</b> Drafting and Construction: Top Wear-Polo Shirt, T-Shirt, vests. Bottom wear- Briefs, knickers, boxers, Track pants.	9 Hours
UNIT III WOMEN'S KNIT APPARELS Drafting and Construction: Top Wear-Camisole, Brassiere, corset. Bottom Wear-Panty, leggings, jeggings.	9 Hours
UNIT IV FUNCTIONAL WEAR Drafting and Construction: Surgical gown/ apron, hooded sports jacket, swim suit.	9 Hours
<b>UNIT V</b> <b>PRODUCT DEVELOPMENT PLAN</b> Design analysis-Operation Breakdown-Process flow-Selection of Machine based on style & line balance-calculation of SAM-operation Bulletin.	9 Hours Process-
1 EXPERIMENT 1 Design and draft the patterns men's knit top wear. (Polo T- Shirt)	3 Hours
2 EXPERIMENT 2 Construction Men's knit top wear for developed patterns (Polo T- Shirt)	3 Hours
3 EXPERIMENT 3 Design and draft the patterns Women's knit top wear. (cowl neck T-shirt)	4 Hours
4 EXPERIMENT 4 Construction women's knit top wear for developed patterns (cowl neck T-shirt)	4 Hours
5 EXPERIMENT 5 Design and draft the patterns) men's knit Bottom wear. (Track suit)	4 Hours
6 EXPERIMENT 6 Construction of Men's knit Bottom wear. (Track suit)	4 Hours
7 EXPERIMENT 7	4 Hours

Draft the patterns and construct surgical gown/ apron for the given design/ tech pack.

#### 4 Hours

#### **EXPERIMENT 8**

Draft the patterns and construct sportswear for the given design/ tech pack

#### **Reference**(s)

8

Total: 75 Hours

- 1. Helen Joseph Armstrong-Pattern Making for Fashion Design, Pearson Education (Singapore)Pvt. Ltd.,2005
- 2. Winifred Aldrich-Metric Pattern Cutting, Blackwell Science Ltd., 1994
- 3. B. Claire and Shaeffer, Sewing for Apparel Industry, Pearson's Prentice Hall, New Jersey, 2000
- 4. Leila Aitken, Step by Step Dress Making Course, Sterling Publishing Co. Inc. NewYork, 1994.
- 5. Marry Mathew, Practical Clothing Construction Part I, Basic Sewing Process, Cosmic Press, Chennai, 1999.

#### 22FT503 FASHION PORTFOLIO

#### **Course Objectives**

- To predict the trends through trend forecasting process and also asses the color forecast the same.
- To impart the knowledge of conceptualizing designs and to develop prototypes for the same.
- To impart knowledge of organizing different elements in a portfolio and bringing out the desired look.

#### **Programme Outcomes (POs)**

a. PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex

engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

d. PO4: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. PO5:Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodernengineeringandITtoolsincludingpredictionandmodelingtocomplex engineering activities with an understanding of the limitations.

g. PO7: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.

j. PO10: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.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

n. PSO2:Articulate,collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

#### **Course Outcomes (COs)**

- 1. Execute trend analysis, identify key concepts: color, style, fabric and prepare trend reports for the chosen apparel category.
- 2. Carryout stages of the design process there by making boards at each stage of the design process.
- 3. Develop design exploration sketches, fashion illustrations and determine fabric specifications for different looks.
- 4. Determine intended design outcomes by manipulating fabrics and patterns.
- 5. Construct Prototypes and bring out the look desired through photoshoot with a proper presentation.

CO No	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	2		2						2			3	3
2		1			2					2			3	3
3	1	2			3		1						3	3

#### **Articulation Matrix**
4	2		2					3	3
5	2		3	1		1		3	3

#### UNIT I

#### FASHION TRENDS AND FORECASTING

Fashion trend, trend analysis techniques: trend forecasting platforms, interpreting trends, forecast report, types of forecasting. Color forecasting process - Key colors. Social and Cultural aspects. Consumer segmentation based on Psychographic profiles. Fashion design process: Stages in design thinking, Double diamond approach.

#### **UNIT II**

#### FASHION DESIGN PROCESS

Fashion design process: Stages in design process, Double diamond approach. Inspiration board: elements to be present, visual arrangements. Mood board: Deriving mood board elements from the trend forecast report, Color board: color story, base color, ascent and descent colors and color proportions.

#### UNIT III

#### **CONCEPTUALIZATION AND SILHOUETTE DEVELOPMENT**

Design exploration techniques, fashion illustration: poses, rendering different fabrics, flat sketch: seam details, fabric and trim details, accessory board. Development of designs and silhouettes, Design exploration. Types of fashion looks - classic, bohemian, casual, eclectic, minimalistic and sporty.

#### UNIT IV

#### **FABRIC PARAMETERS**

Classification of fabric types: woven fabric categories and knitted fabric categories. Fabric specification development: color specification, weight specification, drape specification. Fabric manipulation techniques: surface embellishments, different dyeing techniques: batik, tie and dye, vegetable dyeing, marbling. other ornamentation techniques.

#### UNIT V

#### **PROTOTYPE DEVELOPMENT**

Pattern development processes - draping & alterations, Flat sketches. Story board preparation. Fashion photoshoot. Look book contents. Garment construction: the selection of appropriate needles, seams, stitches. fit testing. fashion photoshoot: product and model Photoshoot. Developing theme; Choosing poses, Hair and makeup, accessories, background selection. Arranging elements in the portfolio.

#### 1

### **EXPERIMENT 1**

Develop a trend report for a selected women's wear line for the upcoming spring summer season for the

Selected target customer category.

#### 2

## **EXPERIMENT 2**

Design and develop an inspiration board for the spring summer collection based on the trend report.

#### 3

### **EXPERIMENT 3**

Design and develop a mood board for the spring summer collection based on the inspiration board.

#### 9 Hours

9 Hours

9 Hours

### 9 Hours

9 Hours

# 4 Hours

# 4 Hours

### 4

# **EXPERIMENT 4**

Develop design exploration of 15 sketches for the theme selected.

### 5

# **EXPERIMENT 5**

Illustrate a fully rendered fashion illustration of the finalized sketch selected either by mixed media or digital sketch.

### 6

# **EXPERIMENT 6**

Develop a tech-pack with flat sketch and stitch details for the selected design.

# 7

# **EXPERIMENT 7**

Develop prototype for the chosen design with proper fabric and accessories.

# 8

# **EXPERIMENT 8**

Create a suitable styling for the final designed garment and develop a photoshoot portfolio of the same by arranging all the above boards.

## **Reference**(s)

- 1. Portfolio Presentation for Fashion Designers, Linda Tain 4th edition. Publication 2018
- 2. Anette Fischer and Kiran Gobin, Construction for fashion design, Bloomsbury, 2017.
- 3. Anna Kiper, Fashion Portfolio-Design and Presentation, Publisher: Botsford, October 2016
- 4. Karl Aspelund, The design process, Fairchild, 2015.
- 5. Designing Your Fashion Portfolio from Concept to Presentation 1st edition, Joanne Barrett, Publication 2014.

# 4 Hours

#### 4 Hours

4 Hours

2 Hours

# 4 Hours

## **Total: 75 Hours**

#### 22FT601 APPAREL PRODUCTION PLANNING AND CONTROL

#### **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.

#### **Programme Outcomes (POs)**

a. PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex

engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

d. PO4: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.

h. PO8:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

k. PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply the set one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

n. PSO2:Articulate,collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

### **Course Outcomes (COs)**

- 1. Analyse the objectives of production planning and control system practiced in apparel industry
- 2. Evaluate the types of garment production systems followed in the apparel industry
- 3. Evaluate labour and machinery requirements for a apparel factory
- 4. outline the principles of production scheduling and line balancing techniques
- 5. Analyze the production control forms used in apparel industry

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3												1
2		3						2						1
3	1	2		3										1
4				3				2			1			1
5	1	2		2				1			1			1

#### **Articulation Matrix**

#### UNIT I

#### **PRODUCTION PLANNING AND CONTROL**

Definition, Objectives and functions of production planning and production control, Function of P P C i n garment industry. Pre-production functions, Importance of Preproduction function, Product development - steps from prototype to production sample. Lead Time, Product data management, Order quantity to shipment quantity. Calculate the productivity based on the different measures and production. Analyse and show the critical path and duration that can be taken to do the job

# 9 Hours

# **APPAREL PRODUCTION SYSTEMS**

Section Production systems-whole garment production system, Progressive bundle system, Unit production system, Multiple flow system, modular manufacturing systems-their advantages and disadvantages. Guide lines for choosing suitable production system. Create plant layout for given lot production. Analyze the Operation break down for the particular style (Men's formal shirt).

#### UNIT III

#### FLOW PROCESS GRIDS AND CHARTS

Operation Break Down and Production Sequence, Identification Of Bottle Necks And Critical Area, Operation Wise Machinery Allocation, Usage Of Special Attachments And Tools For Operation Simplifications, Production Grid And Flow Chart. Analyze optimized techniques and line sequence for manufacturing apparel products through Methods study (Flow charts based on sequence and time scale). Analyze optimized techniques and line sequence for manufacturing apparel products through Methods study (Diagrams based on movements and motion study).

#### **UNIT IV**

### PRINCIPLES OF SCHEDULING AND LINE BALANCING

Scheduling charts-GANTT chart, Scheduling techniques Network representation-CPM and PERT Time & Action calendar Time study predetermined motion time standards (PMTS). Calculation of SAM for different garments, General Sewing Data. Determination and allocation of manpower and machines for balanced production in existing plant for a given target, application of line balancing techniques-balance control. Prepare time and action plan for the particular style of garment. Analyze the performance of the operator for the particular style by using on standard efficiency technique.

#### UNIT V

#### **PRODUCTION CONTROL**

Production line loading planning, Factory Capacity planning, Determination of machine requirements for a new factory -calculation of labor requirements, Linear programming. Production control forms, Modern Methods in Cut Piece Distribution and Tracking in different Manufacturing Systems, Production planning softwares. Toyota Production System (TPS), Capacity planning, scientific method of training, Value engineering, LEAN manufacturing. Calculate standard allowed minute for the particular style (Men's T shirt). Analyze and perform capacity planning and line balancing.

#### **Reference**(s)

- 1. Johnson "Introduction Study", International Maurice of Work Labour Organization, Geneva, 2005.
- 2. V.RameshBabu "Industrial Engineering in Apparel Production" Wood head publishing India PVT ltd,2012.
- 3. Rajesh Bheda, "Managing Productivity in Apparel Industry"CBS Publishers & Distributors, ISBN8123909217, 9788123909219,2008.
- 4. Chuter A. J., "Introduction to Clothing Production Management", Black well Science, U. S. A..1995.
- 5. J. K. Akhil, Apparel Engineering: Industrial Engineering Methods for Apparel Industry Create space Independent Pub; 01 edition (20 March 2016) ISBN-10: 1515127125
- 6. Dr. Prabir Jana and Dr. Manoj Tiwari. Industrial Engineering in Apparel Manufacturing: Practitioner's Handbook Apparel resources Pvt Ltd. ISBN-10: 8193247205

#### **UNIT II**

9 Hours

## 9 Hours

Total: 45 Hours

#### **Course Objectives**

- To understand the Retail management concepts and their uses
- To utilize the strategical knowledge obtained in developing a retail store
- To plan the merchandise assortments and cater to the needs of customers

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. PO3: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

consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. PO4: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.

h. PO8:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

k. PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply the set one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

n. PSO2:Articulate,collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

### **Course Outcomes (COs)**

- 1. Analyze the retail management system in terms of its characteristics and functions
- 2. Analyze the retailing strategies and devise an organization structure
- 3. Differentiate the types of retailers, attribute its locations and functions
- 4. Determine the factors influencing sale and manage information systems
- 5. Determine the store planning and retail information

#### **Articulation Matrix**

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	<b>PO10</b>	PO11	<b>PO12</b>	PSO1	PSO2
1		2	3										1	2
2			3					2					1	2
3	1	2		3									1	2
4				3				2			1		1	2
5	2	3		3				2			1		1	2

and multi channel, Relationship between retailers and suppliers, Changing trends in retailing. Retail

#### UNIT II

#### **RETAIL ORGANIZATION AND ITS STRUCTURE**

structure and consumer interaction, Emerging forms of retailing.

Retail strategy-building and sustaining relationships, Elements in retail mix -location, merchandise assortment, store display and design, pricing, customer service and communication mix. Retail image and promotional strategy, Retail communication mix, Organizational structure and human resource management

Introduction to retail management-characteristics and significance, Types of retailing-single channel

#### **UNIT III**

#### STORE FORMAT AND LOCATION

Retailer characteristics-Types of retailers -food, general merchandise, non store, Forms of retailingownership based and store based strategy mix, non store based, Operational dimensions, Trading area analysis - Geographic information system (GIS), Site selection - computerized trading area analysis models.

#### **UNIT IV**

#### **MERCHANDISING MANAGEMENT**

Merchandising philosophy-micro merchandising and cross merchandising, Devising merchandise plans- forecasts, assortment, timing and allocation, Reordering merchandise, Inventory managementbasic stock method, Planning purchases-Open-to-buy(OTB), Economic order quantity (EOQ).

#### UNIT V

#### STORE PLANNING AND RETAIL INFORMATION SYSTEM

Store planning - utility of planograms, Merchandise planning - line plan and range plan. Retail information system (RIS) -significance, Universal Product code (UPC), Electronic data interchange (EDI), Information gathering and data base management.

#### **Reference**(s)

- 1. Retail Management-A strategic approach, Barry Berman, Joel R Evans, Tenth Edition, Pearson Education, Inc, 2007.
- 2. Fashion Retailing-A multi-channel approach, Ellen Diamond, Jay Diamond and Sheri Litt, Bloomsbury, 2006.
- 3. Y.P.Singh, Effective Retail Management, Anmol PublicationsPvt.Ltd., NewDelhi, 2001.
- 4. ElaineStone, Fashion Merchandising, BlackwellScience Ltd., 2000.

#### 9 Hours

# 9 Hours

9 Hours

#### 9 Hours

#### **Total: 45 Hours**

#### 22FT603 QUALITY ASSURANCE IN GARMENT PRODUCTION

#### **Course Objectives**

- Students will have fundamental knowledge on quality and quality standards
- Students will know the methodology of quality assurance in the apparel industry
- Students will apply statistical tools in the apparel industry

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex

engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. PO3: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.

e. PO5:Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodernengineeringandITtoolsincludingpredictionandmodelingtocomplex engineering activities with an understanding of the limitations.

j. PO10: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.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

n. PSO2:Articulate,collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

### **Course Outcomes (COs)**

- 1. Explain the fundamentals of quality concepts and choose quality tools and inspection for each garment manufacturing stage
- 2. Analyze the specifications of quality standards and resolve the testing requirements of different organization protocols
- 3. Classify the quality inspection system procedures for fabric and accessories and implement them for carry out sample inspections
- 4. Determine tolerance limits for garment manufacturing processes and design standard operating procedures
- 5. Compare the costs of quality and determine the product care and safety requirements for different garments

CO No	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	<b>PO12</b>	PSO1	PSO2
1	1	1	1		2					3			1	1
2	1	2	1		3					1			1	1
3	1	1	2		1								1	1
4	1	1	1										1	1

#### **Articulation Matrix**

5	1	1	1										1	1
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#### **UNIT I**

#### **OUALITY FUNDAMENTALS**

Quality: Definition, Dimensions & its importance, Quality Control, Quality Assurance, Quality Management, Operating characteristic curve: Producers risk, Consumers risk, AQL, LTPD, Seven statistical tools of Quality Control and its application

#### UNIT II

#### **QUALITY STANDARDS SYSTEMS AND INSPECTION AGENCIES**

Quality Standards: AATCC, ASTM, BIS, ISO, CSE. ISO 9001, ISO 14001, OHSAS 18000:2000, GOTS, CPS (Children Protection Standards), Social Compliance. Inspection agencies: Government and private agencies, third party testing / inspection services, AEPC, Textiles Committee, Test and inspection report

#### **UNIT III**

#### **QUALITY ASSURANCE IN FABRICS AND ACCESSORIES**

Establishing spec sheet for raw materials and accessories, Inspection: Inspection loop, Systems of inspection, Types of inspection Fabric grading &inspection systems: types, Types of defects in fabrics, major and minor faults, 4 point and 10 point, sampling procedure, prescribing inspection procedure for raw materials and accessories. Tolerance limits and quality standards for fabrics, other raw materials and accessories

#### UNIT IV

#### **QUALITY ASSURANCE IN APPAREL PRODUCTION**

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

#### UNIT V

#### **OUALITY ASSURANCE IN PACKING AND ORGANIZATION**

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

#### **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 Characterization of apparel-Second Edition, Woodhead Publishing, 2019
- 4. Douglas C. Montgomery, Statistical Quality Control: A Modern Introduction, 6th edition, Wiley IndiaPvt. Limited, 2010

9 Hours

#### 9 Hours

# 9 Hours

#### 9 Hours

Total: 60 Hours

#### 22FT701 OPERATIONAL RESEARCH AND EXPORT DOCUMENTATION

#### **Course Objectives**

- To impart knowledge on operation research
- To know the export documentation procedures
- To know about export regulations

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex

engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c. PO3: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. PO4: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. PO5:Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodernengineeringandITtoolsincludingpredictionandmodelingtocomplex engineering activities with an understanding of the limitations.

j. PO10: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.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

n. PSO2:Articulate,collaborate and solve: Articulate design aesthetics, communicate product values, collaborate across disciplines as member and leader; and envision solutions in fashion systems: design, technology, production and management.

## **Course Outcomes (COs)**

- 1. Demonstrate the knowledge about operation research and linear programming problems
- 2. Indicate the classifications of inventory control and the replacement models
- 3. Apply the payment formats in processing export orders
- 4. Apply export documentation procedures, analyze the export regulations
- 5. Choose and apply the suitable schemes during export orders

CO No	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3	1	2									1	
2	2	3	1	2										1
3	2	3	1										1	
4	2	3	1		1					2				1
5	2	3	1		1					1			1	

### Articulation Matrix

### 9 Hours

# 9 Hours

#### 9 Hours

#### 9 Hours

# 9 Hours

**Total: 60 Hours** 

### **UNIT I OPERATIONS RESEARCH**

Origin of Operation Research, Historical Standpoint, Methodology, Different Phases, Characteristics, Scope and Application of Operations Research. Linear Programming Problem: Introduction, Requirement of LP, Basic Assumptions, Formulation of LP, General Statement of LP, Solution techniques of LP: Graphical Methods, Analytical Methods.

# UNIT II

# **INVENTORY CONTROL**

Inventory classification, Different cost associated to Inventory, Economic order quantity, ABC analysis. Models of inventory, operation of inventory system, quantity discount. Replacement, Replacement models: Equipments that deteriorate with time, equipment that fail with time.

#### **UNIT III**

### **EXPORT DOCUMENTATION**

Importance of Export/Import Documentation, Terms of Payment: Letter of Credit - Documentary collection - open account. Terms of Shipments- Inco terms - 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, Dock and Warehouse receipts, Letters of credit, Electronic export information, Air cargo security and C-TPAT, Negotiation of documents - action in the event of discrepancies. Online documentation.

#### UNIT IV

#### **EXPORT-IMPORT PROCEDURE**

Steps in Export Procedure- Export Contract - Forward Cover -Export Finance -Institutional framework for Export Finance- Excise Clearance - Pre-shipment Inspection - Methods of Preshipment Inspection - Marine Insurance - Role of Clearing and Forwarding Agents - Shipping and Customs Formalities - Customs EDI System - Negotiation of Documents.

### UNIT V

### POLICY AND INSTITUTIONAL FRAMEWORK FOR EXPORTS

Foreign Trade Policy - Highlights - Special Focus Initiatives - Duty Drawback - Deemed Exports -ASIDE - MAI & MDA - EPCG Scheme - Incentives for Exporters. Apparel Export Promotion Councils And Their Role - Commodity Boards - FIEO - IIFT - EOUs - SEZs - ITPO - ECGC - EXIM Bank.

### **Reference**(s)

- 1. Hamdy A Taha, Operations Research: An Introduction, Pearson Education/PHI, 8/E, 2007.
- 2. F S Hillier and G J Lieberman, Introduction to Operations Research, TMH, 8/E, 2006.
- 3. M. I. Mahajan, Export Policy, Procedures and Documentation, Snow-white Publishers, Mumbai, 2007.

#### 22FT702 GARMENT TESTING PERFORMANCE AND SUSTAINABILITY

#### **Course Objectives**

- To have fundamental knowledge on garment testing protocol and management of restricted substances.
- To acquire knowledge of the methodology of garment testing in the apparel industry.
- To apply testing of harmful substances as par international regulations to achieve sustainability in the apparel industry

#### **Programme Outcomes (POs)**

a.PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering

fundamentals, and an engineering specialization to the solution of complex engineering problems. b.PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex

engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

 $c. \ PO3: Design/development \ of \ solutions: \ Design \ solutions \ for \ complex \ engineering \ problems and design system components or processes that meet the specified needs with appropriate$ 

consideration for the public health and safety, and the cultural, societal, and environmental considerations.

d. PO4: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. PO5:Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodernengineeringandITtoolsincludingpredictionandmodelingtocomplex engineering activities with an understanding of the limitations.

f. PO6:The engineer and society: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. PO7: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. PO8:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i. PO9:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j. PO10: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.

m. PSO1: Understand and incorporate: Interpret trends, decipher fashion movements, apply the knowledge of elements of design and Gestalt theory of visual perception; and incorporate sustainable decisions into their design artworks, fashion products and accessories

#### **Course Outcomes (COs)**

- 1. Explain the fundamentals of garment testing and test data management.
- 2. Interpret the specifications of quality standards and resolve the testing requirements of different protocols.
- 3. Classify the testing procedures of fabric and garment for determining care instruction of a garment.
- 4. Determine limits for restricted substances for achieving sustainability in garment quality.
- 5. Compare the regulatory requirements of harmful substances in different countries for different garments.

# **Articulation Matrix**

CO No	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3		1	3	2	3	3	1	1			1	
2	3	3	1	1	3	2	3	3	2	1			1	
3	3	3	1	1	3	2	2	3	2	1			1	
4	3	3	1	1	3	2	3	3	2	1			1	
5	2	1	1		1	2	3	3	3	3			1	

#### UNIT I

#### ESSENTIAL ELEMENTS OF GARMENT TESTING

Garment testing and its importance, Protocols of Garment testing, Routine testing, Random testing and Supplier initiated testing, Test data management and analysis, Role of regulatory and special tests, Management of restricted substances for RSL compliance.

#### **UNIT II**

#### **COMMON PROTOCOLS FOR GARMENT TESTING**

Label verification, Identification, Washability, Performance, Colour fastness tests for woven, knitted, leather/suede and apparel related accessories such as belts, caps, ear muffs, gloves, hats, neckties, scarves and headbands, Special tests for technical outerwear, rainwear, intimate and sleepwear, sweaters, swimwear, down fill product and wrinkle resistance garment.

#### UNIT III

#### GARMENT TESTING FOR DETERMINING GARMENT CARE

Washing tests: Machine wash at different temperature, Normal cycle, Permanent press and Delicate cycle, Hand wash, Bleaching tests: Chlorine bleach and Non-chlorine bleach, Drying tests: Drip dry, Flat dry, Line dry and Tumble dry, Ironing tests: Cool, Warm and Hot, Dry cleaning: Petroleum, Fluorocarbon and Perchloroethylene, Professional dry cleaning.

#### UNIT IV

#### GARMENT TESTING FOR SUSTAINABILITY

Definition, Sustainable development and its goals, three dimensions of sustainability, Restricted Substances List (RSL), Testing of restricted substances such as carcinogenic and allergenic dyes, azo dyes, formaldehyde, chlorinated and other phenols, Chlorinated organic carriers, chromium VI, lead, cadmium, nickel, APEOs, Organotin compounds, phthalates, PVC, SCCPs, PAH, fluorocarbons, residual pesticides in garments, trims and embellishments, Overview of Manufacturing Restricted Substances List (MRSL) and its scope.

#### UNIT V

#### GLOBAL REGULATORY TESTING REQUIREMENTS ON HARMFUL SUBSTANCES IN TEXTILE AND APPAREL

US regulations: CPSA, CPSIA, FHSA, FIFRA, TSCA, Cal Prop 65, WCSPA, EPA, EU regulations: REACH, BPR, GOTS, OEKO TEX Standard, China regulation, Korea Certification, Japanese regulation, Regulations of Vietnam, Regulations of Taiwan, Regulations of India.

#### Total: 45 Hours

### **Reference**(s)

- 1. Subrata Das, Product Safety and Restricted Substances in Apparel 2nd edition, Woodhead Publishing, 2016.
- 2. Nimkartek Technical Services Private Limited, Guidebook of Chemical Management for Textile and Apparel Industry, 2015.

### 9 Hours

9 Hours

# 9 Hours

# 9 Hours

- 3. Janace E. Bubonia, Apparel Quality: A Guide to Evaluating Sewn Products, Bloomsbury Publishing,2014.
- 4. Thomas E. Johnson and Donna L. Bade, Export/Import Procedures and Documentation, 2010.
- 5. S. K. Bhattacharya & John Dearden, Accounting for Management Text and Cases, Vikas Publishing House, New Delhi, 2000