ANNA UNIVERSITY, CHENNAI

UNDERGRADUATE CURRICULUM (NON-AUTONOMOUS AFFILIATED INSTITUTIONS)

Programme: B.Tech. Fashion Technology **Regulations:** 2025

Abbreviations:

HUM – Humanities (Languages, Management, Heritage, and others)

BS – Basic Science (Mathematics, Physics, Chemistry)

ES – Engineering Science (General (**G**), Programme Core (**PC**), Programme Elective (**PE**) & Emerging Technology (**ET**))

SD – Skill Development

SL – Self Learning

CDP – Capstone Design Project

OE – Open Elective

L – Laboratory Course

T – Theory

LIT – Laboratory Integrated Theory

PW – Project Work

IPW – Internship cum Project Work

DIC – Department Introductory Course

TCP – Total Contact Period(s)

Program Outcomes

1. **Engineering Knowledge**: Apply math, science, and engineering fundamentals to complex problems.
2. **Problem Analysis**: Identify and analyze complex problems using research and sustainability principles.
3. **Design Solutions**: Design systems and processes considering health, safety, cost, culture, and environment.
4. **Investigations**: Use experiments, modelling, and data analysis to reach valid conclusions.
5. **Engineering Tools**: Apply modern tools for modelling and problem-solving, recognizing their limits.
6. **Society & Environment**: Assess societal, legal, and environmental impacts of engineering solutions.
7. **Ethics**: Commit to ethics, human values, diversity, and legal compliance.
8. **Teamwork**: Work effectively as an individual and in multidisciplinary teams.
9. **Communication**: Communicate clearly in reports, presentations, and documentation across diverse groups.

10. **Management & Finance**: Apply management and economic principles in projects and teamwork.
11. **Lifelong Learning**: Engage in continuous learning, adapt to new technologies, and think critically.

Program Specific Outcomes:

PSO 1: Design and develop innovative fashion products particularly in garment sectors.

PSO 2: Utilize modern software tools for innovative product development, quality control and Project Management.

PSO 3: Incorporate sustainability, ethical practices, and market trends into fashion technology processes for meeting the consumers' demands and also collaborate in teams.

Semester – I							
S. No.	**Course Code**	**Course Name**	**Course Type#**	**Periods / Week**		**Credits**	**Category**
				L-T- P	**TCP***		
1.	MA25C01	Applied Calculus	T	3-1-0	4	4	BS
2.	FT25101	Introduction to Fashion Design	T	2-1-0	3	3	ES (PC) – DIC
3.	PH25C01	Applied Physics – I	LIT	2-0-2	4	3	BS
4.	CY25C01	Applied Chemistry – I	LIT	2-0-2	4	3	BS
5.	UC25H01	தமிழர் மரபு / Heritage of Tamils	T	1-0-0	1	1	HUM
6.	EN25C01	English Essentials – I	T	2-0-0	2	2	HUM
7.	CS25C02	Computer Programming: Python	LIT	2-0-2	4	3	ES (PC)
8.	ME25C04	Makerspace	L	0-0-4	4	2	SD
9.	UC25A01	Life Skills for Engineers – I	---	1-0-2	3	1	HUM
10.	UC25A02	Physical Education – I	---	0-0-4	4	1	HUM
11.		NCC / NSS / NSO/ YRC	---	---	---	---	---
Total Credits					**33**	**23**	

Semester – II							
S. No.	**Course Code**	**Course Name**	**Course Type**	**Periods / Week**		**Credits**	**Category**
				L-T- P	**TCP**		
1.	MA25C02	Linear Algebra	T	3-1-0	4	4	BS
2.	FT25201	Fibre Science	T	3-0-0	3	3	ES (PC)
3.	ME25C01	Engineering Drawing	LIT	2-0-4	6	4	ES (G)
4.	PH25C06	Applied Physics (Tech) – II	T	2-1-0	3	3	BS
5.	EE25C01	Basic Electrical and Electronics Engineering	T	3-0-0	3	3	ES (G)
6.	CY25C04	Applied Chemistry (Tech-TT) – II	T	2-0-0	2	2	BS
7.	UC25H02	தமிழர்களும் தொழில்நுட்பமும் / Tamils and Technology	T	1-0-0	1	1	HUM
8.	ME25C05	Re- Engineering for Innovation	L	0-0-4	4	2	SD
9.	EN25C02	English Essentials – II	LIT	1-0-2	3	2	HUM
10.	UC25A03	Life Skills for Engineers – II	---	1-0-2	3	1	HUM
11.	UC25A04	Physical Education – II	---	0-0-4	4	1	HUM
12.		Foreign Language^	LIT	1-0-2	3	1	HUM
				Total Credits	**39**	**27**	

^ Deutsch / Japanese / Korean

Semester – III							
S. No.	**Course Code**	**Course Name**	**Course Type**	**Periods / Week**		**Credits**	**Category**
				L-T- P	**TCP**		
1.	MA25C13	Probability and Statistics	T	3-1-0	4	4	BS
2.	FT25301	Basics of Textile Technology	T	3-0-0	3	3	ES (PC)
3.	FT25302	Fundamentals of Garment Manufacture	T	3-0-0	3	3	ES (PC)
4.	TT25C08	Woven Fabric Structure	T	3-0-0	3	3	ES (PC)
5.	FT25303	Basic Sewing Machinery Practice Laboratory	L	0-0-4	4	2	ES (PC)
6.	EN25C03	English Communication Skills Laboratory – I	L	0-0-2	2	1	HUM
7.	-	Skill Development Course – I	LIT	1-0-2	3	2	SDC
				Total Credits	**22**	**18**	

Semester – IV							
S. No.	Course Code	Course Name	Course Type	Periods / Week		Credits	Category
				L-T- P	TCP		
1.	FT25401	Pattern Engineering - I	LIT	3-0-2	5	4	ES (PC)
2.	FT25402	Garment Construction -I	LIT	3-0-2	5	4	ES (PC)
3.	FT25403	Textile Chemical Processing	LIT	3-0-2	5	4	ES (PC)
4.	FT25404	Apparel Machineries and Equipment	LIT	2-0-2	4	3	ES (PC)
5.	FT25405	Fashion Design and Illustration	L	0-0-4	4	2	ES (PC)
6.	FT25406	Functional Clothing Designing	L	0-0-4	4	2	ES (PC)
7.	EN25C04	English Communication Skills Laboratory – II	L	0-0-2	2	1	HUM
8.	-	Skill Development Course – II	LIT	1-0-2	3	2	SDC
9.	FT25407	Standards for Textile and Apparel Industries	T	1-0-0	1	1	
Total Credits					**33**	**23**	

Semester – V							
S. No.	Course Code	Course Name	Course Type	Periods / Week		Credits	Category
				L-T- P	TCP		
1.		Fabric and Garment Quality Evaluation	LIT	3-0-2	5	4	ES (PC)
2.		Pattern Engineering - II	LIT	3-0-2	5	4	ES (PC)
3.		Garment Construction-II	LIT	3-0-2	5	4	ES (PC)
4.		Technology of Knitting and Nonwoven	T	3-0-0	3	3	ES (PC)
5.		Programme Elective – I	T	3-0-0	3	3	ES (PE)
6.		Programme Elective – II	T	3-0-0	3	3	ES (PE)
7.		Skill Development Course – III		-	-	2	SD
8.		Industry Oriented Course - I	LIT	1-0-2	3	1	SD
Total Credits					**27**	**24**	
For Honours Degree							
1.		Capstone Design Project – Level I	CDP	0-0-12	12	6	SD
OR							
1.		Honours Elective – I	T	3-0-0	3	3	
2.		Honours Elective – II	T	3-0-0	3	3	

Semester – V							
S. No.	**Course Code**	**Course Name**	**Course Type**	**Periods / Week**		**Credits**	**Category**
				L-T- P	**TCP**		
For Minor Degree							
1.		Minor Elective – I	T	3-0-0	3	3	
2.		Minor Elective – II	T	3-0-0	3	3	

Semester – VI							
S. No.	**Course Code**	**Course Name**	**Course Type#**	**Periods / Week**		**Credits**	**Category**
				L-T-P	**TCP***		
1.		Industrial Engineering in Apparel Industry	T	3-0-0	3	3	ES (PC)
2.		Apparel Marketing and Merchandising	T	3-0-0	3	3	ES (PC)
3.		Retail Merchandising and brand management	T	3-1-0	4	3	ES (PC)
4.		Computer Aided Fashion Designing Laboratory	L	0-0-2	2	2	ES (PC)
5.		Programme Elective – III	T	3-0-0	3	3	ES (ET)
6.		Open Elective	T	3-0-0	3	3	
7.		Self-Learning Course	---	---	0	1	**--**
8.		Industry Oriented Course - II	LIT	1-0-2	3	1	SD
				Total Credits	**21**	**19**	
For Honours Degree							
1.		Capstone Design Project – Level II	CDP	0-0-12	12	6	SD
OR							
1.		Honours Elective – III	T	3-0-0	3	3	
2.		Honours Elective – IV	T	3-0-0	3	3	
For Minor Degree							
1.		Minor Elective – III	T	3-0-0	3	3	
2.		Minor Elective – IV	T	3-0-0	3	3	

Semester – VII							
S. No.	**Course Code**	**Course Name**	**Course Type**	**Periods / Week**		**Credits**	**Category**
				L-T-P	**TCP**		
1.		Apparel Production Planning and Process Control	T	3-0-0	3	3	ES (PC)
2.		Engineering Entrepreneurship Development	T	2-0-2	4	3	HUM
3.		Climate Change and Sustainability	T	2-0-0	2	2	HUM
4.		Financial Management for Apparel	T	3-0-0	3	3	ES (PC)
5.		Retail Management	T	3-0-0	3	3	ES (PC)
6.		Design Collection / Portfolio	L	0-0-2	2	2	ES (PC)
7.		Programme Elective – IV	T	3-0-0	3	3	ES (PE)
8.		Programme Elective – V	T	3-0-0	3	3	ES (PE)
9.		Project Management	T	2-0-0	2	2	HUM
10.		Summer Internship	---	---	---	1	SD
Total Credits					**25**	**25**	
For Honours Degree							
1.		Capstone Design Project – Level III	CDP	0-0-12	12	6	SD
OR							
1.		Honours Elective – V	T	3-0-0	3	3	
2.		Honours Elective – VI	T	3-0-0	3	3	
For Minor Degree							
1.		Minor Elective – V	T	3-0-0	3	3	
2.		Minor Elective – VI	T	3-0-0	3	3	

Semester – VIII							
S. No.	**Course Code**	**Course Name**	**Course Type**	**Periods / Week**		**Credits**	**Category**
				L-T-P	**TCP**		
1		Project Work / Internship cum Project Work	PW/ IPW	0-0-16	16	8	SD
Total Credits					**16**	**8**	

Total No. of Credits: 167

PROGRAMME ELECTIVE COURSES – STREAMS					
Fashion designing	**Apparel management**	**Apparel design and development**	**Advanced technologies in apparel manufacturing**	**Functional garments**	**Textile manufacturing**
Fashion Evolution	Sustainable Apparel Business Management	Fashion Product Development	Computer Applications in Apparel Manufacturing	Protective Garments	Technology of Yarn Spinning
Color Science and Psychology	Market research and consumer behavior analysis	Clothing Fit and Comfort	Advanced Technologies and Automations for Apparel Industry	Intimate Apparels	Technology of Woven Fabric Manufacture
Fashion Communication	Human Resource Management	Garment Finishing and Care	Lean Manufacturing	Smart Textiles and Garments	Technology of Manufactured Fibre Production
Digital Fashion and Apparel Design	Visual merchandising	Knit Product Development	Supply Chain Management for Apparel Industry	Sports Textiles and Garments	Technology of Nonwoven
Fashion Psychology	Enterprise Resource Planning for Apparel Industry	Home Furnishing	Social Compliances and Quality Assurance in Apparel Industry	Medical Textiles and Garments	Special Textile Structures
Fashion forecasting	Operations Research for Textile Industry	Apparel Trims, Accessories and Embellishments	ERP and MIS in Apparel Industry	Leather Garment Technology	Production and Application of Sewing Threads

Semester I

MA25C01	Applied Calculus	L	T	P	C
		3	1	0	4

Course Objectives:

- To provide technical competence of modelling engineering problems using calculus.
- To apply the calculus concepts in solving engineering problems using analytical methods and computational tools.

Differential Calculus: Functions, graph of functions, New functions from old functions, Limit of a function, Continuity, Limits at infinity, Derivative as a function, Maxima and Minima of functions of single variable, Mean value theorem, Effect of derivatives on the shape of a graph.

Activities: Visualization of the functions, Maxima and Minima of a function using open-source software, Solving of Competitive Examination questions (Ex. GATE).

Functions of Several Variables: Partial derivatives, Chain rule, Total derivative, Maxima and minima of functions of two variables, Method of Lagrange's Multipliers, Application problems in engineering.

Activities: Partial Derivatives with two or three variables, Maxima and Minima of a function using open-source software, Solving of Competitive Examination questions (Ex. GATE).

Integral Calculus: Fundamental theorem of Calculus, Indefinite integrals and the Net Change Theorem, Improper integrals, Arc Length, Area of Region, Area of surface of revolution.

Activities: Definite and Indefinite Integrals, Determination of Area, Solving of Competitive Examination questions (Ex. GATE).

Multiple Integrals: Iterated integrals and Fubini's theorem, Evaluation of double integrals, change of order of integration, change of variables between Cartesian and polar co-ordinates, evaluation of triple integrals-change of variables between Cartesian and cylindrical and spherical co-ordinates.

Activities: Double integrals and triple integrals using open-source software, Solving of Competitive Examination questions (Ex. GATE).

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%.

Assessment Methodology: Assignments (20%), Solution to application-oriented problems using software (20%), Solving of GATE questions (20%), Internal Examinations (40%).

References:

1. Anton, H., Bivens, I. C., & Davis, S. (2021). Calculus: Early transcendentals. John Wiley & Sons.
2. Ron Larson and David C. Falvo,(2013), Calculus: an Applied Approach. Cengage Learning.
3. Stewart, J., Clegg, D., & Watson, S. (2019). *Calculus: Early transcendentals*.
4. Thomas, G. B., Jr., Weir, M. D., Hass, J., & Heil, C. (2018). *Thomas' calculus: Early transcendentals*. Pearson.

5. Singh, K. (2019). *Engineering mathematics through applications*. Bloomsbury Publishing.
6. Grewal, B. S. (2012). *Higher engineering mathematics.* Khanna Publishers.

E-resources:

1. https://math.libretexts.org/Bookshelves/Calculus/Map%3A_Calculus__Early_Transcendentals_(Stewart)/
2. https://openstax.org/books/calculus-volume-1/
3. https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx
4. SCILAB, https://www.scilab.org/

	Description of CO	**PO**	**PSO**
CO1	Explain the meaning of derivative, integral, and their geometric and physical interpretations.	---	---
CO2	Apply differentiation and integration techniques to compute maxima, minima, and area.	PO1(3)	PSO1(2) PSO2(2)
CO3	Analyze the behavior of single and multivariable functions using derivatives and partial derivatives.	PO2(3)	PSO1(2) PSO3(1)
CO4	Utilize modern computational software and online platforms to deepen understanding, perform complex calculations, and visualize mathematical concepts.	PO5(2) PO11(1)	PSO2(3) PSO3(1)

FT25101	Introduction to Fashion Design	L	T	P	C
		2	1	0	3

Course Objectives:

To impart the fundamentals of design elements, principles, develop visual awareness, conceptualization and creative expression in the fashion design.

Design Fundamentals: Definition; Importance and role of design in daily life, Types of design: Functional, Aesthetic, Visual, Structural, Introduction to the Design Process. Observation and analysis of design in everyday objects. Exploration of design across disciplines such as fashion, product and communication. Introduction to creative thinking, problem-solving, and user-centred design approaches.

Activity: Demonstration of fashion design in everyday life.

Elements of Design: Line, Shape, Form, Space, Texture, Color, Value, Characteristics and functions of each element, Application of elements in 2D and 3D compositions, Collage and composition exercises focusing on individual elements, Elements of design in apparels.

Activity: virtual demonstration Application of elements in 2D and 3D compositions.

Principles of Design: Balance, Proportion, Emphasis, Rhythm, Harmony, Contrast, Unity, Visual hierarchy and composition, Principles in the context of garment and textile design, Create abstract compositions using principles, Understanding visual hierarchy and layout. Application of design principles in clothing, accessories, and fashion styling.

Activity: Demonstration on clothing, accessories, and fashion styling.

Colour Theory and Application: Colour wheel, primary/secondary/tertiary colours, Warm vs. Cool colours, Tints, Shades, Neutrals, Colour psychology and symbolism in fashion, Colour harmonies: Monochromatic, Complementary, Analogous, Colours theories, Colour perception and optical effects in fabric design and styling.

Activity: Identification of Colour perception and optical effects in fabric design.

Introduction to Fashion Design Context: Concept development and basic design sketching. Fashion as a branch of design: creative and commercial perspectives. The relationship between art, craft, and design, Influences on fashion design: cultural, historical, technological, and social, Case studies of fashion designers and iconic collections, Evolution of fashion as a design narrative, Fashion theories, Introduction to conceptualization and design interpretation in fashion.

Activity: case studies on fashion designers and iconic collections.

REFERENCES:

1. Diane, T., & Cassidy, T. (2005). *Colour forecasting*. Blackwell Publishing. ISBN 1405121203 / ISBN 978-1405121200.
2. Mc Kelvey, K., & Munslow, J. (2005). *Fashion design: Process, innovation, and practice*. Blackwell Publishing.

3. Stone, E., & Samples, J. A. (1985). *Fashion merchandising*. McGraw-Hill Book Company. ISBN 0070617422.
4. North, A. S. V., & Museum, A. (1998). *Historical fashion in detail: The 17th and 18th centuries*. McMillan.
5. Alert, K. (1984). *Traditional folk costumes of Europe: Paper dolls in full color*. Dover Publications, Inc.
6. Davis, M. L. (1996). *Visual design and dress*. Prentice Hall. ISBN 0131121294 / ISBN 978-0131121294.
7. Naik, S. D. (1996). *Traditional embroideries of India*. APH Publishing.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Quiz (10%), Assignments (20%), Virtual Practice (20%), Internal Examinations (50%)

E- Resources:

1. [Understanding Design – IIT Bombay (Prof. B.K. Chakravarthy)] https://nptel.ac.in/courses/107/101/107101090
2. SWAYAM Course: [Apparel Designing – EFLU] https://onlinecourses.swayam2.ac.in/cec23_ah02/preview
3. MOOC: [Fashion as Design – Coursera (MoMA)] https://www.coursera.org/learn/fashion-design

	Description of CO	PO	PSO
CO1	Explain the design fundamentals of the fashion design.	-	-
CO2	Define and analyze the basic principles and elements of design.	PO1(3) PO2(1)	PSO1 (1)
CO3	Interpret the visual and functional aspects of fashion design.	PO1(2) PO2(1) PO3(1)	PSO2(2)
CO4	Understand the role of colour, form, and composition in visual design.	PO1(3) PO2(1)	-
CO5	Demonstrate the historical and cultural contexts to fashion and design development.	PO11(1)	PSO3(2)

PH25C01	Applied Physics – I	L	T	P	C
		2	0	2	3

Course Objective(s):

- To impart knowledge and expose the essentials of physics in various engineering applications.

Properties of Matter: Elasticity, Cantilever, Young's modulus (non-uniform bending), Girders: Bridges and buildings, Viscosity: Stokes method, Surface tension: drop weight method, Thermal expansion, Thermal stress, Bimetallic strips, Expansion joints

Practical: Non-Uniform bending, Young's modulus of the material, Torsional pendulum, Rigidity modulus of the wire and moment of inertia of the disc.

Activities: Virtual demonstration of thermal stress.

Oscillations: Simple Harmonic motion, Torsional pendulum, Couple per unit twist, Damped and Forced Oscillation

Waves: Waves on a stretched string, Energy and Power, standing waves, Ultrasonics, piezo, electric method, Acoustic grating, Electromagnetic waves: Maxwell equation, Production of EM waves by dipole antenna, Propagation of EM waves in free space , wave equation, Cell phone reception

Practical: Melde's string experiment – Frequency of an electrically vibrating metal tip.

Activities: Virtual demonstration of propagation of EM waves

Quantum Mechanics: Black body radiation, Photoelectric effect, de Broglie hypothesis, Schrodinger Wave equation, Particle in a box (infinite potential well - three-dimensional box), Barrier penetration and quantum tunnelling.

Practical: Photo-electric effect, Determination of Planck's constant.

Activities: Virtual demonstration of Scanning Transmission Electron Microscope

Applied Optics: Interference: Air wedge, Michelson's Interferometer, Fiber optics: Structure of a fiber, Fiber Optic Communication System, Fiber Sensors (Virtual demo), Displacement, pressure sensor and Temperature sensor, Einstein Co-efficient, Nd:YAG laser, CO_2 laser (construction, functioning and applications), dye laser

Practical: Ruling width of Compact disc using Laser, Thickness of a thin sheet/wire using Air wedge Method.

Activities: Demonstration of sensors and applications of Lasers

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Assignments (20%), Flipped Class (5%), Practical (30%), Internal Examinations (40%)

References:

1. Young, H. D., & Freedman, R. A. (2020). University physics with modern physics. Pearson.
2. Gaur, R. K., & Gupta, S. L. (2022). Engineering physics. Dhanpat Rai Publications.
3. Mathur, D. S. (2010). Elements of properties of matter. S. Chand Publishing.
4. Griffiths, D. J. (2018). Introduction to quantum mechanics. Cambridge University Press.
5. Silfvast, W. T. (2008). Laser fundamentals. Cambridge University Press.

E-Resources:

1. Barrier penetration problem and Quantum tunnelling: https://archive.nptel.ac.in/courses/115/104/115104096/
2. EM waves and wireless channelling: https://onlinecourses.nptel.ac.in/noc24_ee31/preview
3. CO2 Laser: https://onlinecourses.nptel.ac.in/noc25_ph03/preview
4. Bimetallic Strips _ https://www.youtube.com/watch?v=WZQ8lvxdzDk
5. Cell phone Reception_ https://www.youtube.com/watch?v=1JZG9x_VOwA
6. Dipole Antenna_ https://www.youtube.com/watch?v=4xF1Fq2wB1I
7. Optical Sensors_ https://auece.digimat.in/nptel/courses/video/108106173/L02.html
8. Scanning Tunnelling Electron Microscope_ https://www.youtube.com/watch?v=XNYZYbXNWQA

	Description of CO	**PO**	**PSO**
CO1	Explain the physics concepts in various applications.	---	---
CO2	Apply the principles of wave optics and laser physics in practical systems.	PO1(3)	PSO1(2) PSO2(2)
CO3	Analyse the behaviour of materials under different conditions.	PO2(2)	PSO1(2) PSO3(1)
CO4	Conduct experiments in groups and interpret the data.	PO4(3) PO8(1)	PSO1(2) PSO2(2)

CY25C01	Applied Chemistry – I	L	T	P	C
		2	0	2	3

Course Objectives:

- To provide students with a solid understanding of the chemical principles for engineering applications.
- To introduce the chemical properties of materials and how these properties influence the selection and use of materials in engineering systems.
- To impart practical applications of chemistry in commonly used engineering devices

Water Technology: Water quality parameters and standards. Industrial feed water,Remediation. Municipal water treatment. Desalination.

Practical: Analysis of alkalinity, hardness and dissolved oxygen.

Activity: Coagulation of water sample using Alum

Nano-chemistry: Classification, Size, dependent properties. Preparation of nanomaterials, Top-down and Bottom-Up approaches, Applications (Flipped classroom).

Practical: Preparation of nanoparticles by Sol-Gel method.

Electrochemistry: Electrochemical cell, Electrode potential., Redox reaction. Conductivity of electrolytes, Factors.

Practical: Conductometric titrations

Activity: Electrochemical cell demonstration

Corrosion & Control: Chemical and electrochemical corrosions, galvanic series, factors influencing corrosion, Electrochemical protection. Organic and Inorganic coating.

Practical:

- Corrosion study by weight loss and salt spray method.
- Potentiometry/UV-visible spectrophotometer.

Activities: Case Study on Corrosion in Pipelines and Electronics, Control measures for a corroded metal

Batteries: Conventional, Contemporary and Emerging battery storage technologies, Primary & Secondary Batteries, Battery Pack, Battery Materials, Performance Parameters, Testing, Safety aspects.

Practical: Measurement of EMF, Internal Resistance, Charge and Discharge Characteristics.

Activities: Demonstration of battery pack in e-vehicles.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Assignments (20%), Flipped Class (5%), Practical (30%), Internal Examinations (40%)

References:

1. Jain, P. C., & Jain, M. (2015). Engineering Chemistry. Dhanpat Rai Publishing Company (P) Ltd.
2. Dara, S. S. (2004). A Textbook of Engineering Chemistry. Chand Publications.
3. Sachdeva, M. V. (2011). Basics of Nano Chemistry. Anmol Publications Pvt Ltd.
4. Friedrich, E. (2014). Engineering Chemistry. Medtech.

E-Resources:

1. Water and Wastewater Engineering (Prof. Ligy Philip, IIT Madras) – https://nptel.ac.in/courses/105106202.
2. Electrochemical Energy Systems (Prof. S. Mitra, IIT Madras) – https://nptel.ac.in/courses/113106028.
3. Corrosion (Prof. Kallol Mondal, IIT Kanpur) – https://nptel.ac.in/courses/112104088
4. Chemistry of Battery Systems (Prof. V. R. Marathe, IIT Madras) – https://nptel.ac.in/courses/115106130
5. Resource on all battery types, testing, and safety – https://batteryuniversity.com/articles

	Description of CO	**PO**	**PSO**
CO1	Understand the importance of chemistry applications with underlying mechanisms.	---	
CO2	Apply the chemistry concepts in widely used devices.	PO1(3)	PSO1(2) PSO2(2)
CO3	Analyse the effect of various chemical parameters on performance of engineering systems.	PO2(2)	PSO1(2) PSO2(1)
CO4	Perform experimentations as a group and interpret the results.	PO4(3) PO8(1)	PSO2(2) PSO3(2)
CO5	Communicate findings through case studies and reports	PO9(1)	PSO2(2) PSO3(3)

UC25H01	தமிழர் மரபு	L	T	P	C
		1	0	0	1

மொழி மற்றும் இலக்கியம்: இந்திய மொழிக் குடும்பங்கள், திராவிட மொழிகள், தமிழ் ஒரு செம்மொழி, தமிழ் செவ்விலக்கியங்கள், சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை, சங்க இலக்கியத்தில் பகிர்தல் அறம், திருக்குறளில் மேலாண்மைக் கருத்துக்கள், தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம், பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள், சிற்றிலக்கியங்கள், தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி, தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை:நடுகல் முதல் நவீன சிற்பங்கள் வரை, ஐம்பொன் சிலைகள், பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் , தேர் செய்யும் கலை, சுடுமண் சிற்பங்கள், நாட்டுப்புறத் தெய்வங்கள், குமரிமுனையில் திருவள்ளுவர் சிலை, இசைக் கருவிகள், மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம், தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்: தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

தமிழர்களின் திணைக் கோட்பாடுகள்: தமிழகத்தின் தாவரங்களும், விலங்குகளும், தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள், தமிழர்கள் போற்றிய அறக்கோட்பாடு, சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும், சங்ககால நகரங்களும் துறை முகங்களும், சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி, கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு, இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் , சுயமரியாதை இயக்கம் இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு, கல்வெட்டுகள், கையெழுத்துப்படிகள், தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

References:

1. தமிழக வரலாறு, மக்களும் பண்பாடும், கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ், முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி, வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை, ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

UC25H01	Heritage of Tamils	L	T	P	C
		1	0	0	1

Language and Literature: Language Families in India, Dravidian Languages, Tamil as a Classical 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.

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.

Folk and Martial Arts: Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance, Sports and Games of Tamils.

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.

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

References:

1. தமிழக வரலாறு, மக்களும் பண்பாடும், கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும், கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ், முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி, வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை, ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils, The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
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8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi, 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL), Reference Book.

EN25C01	English Essentials – I	L	T	P	C
		2	0	0	2

Course Objectives:

- Enhance learners' listening and speaking skills to understand and deliver speeches effectively
- Equip students with the skills to write clear, coherent, and grammatically correct texts for various purposes.
- Strengthen the ability to comprehend, interpret, and analyse written English across diverse contexts.

Speaking Skills: Self-Introduction (Tenses, Adjectives) Expressing opinions (Subject-Verb Agreement), Participating in Conversations (Speech Acts - agreeing & disagreeing – synonyms and antonyms**)**

Suggested Activities: Self-Introduction, Just a Minute (JAM) Video recording, Situational role plays, Spell Bee, Word Substitution, Usage of Apps.

Listening Skills: Listening to Simple Conversations (Understanding tone and intent), Short Speeches / Stories, Extracting information, Pronunciation, Listening to Various Accents.

Suggested Activities: Listening and Repeating, Gap fill exercises, Note-taking

Reading Skills: Reading Strategies – (Skimming, scanning, predicting) intensive reading - short passages and long passages on suggested themes (Sentence Patterns, Prefixes and suffixes, idioms and phrases).

Activities: Reading - newspaper and digital articles, Cloze, Reading comprehension, note making and summarising,

Writing Skills: Word Substitution, Sentence Formation, Hints Development (Guided Writing), Writing Different Types of Paragraphs - (Sentence Structure) – Letter Writing / Emails (Informal)

Activities: Error Detection, Picture and poster description, Descriptive, Narrative and Comparative paragraphs, Brainstorming and Mind Mapping - Informal letters/ Emails

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Quiz (10%), Assignments (20%), Speaking Task (10%), Reading Task (10%), Writing Task (10%), Internal Examinations (40%).

References:

1. Miller, K. Q., & Wahl, S. T. (2023). *Business and Professional Communication: KEYS for Workplace Excellence* (5th ed.). SAGE Publications.
2. Kumar, Sanjay & Pushpalatha. (2018). *English Language and Communication Skills for Engineers*. India: Oxford University Press.
3. Sharma, S., & Mishra, B. (2024). *Communication Skills for Engineers and Scientists* (2nd ed.). PHI Learning.

E-resources:

1. Cambridge English – https://www.cambridgeenglish.org/learning-english/grammar-and-vocabulary/
2. Perfect English Grammar – https://www.perfect-english-grammar.com/
3. British Council – Learn English - https://learnenglish.britishcouncil.org/grammar
4. Speechling – https://speechling.com/
5. mePro by Pearson – https://mepro.pearson.com/
6. TED Talks – https://www.ted.com/

	Description of CO	**PO**	**PSO**
CO1	Listen and comprehend spoken English, take and draft notes.	---	---
CO2	Apply vocabulary and grammar appropriately to communicate in written and spoken forms.	PO1(3)	PSO1(2) PSO3(3)
CO3	Analyze texts in different contexts using appropriate reading strategies.	PO2(2)	PSO2(1)
CO4	Communicate thoughts and ideas in real life situations.	PO9(2)	PSO3(2)
CO5	Develop communication skills relevant to engineering and technology.	PO11(1)	PSO3(3)

CS25C02	Computer Programming: Python	L	T	P	C
		2	0	2	3

Course Objectives:

- To equip engineering students with the foundational knowledge and practical skills in Python programming to analyse and solve computational problems effectively.
- To foster problem-solving, critical thinking, and modular programming skills essential for engineering domains.

Introduction to Python: Problem Solving, Problem Analysis Chart, Developing an Algorithm, Flowchart and Pseudocode, Interactive and Script Mode, Indentation, Comments, Error messages, Variables, Reserved Words, Data Types, Arithmetic operators and expressions, Built-in Functions, Importing from Packages.

Practical: Problem Analysis Chart, Flowchart and Pseudocode Practices. (Minimum three)

Control Structures: if, if-else, nested if, multi-way if-elif statements, while loop, for loop, nested loops, pass statements.

Practical: Usage of conditional logics in programs. (Minimum three)

Functions: Hiding redundancy, complexity; Parameters, arguments and return values; formal vs actual arguments, named arguments, Recursive & Lambda Functions.

Practical: Usage of functions in programs. (Minimum three)

Strings & Collections: String Comparison, Formatting, Slicing, Splitting, Stripping, Lists, tuples, and dictionaries, basic list operators, searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values.

Practical: String manipulations and operations on lists, tuples, sets, and dictionaries. (Minimum three)

File Operations: Create, Open, Read, Write, Append and Close files. Manipulating directories, OS and Sys modules, reading/writing text and numbers, from/to a file; creating and reading a formatted file (csv, tab-separated, etc.).

Practical: Opening, closing, reading and writing in formatted file format and sort data. (Minimum three)

Packages: Built-in modules, User-Defined modules, Numpy, SciPy, Pandas, Scikit-learn**.**

Practical: Usage of modules and packages to solve problems. (Minimum three), Project (Minimum Two)

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Project (15%), Assignment Programs (25%), Practical (25%), Internal Examinations (30%)

References:

1. Matthes, E. (2019). *Python crash course: A hands-on, project-based introduction to programming*. No Starch Press.
2. Brown, M. C. (2018). *Python: The complete reference* . McGraw Hill Publishers.

3. Guttag, J. V. (2016). *Introduction to computation and programming using Python: With applications to understanding data*. MIT Press.
4. McKinney, W. (2017). *Python for data analysis: Data wrangling with pandas, NumPy, and IPython*. Shroff/O'Reilly.

E-Resources:

1. Official Python Documentation – https://docs.python.org/3/
2. Python Tutorials – https://www.w3schools.com/python/
3. NumPy – https://numpy.org/doc/
4. SciPy – https://scipy.org/
5. Google's Python class – https://developers.google.com/edu/python/

	Description of CO	**PO**	**PSO**
CO1	Explain the potential usage of Python in engineering applications	---	---
CO2	To apply the concepts of Python in solving engineering problems and formulate new projects.	PO1 (2) PO5 (2)	PSO2(2) PSO3(1)
CO3	To interpret the data and effectively communicate in groups.	PO2 (3) PO8 (1) PO9 (1)	PSO3(1) PSO3(2)
CO4	Adapt new programming concepts and technologies in the profession.	PO11 (1)	PSO2(2)

ME25C04	Makerspace	L	T	P	C
		0	0	4	2

Course Objectives:

1. To impart practical skills in the assembly, disassembly, and welding of components using appropriate tools and techniques.
2. To provide hands-on training in electrical wiring practices, and the use of electronic components, sensors, and actuators.

List of Activities

(A). Dis-assembly & Assembly Practices

i. Tools and its handling techniques.
ii. Dis-assembly and assembly of home appliances – Grinder Mixer Grinder, Ceiling Fan, Table Fan & Washing Machine.
iii. Dis-assembly and assembly of Air-Conditioners & Refrigerators.
iv. Dis-assembly and assembly of a Bicycle.

(B). Welding Practices

i. Welding Procedure, Selection & Safety Measures.
ii. Power source of Arc Welding – Gas Metal Arc Welding & Gas Tungsten Arc Welding processes.
iii. Hands-on session of preparing base material & Joint groove for welding.
iv. Hands-on session of MAW, GMAW, GTAW, on Carbon Steel & Stainless Stell plates / pipes, for fabrication of a simple part.

(C). Electrical Wiring Practices

i. Electrical Installation tools, equipment & safety measures.
ii. Hands-on session of basic electrical connections for Fuses, Miniature Circuit Breakers and Distribution Box.
iii. Hands-on session of electrical connections for Lightings, Fans, Calling Bells.
iv. Hands-on session of electrical connections for Motors & Uninterruptible Power Supply.

(D). Electronics Components / Equipment Practices

i. Electronic components, equipment & safety measures.
ii. Dis-assembly and assembly of Computers.
iii. Hands-on session of Soldering Practices in a Printed Circuit Board.
iv. Hands-on session of Bridge Rectifier, Op-Amp and Transimpedance amplifier.
v. Hands-on session of integration of sensors and actuators with a Microcontroller.
vi. Demonstration of Programmable Logic Control Circuit.

(E). Contemporary Systems

i. Demonstration of Solid Modelling of components.
ii. Demonstration of Assembly Modelling of components.
iii. Fabrication of simple components / parts using 3D Printers.
iv. Demonstration of cutting of wood / metal in different complex shapes using Laser Cutting Machine.

References:

1. Stephen Christena, Learn to Weld: Beginning MIG Welding and Metal Fabrication Basics, Crestline Books, 2014.
2. H. Lipson, Fabricated - The New World of 3D Printing, Wiley, 1st edition, 2013.
3. Code of Practice for Electrical Wiring Installations (IS 732:2019)

	Description of CO	PO	PSO
CO1	Demonstrate proper use and handling of basic hand and power tools.	---	---
CO2	Carry out electrical wiring installations and repairs, applying safety measures in domestic applications.	PO1(3)	PSO2(1)
CO3	Develop solid innovative models through software.	PO5(2)	PSO2(2)
CO4	Adapt and follow safety protocols in the work environment.	PO11(2)	PSO3(2)

UC25A01	Life Skills for Engineers – I	L	T	P	C
		1	0	2	1

Course Objectives

- To equip engineering students with essential life skills encompassing personal and emotional development, effective management of time and stress, financial literacy, digital safety, and civic responsibility.
- To enhance self-awareness, interpersonal skills, and resilience to prepare students for the professional and personal challenges of engineering careers and life beyond academics**.**

Personal and Emotional Development: Self-Awareness & Personality, Emotional Intelligence & Empathy, Positive thinking, Right attitude, Stress & Anger Management, Goal-Setting & Time Management, Growth Mindset & Resilience.

Activities: Personality tests (MBTI, DISC), reflection journals, Empathy circle, role-playing difficult conversations, Guided mindfulness sessions, stress relief toolkit creation, Vision board creation, weekly time audit and planner, Group challenge scenarios, resilience journal.

Management Skills: Financial Literacy: Budgeting & Saving, Nutrition, Health, and Hygiene, Digital Literacy & Online Safety, Civic Responsibility & Ethics

Activities: Create a monthly budget, financial simulation game, Meal planning workshop, physical wellness challenge, Social media audit, privacy and safety scenarios, Community service, values debate.

Weightage: Continuous Assessment: 100%

Assessment Methodology: Assignments (20%), Flipped Class & Worksheets (10%), Practical (30%), Internal Examinations (40%)

References:

1. Khera, S. (2003). *You can win*. Macmillan.
2. Levesque, H. (n.d.). *Life skills 101: A practical guide to leaving home and living on your own*. (Publication year not specified)
3. Mitra, B. K. (2017). *Personality development & soft skills* (3rd impression). Oxford University Press.
4. ICT Academy of Kerala. (2016). *Life skills for engineers*. McGraw Hill Education (India) Private Ltd.

	Description of CO	PO	PSO
CO1	Understand personality traits and emotional intelligence, in interpersonal interactions.	---	---
CO2	To work and execute as a team through successful implementation of set goals.	PO7 (1) PO8 (2) PO9 (2)	PSO3(2)
CO3	Develop and implement best practices in day-to-day life, in terms of planning and execution.	PO11 (3)	PSO3(2)

UC25A02	Physical Education - I	L	T	P	C
		0	0	4	1

Course Objectives:

- To impart the fundamentals of physical education for development of students' physical, mental, and social well-being.
- To instill a lifelong appreciation for physical activity towards the development of positive attitude and fostering values of team work and sportsmanship.

Introduction to physical education: Exercise for Good Posture – Conditioning and Calisthenics for Before start, Jogging, Bending, Twisting, Standing, Sitting and Relaxation, Training on First Aid practices.

Participation of athletic events: Rules and regulations of important athletic events, Sprint, Jumps, Throws and Hurdles.

Skill development in any one of the following outdoor games: Basket Ball, Volley Ball, Ball Badminton, Football, Hockey, Kho-Kho, Kabaddi, Cricket, Hand ball and Tennis.

Skill development in any one of the following indoor games: Shuttle Badminton, Chess and Table Tennis.

Weightage: Continuous Assessment: 100%

Assessment Methodology: Attendance (60%), Quiz (10%), Participation in Sports and Games (20%) and Viva Voce (10%)

References:

1. Singh, A. (2008). Essentials of physical education. Kalyani Publishers.
2. Kamlesh, M. L. (2006). Psychology in physical education and sport (3rd ed.). Metropolitan Book Co.
3. Mangal, S. K. (2009). *Psychology of sports performance*. Sports Publication.

E-resources:

1. **https://www.who.int/health-topics/physical-activity**

	CO Description	PO	PSO
CO1	Understand and explain the importance of physical activity for mental and physical health.	---	---
CO2	Apply basic principles of exercise science in the routine life.	PO1(3)	PSO1(1)
CO3	Develop teamwork, discipline, and leadership through sports and group activities and collaborate effectively.	PO8(3)	PSO3(2)
CO4	Demonstrate independent learning in health, nutrition, and fitness-related topics.	PO11(2)	PSO3(2)

Semester II

MA25C02	Linear Algebra	L	T	P	C
		3	1	0	4

Course Objectives:

- To impart foundational knowledge in linear algebra essential for analysing and solving problems in engineering applications.
- To provide the knowledge on computation using software and interpret key linear algebra concepts using software.

Vector Spaces Introduction to Vector Spaces, Examples, Subspaces, Linear Combinations, Span, Generating Sets, Linear Dependence and Independence, Basis and Dimension, Dimension of Subspaces.

Activities: Open-Source software, exercises to test linear dependence and independence using rank, compute span and basis of a set of vectors, determine the dimension of subspaces, and illustrate the concept of subspace and basis in $\boldsymbol{R^2}/\boldsymbol{R^3}$ with visualization.

Linear Transformations and Diagonalization: Null space, Range, Dimension Theorem (statement only), Matrix representation of a linear transformation, Eigenvalues & Eigenvectors, Diagonalizability.

Activities: Open-Source software, exercises to compute the matrix representation of a linear transformation, find the null space and range of a matrix, and compute eigenvalues and eigenvectors of a matrix.

Inner Product Spaces: Inner product, Norms, Cauchy, Schwarz inequality, Gram, Schmidt orthogonalization, Simple problems (up to $\boldsymbol{R^3}$).

Activities: Open-Source software, exercises to compute inner products and vector norms.

Matrix Decomposition: Orthogonal transformation of a symmetric matrix to diagonal form - Positive definite matrices, QR decomposition, Singular Value Decomposition (SVD), Least squares solutions- simple problems (up to $3 \times 3\ matrices$).

Activities: Open-Source software, exercises to check if a matrix is positive definite, perform QR decomposition and SVD using built-in functions.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%.

Assessment Methodology: Assignment (20%), Software activity (20%), Quiz (20%), Internal Examinations (40%).

References:

1. Friedberg, S. H., Insel, A. J., & Spence, L. E. (2022). *Linear algebra*. Pearson.
2. Lay, D. C., Lay, S. R., & McDonald, J. J. (2020). *Linear algebra and its applications with MATLAB*. Pearson.
3. Bronson, R. (2011). *Schaum's outline of matrix operations*. McGraw-Hill Education.
4. Strang, G., & Thomson, R. (2005). *Linear algebra and its applications*. Brooks/Cole.
5. Lipschutz, S., & Lipson, M. (2009). *Schaum's outline of linear algebra*. McGraw-Hill.
6. Kreyszig, E. (2018). *Advanced engineering mathematics*. Wiley India.

	Description of CO	PO	PSO
CO1	Explain the fundamental concepts of Linear Algebra.	---	
CO2	Compute and interpret eigenvalues and eigenvectors.	PO1(3)	PSO1(2)
CO3	Apply inner product concepts and perform orthogonalization.	PO1 (3)	PSO1(1)
CO4	Compute least squares solutions of linear system of equations.	PO1 (2) PO2 (2)	PSO3(1)
CO5	Use MATLAB to implement and validate key linear algebra concepts	PO5 (1) PO11 (1)	PSO2(2)

FT25201	Fibre science	L	T	P	C
		3	0	0	3

Course Objectives:

To enable the students to learn about Structure and morphology of textile fibres.

Introduction and cultivation of natural fibres: definition of staple fibre, filament; classification of fibres; essential and desirable properties of fibres; fibre forming polymers and its properties; morphological structure of cotton and wool; Cultivation and extraction of natural fibers- cotton, jute, flax; sericulture of silk; extraction of wool fibre; chemical composition; structure and properties of fibres

Activity: List out the properties of various natural fibres.

Manmade fibres: Production sequence of regenerated and modified cellulosic fibres- viscose rayon, acetate rayon, high wet modulus and high tenacity fibres; synthetic fibres- polyester, nylon, polypropylene, polyethylene, acrylic and polyurethane; chemical structure and properties; production principles

Activity: ideality the natural and manmade fibres with the given materials.

Moisture absorption behavior of natural and man-made fibres: conditioning of fibres- mechanism of conditioning and factors influencing conditioning, moisture diffusion in fibres; tensile characteristics; elastic recovery and mechanical conditioning of fibres; Tg and Tm; static electricity in textile fibres; friction and its measurement for fibres

Activity: virtual demonstration of measuring the various properties.

Characterization of fibres: Identification of fibres; transmission and scanning electron microscopes – principle and working; X-ray diffraction techniques – estimation of crystallinity; infrared radiation and dichroism techniques

Activity: Demonstration of various characterization instruments for the fibres.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Quiz (10%), Assignments (20%), Virtual Practice (20%), Internal Examinations (50%)

References:

1. Morton, W. E., & Hearle, J. W. S. (2008). *Physical properties of textile fibres*. The Textile Institute.
2. Mishra, S. P. (2010). *Fibre science and technology*. New Age International Publishers.
3. Mukhopadhyay, S. K. (1992). *Advances in fibre science*. The Textile Institute. ISBN 1870812379.
4. Meredith, R. (1986). *Mechanical properties of textile fibres*. North Holland. ISBN 1114790699 / ISBN-13: 9781114790698.
5. Raheel, M. (Ed.). (1995). *Modern textile characterization methods*. Marcel Dekker. ISBN 0824794737.
6. Mukhopadhyay, S. K. (1989). *The structure and properties of typical melt spun fibres*. *Textile Progress*, 18(4). Textile Institute. ISBN 1870812115.

	Description of CO	PO	PSO
CO1	Classify textile fibres and discuss about the properties of fibres	-	PSO3(1)
CO2	Analyse the structure and properties of natural fibres	PO1(3) PO2(2)	PSO1 (1)
CO3	Discuss the properties of regenerated and synthetic fibres	PO2(1) PO3(1)	PSO2(2)
CO4	Assess the moisture, tensile and thermal properties of textile fibres.	PO2(2) PO3(1)	PSO2(1)
CO5	Demonstrate the structure and properties of natural fibres.	PO11(1)	PSO3(3)

ME25C01	Engineering Drawing	L	T	P	C
		2	0	4	4

Course Objectives:

- To impart knowledge on dimensions and drawing standards.
- To explore the orthographic projection of lines and solids.
- To provide the understanding of orthographic, isometric and perspective views.

Fundamentals: Drawing instruments, Drawing standards (BIS), Lettering in engineering, Sheet layout, elements of dimensioning, Systems of dimensioning. Free hand sketching of 2D & 3D objects, Conics – Ellipse, Parabola and Hyperbola.

Activities: Virtual Demonstration of Conics and Cycloids.

Orthographic Projection: First angle projection, Projection of points, straight lines and planes.

Projection of Solids: Simple Solids, Section of Solids, Development of Surfaces

Activities: Development of models of various solids and virtual demonstration of sectioning, CAD modelling of 2D objects.

Isometric Projection: Isometric Scale, Projection of Simple solids.

Activities: Conversion of 3D into 2D orthographic views, CAD modelling of 3D objects.

Perspective Projection: Simple solids projection

Activities: Virtual demonstration of perspective views.

Project: Development of 2D objects and 3D objects using CAD tools.

Weightage:
Continuous Assessment: 50%
End Semester Examinations: 50%

Assessment Methodology:
Project – 10%, Models - 5%, Assignments - 35% and Internal Examinations - 50%

References:

1. Natarajan, K. V. (2025). A Text Book of Engineering Graphics. Dhanalakshmi Publisher.
2. Venugopal, K., & Prabhu Raja, V. (2022). Engineering Drawing + AutoCAD. New Age International Publishers.

E-Resources:

1. CAD Software – https://www.freecadweb.org/
2. Engineering Drawing and Computer Graphics, Prof. Rajaram Lakkaraju (IIT Kharagpur) – https://onlinecourses.nptel.ac.in/noc22_me105/preview
3. MIT Design Handbook: Engineering Drawing and Sketching – https://ocw.mit.edu/courses/2-007-design-and-manufacturing-i-spring-2009/pages/related-resources/drawing_and_sketching/

	CO Description	PO	PSO
CO1	Explain the advantages of engineering drawing in engineering applications	---	
CO2	Apply the concepts of projections in formulating various solid parts in engineering systems.	PO1(3)	PSO1(2)
CO3	Analyse the various view and interpret the engineering drawings.	PO2(3)	PSO1(2)
CO4	Use CAD tools for creation of various models.	PO3(1)	PSO2(2)
CO5	Critically think and develop innovative models.	PO11(1)	PSO3(1)

PH25C06	Applied Physics (Tech) – II	L	T	P	C
		2	1	0	3

Course Objectives:

- To impart knowledge on physics concepts and explore the potential applications in the fields of engineering and technology.

Thermal Physics: Thermal Expansion- Thermal stress- Thermal resistance - Heat transfer- Thermal conductivity (Virtual demo) - Lee's disc method - Forbe's method - conduction through compound media –thermo-electric power.

Activities: Measurement of thermal conductivity of bad conductors.

Dielectric Properties: Dielectric- ferroelectric materials - Internal field – Clausius Mosotti equation – dielectric loss – Piezo, Pyro electric materials – Applications

Activities: Virtual demonstration of Piezoelectric sensor.

Optical Properties: Classification of optical materials – Luminescence-Phosphors -Polarization – Optical anisotropy - Optical processes in semiconductors – LED characteristics (Virtual demo)

Activities: Virtual demonstration of LED Characteristics

New Engineering Materials: Ceramics –Composites - fibre reinforced plastics -fibre reinforced metals – Shape memory alloys (Virtual Demo) – Biomaterials – hydroxyapatite – Bio-sensors – Polymer semiconductors – CNT (Carbon Nano Tubes)

Activities: Virtual demonstration of 3D structure of CNTs.-

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Quiz (10%), Assignments (30%), Flipped Class (10%), Internal Examinations (50%)

References:

1. Raghavan, V. (2007). *Materials science and engineering*. Prentice Hall of India.
2. Brijlal, & Subramaniyan, N. (2018). *Heat, thermodynamics and statistical physics*. S. Chand.
3. Askeland, D. R. (2010). *Materials science and engineering*. Brooks/Cole.
4. Kasap, S. O. (2007). *Principles of electronic materials and devices*. McGraw-Hill Education.

E-resources:

1. Thermal conductivity -Understanding Thermal Conductivity in Solids - https://youtu.be/VcFqqdGcwrw-
2. Applications of Piezo and pyro electric materials -NDLI: Lecture 40- Applications of Piezoelectric and Pyroelectric Materials
3. White LED_ https://archive.nptel.ac.in/courses/108/108/108108122/
4. Shape memory alloys: https://nescacademy.nasa.gov/video/00a31561480547248033a1c2df6f87831d

	Description of CO	PO	PSO
CO1	Explain the concepts of physics in technology stream.	---	
CO2	Apply appropriate techniques in physics to solve engineering problems.	PO1(3)	PSO1(3)
CO3	Analyse physical systems and interpret data from the virtual studies in the core branches in technology streams.	PO2(2)	PSO1(2)

EE25C01	Basic Electrical and Electronics Engineering	L	T	P	C
		3	0	0	3

Course Objectives:

- To impart foundational knowledge in principles and applications of electrical and electronics engineering.

DC Fundamentals: Current and Voltage sources, Resistance, Inductance and Capacitance; Ohm's law, Kirchhoff's law, Series parallel combination of R, L and C components, Voltage Divider and Current Divider Rules.

Activities: Virtual Demonstration of electrical laws & circuits, Hands-on Breadboarding, Solving GATE questions.

AC Fundamentals: Faraday's Laws of Electro-magnetic Induction, Definition of Self and Mutual Inductances, Generation of sinusoidal voltage, Instantaneous & RMS values of sinusoidal signals, Introduction to 3-phase systems, Electrical Safety, Fuses and Earthing.

Activities: Virtual Demonstration of electromagnetic induction, Measurement of instantaneous and RMS values of AC signals, Solving GATE questions.

Electric Machines: DC Machines, Transformers, Star and delta Connections, Three phase Induction motors, Synchronous Generators, Single Phase Induction Motors, Stepper Motor, Universal Motor and BLDC motor.

Activities: Virtual demonstration of step-up and step-down transformers, Virtual working models of Universal and BLDC motors, Solving GATE questions.

Semiconductor Devices: PN junction diodes, Zener Diode, Voltage regulator, BJT & FET Transistors, Timers, Operational Amplifiers.

Activities: Virtual demonstration of V-I characteristics of PN junction and Zener diodes using simulation, inverting/non-inverting amplifiers, Solving GATE questions.

Digital Electronics: Boolean algebra, Basic and Universal Gates, adders, multiplexers, demultiplexers and flip-flops.

Activity: Online logic gate simulators, Solving GATE questions.

Microcontrollers: Introduction, Architecture, Potential Applications.

Activities: Physical demonstration of a microcontroller and online simulation of microcontroller.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Quiz (5%), Assignments (25%), GATE Questions (20%), Internal Examinations (50%)

References:

1. Del Toro, V. (2022). *Electrical engineering fundamentals*. Pearson Education.
2. Hambley, A. R. (Year). *Electrical engineering: Principles and applications* (Edition if known). Publisher.
   (Note: Please provide the year and edition for complete citation)
3. Mehta, V. K., & Mehta, R. (2006). *Principles of electrical engineering and electronics*. S. Chand Publishing.

E-resources:

1. https://archive.nptel.ac.in/courses/108/106/108106172/
2. Circuit Simulator – https://www.falstad.com/circuit/

	Description of CO	**PO**	**PSO**
CO1	Understand and explain basic electrical and electronic concepts.	---	
CO2	Apply and analyse electrical circuits in real-time applications.	PO1 (3) PO2 (1)	PSO1(2)
CO3	Identify and utilise key electronic devices used in engineering applications	PO2 (2)	PSO1(2)

CY25C04	Applied Chemistry (Tech-TT) – II	L	T	P	C
		2	0	0	2

Course Objectives

- To impart knowledge on chemical principles used in various fields of textile technology.
- To build a foundation in applied chemistry relevant to materials, interfaces, and surface technologies.

Interface and Colloids: Interface region, Interface control, Emulsion and Foams, Surfactant action.

Activities: Demonstration of oil-water interfaces, Formation of micelles.

Oils, Fats and Soaps: Types of oils, Properties of oils, Fats – classification, Soaps and detergents.

Activities: Seminar on the saponification of edible, non-edible and essential oils.

Lubricants: Mechanism of lubrication, Preparation of Petro lubes, Characteristics, Semisolid lubricant, Solid lubricants.

Activities: Virtual demonstration of lubrication, Assignment on the lubricants used in automotive engines.

Adhesives: Adhesive action, Classification of adhesives, Factors influencing adhesive action, Synthetic adhesives.
Activities: Adherence of liquids on surfaces (Flipped Class sessions).

Colourants: Theory of colour and constitution, Classification of dyes based on application, Chemistry and synthesis of dyes.

Activities: Study of bonding of dyes with fabric (Flipped Class sessions).

Chemical Auxiliaries: Functions, Classification, Preparation, Estimation using Iodometry, Permanganometry.

Activities: Estimation of available chlorine, Determination of strength of hydrogen peroxide, potential hazards of auxiliaries.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Quiz (5%), Assignments (20%), Flipped Class (15%), Virtual Practice (10%), Internal Examinations (50%)

References:

1. Jain, J., & Jain, S. (2015). Engineering Chemistry. Dhanpat Rai Publishing Company.
2. Dara, S. S., & Umare, S. S. (2024). A textbook of Engineering Chemistry. S. Chand & Company Ltd.
3. Sharma, B. K. (2014). Industrial Chemistry. Goel Publishing House, Krishna Prakashan Media (P) Ltd.
4. Puri, B. R., Sharma, L. R., & Pathania, S. (2020). Principles of Physical Chemistry. Vishal Publishing Co.

	Description of CO	PO	PSO
CO1	Explain the applications of chemistry in the field of textile technology.	---	
CO2	Apply chemistry concepts in various textile applications.	PO1(3)	PSO1(2)
CO3	Analyse the systems and interpret data from the virtual studies in the field of textile technology.	PO2(2)	PSO2(2) PSO3(1)

UC25H02	தமிழர்களும் தொழில்நுட்பமும் / Tamils and Technology	L	T	P	C
		1	0	0	1

நெசவு மற்றும் பானைத் தொழில்நுட்பம்: சங்க காலத்தில் நெசவுத் தொழில், பானைத் தொழில்நுட்பம், கருப்பு சிவப்பு பாண்டங்கள், பாண்டங்களில் கீறல் குறியீடுகள்.

வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு, சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள், மாமல்லபுரச் சிற்பங்களும், கோவில்களும், சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் – நாயக்கர் காலக் கோயில்கள், மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் – செட்டிநாட்டு வீடுகள், பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ, சாரோசெனிக் கட்டிடக் கலை.

உற்பத்தித் தொழில் நுட்பம்: கப்பல் கட்டும் கலை, உலோகவியல், இரும்புத் தொழிற்சாலை, இரும்பை உருக்குதல், எஃகு, வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள், நாணயங்கள் அச்சடித்தல், மணி உருவாக்கும் தொழிற்சாலைகள், கல்மணிகள், கண்ணாடி மணிகள், சுடுமண் மணிகள், சங்கு மணிகள், எலும்புத்துண்டுகள், தொல்லியல் சான்றுகள், சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: அணை, ஏரி, குளங்கள், மதகு, சோழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம், கால்நடை பராமரிப்பு, கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள், வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள், கடல்சார் அறிவு, மீன்வளம், முத்து மற்றும் முத்துக்குளித்தல், பெருங்கடல் குறித்த பண்டைய அறிவு, அறிவுசார் சமூகம்.

அறிவியல் தமிழ் மற்றும் கணித்தமிழ்: அறிவியல் தமிழின் வளர்ச்சி, கணித்தமிழ் வளர்ச்சி, தமிழ் நூல்களை மின்பதிப்பு செய்தல், தமிழ் மென்பொருட்கள் உருவாக்கம், தமிழ் இணையக் கல்விக்கழகம், தமிழ் மின் நூலகம், இணையத்தில் தமிழ் அகராதிகள், சொற்குவைத் திட்டம்.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Quiz (20%), Assignments (30%), Internal Examinations (50%)

Text-Cum-Reference Books

1. தமிழக வரலாறு, மக்களும் பண்பாடும், கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை, ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi – 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

UC25H02	Tamils and Technology	L	T	P	C
		1	0	0	1

Weaving and Ceramic Technology: Weaving Industry during Sangam Age, Ceramic technology, Black and Red Ware Potteries (BRW), Graffiti on Potteries.

Design and Construction Technology: Designing and Structural construction House & Designs in household materials during Sangam Age, Building materials and Hero stones of Sangam age, Details of Stage Constructions in Silappathikaram, Sculptures and Temples of Mamallapuram, Great Temples of Cholas and other worship places,Temples of Nayaka Period, Type study (Madurai Meenakshi Temple), Thirumalai Nayaka rMahal, Chetti Nadu Houses, Indo, Saracenic architecture at Madras during British Period.

Manufacturing Technology: Art of Ship Building , Metallurgical studies, Iron industry, Iron smelting, steel, Copper and gold Coins as source of history - Minting of Coins, Beads making, industries Stonebeads, Glass beads, Terracotta beads, Shell beads / bone beats, Archeological evidences, Gem stone types described in Silappathikaram.

Agriculture and Irrigation Technology: Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompuof Chola Period, Animal Husbandry - Wells designed for cattle use , Agriculture and Agro Processing -Knowledge of Sea -Fisheries, Pearl, Conche diving, Ancient Knowledge of Ocean -Knowledge Specific Society.

Scientific Tamil & Tamil Computing: Development of Scientific Tamil, Tamil computing, Digitalization of Tamil Books, Development of Tamil Software, Tamil Virtual Academy, Tamil Digital Library, Online Tamil Dictionaries, Sorkuvai Project.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Quiz (20%), Assignments (30%), Internal Examinations (50%)

Text-Cum-Reference Books

1. தமிழக வரலாறு, மக்களும் பண்பாடும், கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ், முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி, வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை, ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils, The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi , 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

ME25C05	Re-Engineering for Innovation	L	T	P	C
		0	0	4	2

Course Objectives:

- To cultivate foundational skills in prototyping, and automation for development of prototypes with real-world applications.
- To provide a comprehensive, hands-on exposure to product development through reverse engineering concepts.

Bootcamp 1: Introduction to Product Development, Reverse Engineering, Overview of the product lifecycle, Hands-on disassembly of simple products, Practice of basic measurements and sketching, Introduction to CAD modeling of disassembled parts, Virtual assembly of parts.

Bootcamp 2: Embedded System Programming (Open-source platforms), Practice of interfacing sensors, reading data, automation in home, healthcare and agriculture.

Reverse Engineering: Sketch and prototype alternative designs, Group brainstorming sessions, Manufacture prototype parts using 3D printing and / or workshop tools, Assemble prototype product.

Weightage: Continuous Assessment: 60%, End Semester Examinations: 40%

Assessment Methodology: Project (30%), Assignment (10%), Practical (30%), Internal Examinations (30%)

References:

1. Wang, W. (2010). Reverse engineering: Mechanisms, structures, systems & materials. CRC Press.
2. Margolis, M. (2020). Arduino cookbook: Recipes to begin, expand, and enhance your projects (3rd ed.). O'Reilly Media.

E-resources:

1. GrabCAD – https://grabcad.com/
2. GitHub – https://github.com/

	Description of CO	PO	PSO
CO1	Understand the product development lifecycle, including stages such as concept generation, design, prototyping, and testing.	---	
CO2	Apply reverse engineering techniques to analyze and document existing products.	PO1 (3) PO2 (2)	PSO1(2)
CO3	Collaborate in teams to fabricate prototypes using appropriate tools.	PO5 (2) PO8 (1) PO9 (1)	PSO3(3)
CO4	Engage in independent learning and continuously adapt to emerging technologies in product design	PO11 (2)	PSO2(2) PSO3(2)

EN25C02	English Essentials – II	L	T	P	C
		1	0	2	2

Course Objectives

- Enable learners to improve fluency and accuracy in spoken and written communication.
- Develop learners' ability to articulate ideas clearly and effectively in formal and informal spoken interactions.
- Help learners construct well-organised written documents relevant to academic and workplace contexts.

Oral Communication: Types (Verbal and Nonverbal), Interpersonal and group communication, Telephonic conversation.

Suggested Activities: Short presentations, Debates, Formal Speeches (Welcome, Vote of Thanks and introducing guests), Listen and respond to short podcasts.

Business Correspondence: Email Communication, Formal Letters (Types), Business Meeting.

Suggested Activities: Email and letter writing (Complaint, request, permission), Agenda, minutes of the meeting.

Academic Writing: Paraphrasing, Summarizing, Essay Writing, Instructions and Recommendations.

Suggested Activities: Essay writing (Cause and effect, argumentative, persuasive), User guides/ manuals, policy document.

Team Work: Leadership Skills (Team building, Team Leader, Team player), Negotiation and Problem solving skills

Suggested Activities: SWOT Analysis, Brainstorming and Group discussions.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Worksheets (10%), Group Activity (20%), Report Writing (20%), Internal Examinations (50%)

References:

1. Koneru Aruna. (2020). English Language Skills for Engineers. McGraw Hill Education.
2. Taylor, Shirley & Chandra .V. (2010). Communication for Business A Practical Approach. India: Pearson Longman.
3. Ian Badger, et al., (2014). Listening: B2 (Collins English for Life: Skills), Collins.
4. Raymond Murphy (2019), Grammar in Use, Cambridge University Press.

E-resources:

1. Communication for Business Success - https://open.umn.edu/opentextbooks/textbooks/8
2. TED Talks – https://www.ted.com/

	Description of CO	PO	PSO
CO1	Demonstrate effective communication skills both in academic and professional contexts.	---	
CO2	Develop engaging and meaningful business correspondence.	PO1(3)	PSO3(2)
CO3	Participate actively in group discussions by analysing critically from different views.	PO2(2) PO8(1)	PSO3(3)
CO4	Create coherent written texts and documents for various purposes.	PO9(2)	PSO3(2)
CO5	Adapt communication styles to global environments.	PO11(1)	PSO2(2)

UC25A03	Life Skills for Engineers – II	L	T	P	C
		1	0	2	1

Course Objectives:

- To impart and cultivate analytical reasoning, innovative thinking, effective collaboration, and ethical leadership to prepare students for complex challenges in professional and personal environments.

Critical Thinking: Creativity, Critical Thinking, Collaboration, Problem Solving, Decision Making, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity, Critical thinking Vs Creative thinking, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.

Activities: Two-Brainstorm Method, “30 Circles” Challenge, “Desert Survival” Simulation, Lateral thinking riddles and puzzles, "What If?" Scenario Writing, Fast vs. Slow Thinking Game, Creativity Myth Busters

Problem Solving: Techniques, Six Thinking Hats, Mind Mapping, Forced Connections. Analytical Thinking, Numeric, symbolic, and graphic reasoning. Scientific temperament and Logical thinking.

Activities: Case study analysis, Escape Room challenge.

Leadership: Leadership Styles & Self-Assessment, Communication & Active Listening, Decision-Making & Responsibility, Teamwork & Delegation, Empathy, Integrity & Conflict Management, Vision, Motivation & Goal-Setting.

Activities: Crisis Leadership Simulation, Tower Challenge, Leadership Dilemmas Role-Play, Team Vision Board

Weightage: Continuous Assessment: 100%

Assessment Methodology: Assignments (20%), Flipped Class & Worksheets (10%), Practical (30%), Internal Examinations (40%)

References:

1. De Bono, E. (2017). *Six thinking hats*, Little, Brown Book Group.
2. Facione, P. A. (2015). *Critical thinking: What it is and why it counts*. Insight Assessment.
3. Kahneman, D. (2011). *Thinking, fast and slow*. Farrar, Straus and Giroux.
4. Whetten, D. A., & Cameron, K. S. (2016). *Developing management skills*. Pearson.

	Description of CO	PO	PSO
CO1	Explain the importance of leadership and management skills in life.	---	
CO2	Apply and demonstrate creative thinking techniques to generate innovative solutions.	PO7 (3)	PSO1(1) PSO2(1)
CO3	Exhibit effective collaboration and communication skills through teamwork, active listening, and conflict resolution strategies.	PO8 (2)	PSO3(3)
CO4	Integrate scientific temperament and logical reasoning into c problem solving in engineering and real-world contexts.	PO11 (2)	PSO2(1) PSO3(2)

UC25A04	Physical Education - II	L	T	P	C
		0	0	4	1

Course Objectives:

- To impart knowledge on gymnastic exercises and pressing needs for upskilling in a particular game.

Basic gymnastics exercises: Warming up, Suitable exercise, Lead up games, Safety education, Movement education, Balanced Walk, execution, floor exercise, tumbling/acrobatics, grip, release, swinging, parallel bar exercise, horizontal bar exercise, flic-flac-walk and pyramids.

Upskilling in any one of the athletics: Broad Jump, High Jump, Triple Jump, Relay Sprints, Javelin Throw, Discuss Throw, Shot Put, Short and Long-distance Running.

Advance skills in any one of the indoor/outdoor games, which has been opted by the student in the I semester.

Weightage: Continuous Assessment: 100%

Assessment Methodology: Attendance (60%), Quiz (10%), Participation in Sports and Games (20%) and Viva Voce (10%)

References:

1. Singh, A. (2008). Essentials of physical education. Kalyani Publishers.
2. Kamlesh, M. L. (2006). Psychology in physical education and sport (3rd ed.). Metropolitan Book Co.
3. Mangal, S. K. (2009). *Psychology of sports performance*. Sports Publication.
4. Kandappan, K. (2004). *Foundations of physical education*. Friends Publications.

E-resources:

1. **https://www.who.int/health-topics/physical-activity**

	CO Description	PO	PSO
CO1	Understand and explain the importance of physical activity for mental and physical health.	---	
CO2	Apply safety principles and methods during sports activities.	PO1(3)	PSO3(1)
CO3	Develop teamwork, discipline, and leadership through sports and group activities and collaborate effectively.	PO8 (3)	PSO3(2)
CO4	Demonstrate the advanced technical skills and strategic understanding in the game of their interest.	PO11(1)	PSO3(2)

Foreign Language^

UC25F01	Deutsch – I	L	T	P	C
		1	0	2	1

Course Objectives:

- To impart fundamentals of the Deutsch language, including reading, writing systems, pronunciation, and speaking.

Basics & Introduction: German alphabet and pronunciation, Basic greetings and farewells, Introducing yourself and others (Ich heiße…, Wer bist du?), Numbers 1–100 and days of the week, Personal pronouns (ich, du, er, sie…), Sentence structure (SVO word order).

Activities: Alphabet spelling game, short skits, Use color-coded cards for SVO sentences.

Grammar Essentials & Everyday Vocabulary: Present tense of regular verbs (spielen, arbeiten, machen…), Common irregular verbs: sein (to be), haben (to have), gehen, kommen, Articles and gender (der, die, das; ein, eine), Simple questions and negation (nicht, kein), Describing people and things: adjectives and colors, Family, school, food, and common objects vocabulary.

Activities: Conjugate regular and irregular verbs, “Question Chain” game, Create a simple family tree.

Everyday Communication in German: Asking for and giving directions, Telling the time and talking about schedules, Ordering food and drinks at a café or restaurant, Talking about hobbies, weather, and daily routines, Listening to short conversations and responding appropriately, Introduction to German culture and formal/informal language use (du vs Sie).

Activities: Ordering food and drinks, Give directions, Formal / Informal greetings, Do’s and Don’ts.

Weightage: Continuous Assessment: 100%

Assessment Methodology: Assignments (30%), Quiz (10%) and Internal Examinations 60%

References:

1. Funk, H., Kuhn, C., & Demme, S. (2015). Menschen A1: Deutsch als Fremdsprache Kursbuch. Hueber Verlag.

	CO Description	PO	PSO
CO1	Understand simple spoken Deutsch in everyday contexts.	---	
CO2	Communicate with widely used Deutsch words effectively.	PO9 (2)	PSO3(2)
CO3	Develop the skills necessary for self-directed learning and continuous improvement in Deutsch language.	PO11 (1)	PSO3(2)

UC25F02	Japanese – I	L	T	P	C
		1	0	2	1

Course Objectives:

- To impart fundamentals of the Japanese language, including reading, writing systems, pronunciation, and speaking.

Writing Systems & Basic Communication: Introduction to Hiragana: vowels, basic characters, reading & writing, Introduction to Katakana: basic characters and usage, Basic greetings and farewells (こんにちは, おはようございます, さようなら), Introducing yourself (名前、出身、年齢), Basic sentence structure: Subject–Object–Verb, Numbers 1–100, days of the week, classroom expressions.

Activities: Flashcard games and writing drills, Self-introduction, Numbers & date-matching, Greeting expressions, Listening to audio.

Grammar & Everyday Vocabulary: Particles: は (wa), を (wo), の (no), へ (e), に (ni), Present tense verbs: です, ます-form conjugation (たべます、のみます), Negative forms: ではありません, ません, Describing people and objects using adjectives (い and な), Question formation: なに、どこ、だれ、いつ, Vocabulary for family, food, colors, and basic actions.

Activities: Verb conjugation drills, Guessing game, Picture description, “Shopping” with food vocab and counters

Conversation & Cultural Etiquette: Talking about routines and schedules (daily verbs, time expressions), Asking and giving simple directions (〜はどこですか？), Ordering food and making polite requests (〜をください、〜をおねがいします), Expressing likes and dislikes (すき・きらい), Listening to short conversations and identifying key phrases, Introduction to formal/informal speech and Japanese etiquette.

Activities: Skits and role-plays, daily schedule, beginner-level dialogue, Group discussion on etiquette.

Activities: Practice worksheets and flashcards for hiragana, Writing drills and reading simple katakana words, Dialogue practice for greetings and self-introduction, Sentence construction exercises with basic SOV structure, Particle usage exercises and short dialogues, Role-play scheduling, shopping, and telling time, Verb conjugation drills for common verbs, Descriptive sentence exercises using adjectives, Practice Q&A dialogues forming questions and negations, Kanji writing practice and quizzes for basic characters, Vocabulary tests and conversational practice on daily topics, Oral presentations and listening comprehension quizzes.

Weightage: Continuous Assessment: 100%

Assessment Methodology: Assignments (30%), Quiz (10%) and Internal Examinations 60%

References:

1. Banno, E., Ikeda, Y., Ohno, Y., Shinagawa, C., & Tokashiki, K. (2011). Genki I: An integrated course in elementary Japanese. The Japan Times.
2. The Japan Foundation. (2017). Marugoto Japanese language and culture starter (A1) course book for communicative language activities. Goyal Publishers.

	CO Description	PO	PSO
CO1	Understand simple spoken Japanese in everyday contexts.	---	
CO2	Communicate with widely used Japanese words effectively.	PO9 (2)	PSO3(2)
CO3	Develop the skills necessary for self-directed learning and continuous improvement in Japanese language.	PO11 (1)	PSO3(2)

UC25F03	Korean – I	L	T	P	C
		1	0	2	1

Course Objectives:

- To impart fundamentals of the Korean language, including reading, writing systems, pronunciation, and speaking.

Fundamentals of Korean: Introduction to Hangul: consonants and vowels, Basic pronunciation and syllable formation, Common greetings and self-introductions, Numbers (Sino-Korean and Native Korean basics), Basic sentence structure (Subject-Object-Verb), Simple expressions (e.g., 감사합니다, 안녕하세요).

Activities: Writing and reading Hangul practice sheets, Pronunciation drills and audio repetition, Dialogue practice for greetings and self-introduction, Counting and number exercises.

Essential Grammar and Vocabulary: Particles (은/는, 이/가, 을/를) and usage, Basic verbs and present tense conjugation, Sentence patterns: affirmative, negative, interrogative, Common adjectives and descriptive sentences, Expressing possession and location, Asking simple questions (어디, 뭐, 누구).

Activities: Verb conjugation and sentence formation drills, Role-play conversations for shopping and daily routines, Descriptive writing and speaking exercises, Question and answer practice.

Everyday Korean Communication: Polite speech levels and honorifics introduction, Talking about time, dates, and schedules, Ordering food, shopping phrases, counting objects, Simple directions and transportation vocabulary, Listening practice with short dialogues, Cultural notes on etiquette and communication.

Activities: Role-play ordering at a restaurant or buying items, Listening comprehension exercises, Giving and asking for directions practice, Group conversations and presentations.

Weightage: Continuous Assessment: 100%

Assessment Methodology: Assignments (30%), Quiz (10%) and Internal Examinations 60%

References:

1. King, R., Yeon, J., & Brown, A. (2015). Elementary Korean. Tuttle Publishing.
2. Cho, Y., Lee, H., Schulz, C., Sohn, H.-M., & Sohn, S.-O. (2001). Integrated Korean: Beginning 1. University of Hawai'i Press.

	CO Description	PO	PSO
CO1	Understand simple spoken Korean in everyday contexts.	---	
CO2	Communicate with widely used Korean words effectively.	PO9 (2)	PSO3(2)
CO3	Develop the skills necessary for self-directed learning and continuous improvement in Korean language.	PO11 (1)	PSO3(2)

SEMESTER III

MA25C13	Probability and Statistics	L	T	P	C
		3	1	0	4

Course Objectives: The Objectives of the course are to introduce data collection methods, classification techniques, and graphical representation of data using charts and plots, to explain the fundamental concepts of descriptive statistics, probability theory, random variables, and hypothesis testing for analyzing data and to demonstrate the application of statistical techniques such as experimental design and process control using R/Python for data-driven decision-making.

Descriptive Statistics: Collection of Data-Classification-Tabulation-Graphical Representation – Simple Bar Chart – Pie Chart -Measures of Central Tendency: Arithmetic Mean, Median and Mode – Measures of Variation: Range, Quartile Deviation - Standard Deviation and Coefficient of Variation – Five Number Summary – Box Plot Technique.

Activities: Application of descriptive statistics and data presentation methods using R/ Python programming and Analysing data using Box Plots using R/ Python programming.

Probability and Random Variables: Axioms of probability - Conditional probability – Total probability – Bayes' theorem Random variable – Distribution function – properties – Probability mass function – Probability density function – Moments - Standard Distributions - Binomial, Poisson and Normal Distributions-Problems, Uniform Distribution and Exponential Distribution (Simple Problems)

Activities*:* Application of various distributions using R/ Python programming.

Two-Dimensional Random Variables: Joint distributions – Marginal and conditional distributions – Expected values of functions of two variables– Correlation and regression (for discrete data only) - Central limit theorem – Statement and Simple Problems

Activities: Applications of Correlation and Regression using R/ Python programming.

Testing of Hypothesis: Large sample tests for single mean and difference of means – Small samples tests based on t and F distributions (single mean, difference of means, paired t- test and variance ratio test) – Chi-square test for independence of attributes and goodness of fit.

Activities: Application of Student – t test, F test ,Chi –s square test using R/ Python programming.

Design of Experiments: Analysis of Variance (ANOVA) – Completely Randomized Design (CRD) – Randomized Block Design (RBD) – Latin Square Design (LSD)

Activities: Application and visualization of One-way ANOVA and Two -way ANOVA using R/ Python programming.

Weightage: Continuous Theory Assessment: 20%, Continuous Lab Assessment: 20%, End Semester Examinations: 60%

Assessment Methodology: Quiz - 10%, Assignments - 20%, Lab Manual - 15%
Lab Examination - 15%, Internal Examinations - 40%

References:

1. Walpole R. E., Myers S.L. & Keying Ye, “Probability and Statistics for Engineers and Scientists”, Pearson Education Inc, 9th edition, 2024.
2. Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani, “An Introduction to Statistical Learning with Applications in R”, Springer, 2021.
3. Johnson R. A., Miller & Freund’s, “Probability and Statistics for Engineers”, 9th Edition, Pearson Education, Delhi, 2020.
4. Charles Henry Brase and Corrinne Pellillo Brase, “Understandable Statistics: Concepts and Methods”, Cengage Learning, 12th Edition, 2018.
5. Richard A. Johnson and Dean W. Wichern, “Applied Multivariate Statistical Analysis”, 6th Edition, Pearson Education, Asia, 2012.
6. Anderson, T. W, “An Introduction to Multivariate Statistical Analysis”, 3rd edition, John Wiley and Sons, 2009.

E-resources:

1. NPTEL – Descriptive Statistics with R Software - https://onlinecourses.nptel.ac.in/noc22_mg87/preview
2. MIT OCW – Introduction to Probability and Statistics (18.05, Spring 2022) - https://ocw.mit.edu/courses/18-05-introduction-to-probability-and-statistics-spring-2022/
3. MIT OCW – Statistics for Applications (18.650, Fall 2016) - https://ocw.mit.edu/courses/18-650-statistics-for-applications-fall-2016/
4. Control Charts – Coursera: https://www.coursera.org/learn/stability-and-capability-in-quality-improvement#modules

CO Mapping with PO & PSO:

	CO Description	PO Mapping	PSO
CO1	Understand concepts of descriptive statistics, probability theory and testing of hypothesis.	-	-
CO2	Apply probability distributions and statistical methods to solve engineering problems	PO1(3)	PSO1(1)
CO3	Analyze data using correlation, regression, and probability models.	PO2(3)	PSO1(2) PSO3(1)
CO4	Utilize hypothesis testing, ANOVA for data-driven decision-making.	PO5 (3) PO11 (2)	PSO2(2)

FT25301	Basics of Textile Technology	L	T	P	C
		3	0	0	3

Objectives

- To enable the students to learn about the basics of fibre forming, yarn production, fabric formation, coloration of fabrics and garment manufacturing

Basics of Fibre Spinning: Definition of fibre, classification of textile fibers and properties; polymer and polymerization; Spinning Types – wet spinning, dry spinning, melt spinning, gel spinning, dope spinning.

Activities: Identification of fibres

Basics of Yarn Spinning: Sequence of machineries in short staple yarn spinning from ginning to cone winding and their objectives. yarn properties, yarn numbering systems;

Activities: Solve problems on yarn numbering systems (direct and indirect systems)

Basics of Fabric Production: Woven fabric – warp, weft, weaving, path of warp; looms – classification, handloom and its parts, powerloom, automatic looms, shuttleless looms, special type of looms; preparatory machines for weaving process and their objectives; knitting – classification, principle, types of fabrics; nonwoven process – classification, principle, types of fabrics. Fabric specifications and fabric properties.

Activities: Identifying and sketching of primary, secondary and tertiary motions of weaving process

Basics of Chemical Processing: Objectives of the processes - singeing, desizing, scouring, bleaching, mercerization; dyeing- classification of dyes, types of dyeing techniques; printing –types and styles of printing; finishing treatments – chemical and mechanical finishing.

Activities: Assignment on pre-treatment processes (singeing to mercerization), Classify dyes and match them with suitable fibres and dyeing methods, Compare printing styles and finishing techniques based on end-use applications.

Basics of Garment Manufacturing: Overview of Apparel Industry, Basic principles of pattern making and grading, marker planning, spreading, cutting, sorting, sewing, finishing and packing.

Activities: Flow diagram of the Garment manufacturing process, Pattern preparation

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%.

Assessment Methodology: Assignments (20%), Solution to application-oriented problems using software (20%), Solving of competitive exam questions (20%), MCQ/Quiz (20%), Internal Assessment

References

1. Hornberer M., Eberle H., Kilgus R., Ring W and Hermeling H., “Clothing Technology: From Fibre to Fabric”, Europa Lehrmittel Verlag, 2008, ISBN: 3808562250 / ISBN: 978- 3808562253.
2. Wynne A., “Motivate Series-Textiles”, Maxmillan Publications, London, 1997.

3. Carr H. and Latham B., “The Technology of Clothing Manufacture” Backwell Science, U.K., 1994, ISBN: 0632037482 / ISBN:13: 9780632037483
4. Morton W. E. and Hearle J. W. S., “Physical Properties of Textile Fibres”, The Textile Institute, Washington D.C., 2008.
5. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002.
6. Shenai V. A., “Chemistry of Dyes and Principles of Dyeing, Sevak Publications, Mumbai, 1995
7. Lord P.R. and Mohammed M.H., Weaving – Conversion of Yarn to Fabric, Merrow Publication,1992
8. Banerjee N. N., “Weaving Mechanism”, Textile Book House, ISBN: B001A1S41A, 1986.
9. Booth J. E., “Textile Mathematics Volume 3”, The Textile Institute, Manchester, 1977, ISBN: 090073924X.
10. Marks R. and Robinson T. C., “Principles of Weaving”, The Textile Institute, Manchester, 1989, ISBN: 0900739258.
11. Hearle J.W.S., “Polymers and Their Properties, Vol.1. Fundamentals of Structures and Mechanics”, Ellis Horwood, England, 1982
12. Shore J., “Colourants and Auxiliaries: Volume II Auxiliaries”, Wood head Publishing Ltd, 2002

E-resources:

1. NPTEL Online Courses on Fibre Science, Spinning Technology, Fabric Manufacturing, Textile Chemical Processing, and Apparel Production, IITs, India.

CO Mapping with PO & PSO:

CO	CO Description	PO Mapping	PSO Mapping
CO1	Understand the principles of fibre formation, yarn properties, fabric production, and chemical processing techniques.	–	–
CO2	Apply knowledge of yarn numbering, fabric specifications, and garment production processes to practical textile and apparel applications.	PO1 (3)	PSO1 (2)
CO3	Analyze different fabric production methods, chemical processing techniques, and their influence on textile properties and performance.	PO2 (3) PO5 (2)	PSO2 (2)
CO4	Evaluate textile materials, processing methods, and garment manufacturing techniques for suitable, sustainable, and consumer-oriented applications.	PO3 (2) PO7 (1)	PSO3 (2)

FT25302	Fundamentals of Garment Manufacturing	L	T	P	C
		3	0	0	3

Objectives:

- To enable the students to learn fundamentals of garment manufacture

Apparel Industry Process Flow: Introduction to Indian apparel industry. Structure of an apparel industry-work flow, Pre production planning; types of samples and sample approval; Technical pack, Specification sheet – preparation, analysis and approval.

Activities: Analyze an existing apparel industry tech pack and develop a comprehensive tech pack for a selected garment style, including specifications, measurements, materials, and technical details

Raw Material Selection: Requirements of fabric, types and applications of garment accessories and trims – Labels, linings, inter-linings, waddings, lace, braid, elastic, hook and loop fasteners, shoulder pads, eyelets, zip fasteners, buttons, rivets. sewing threads – types and construction

Activities: Identify and list various trims and accessories from different garments

Pattern Layout Planning: Spreading - modes of spreading, different fabric packages, spreading tension, uniformity and alignment. Importance of grain in garment performance. Principles and types of layouts and marker planning - woven fabric lay, knitted fabric lay, types of fabric lay and Marker efficiency. Principles of cutting and cut order plan, bundling and numbering. Control parameters and planning for inspection to numbering

Activities: Fabric inspection, carry out spreading for striped and checked fabrics, marker planning and cutting process in garment production with industry examples

Production Systems: Production systems- individual system; Factory production system- batch production system, progressive bundle system, straight line system, progressive bundle system, conveyor belt system, unit production system, modular production system, quick response system and just in time system. Quality control in sewing section, assembly of garment components and operational break down

Activities: Identification of production system based on garment, collection of garment defects picture

Apparel Finishing Process: Fusing requirements and process; stain removal process and machine, ironing and pressing process and machines. Pressing Machines: buck press for shirt and pant, carousal press and tunnel press. Packaging – types, functions and suitable machines– types of packaging forms

Activities: Case study on garment finishing processes (fusing, stain removal, pressing and packaging) with industry examples

Outcomes:

Upon completion of this course, the students shall be able to

- Understand the structure of apparel industry and production planning
- Define and classify the types of accessories, trims, stitches, seams

- Explain Inspection, spreading and cutting processes
- Discuss the production systems followed in apparel manufacturing
- Explain apparel finishing process and packaging

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%.

Assessment Methodology: Assignments (20%), Solution to application-oriented problems using software (20%), Solving of GATE questions (20%),Internal Examinations (40%).

References:

1. Harrold Carr., and Barbara Latham., “The Technology of Clothing Manufacture” Backwell Science, U.K., 1994,ISBN: 0632037482 | ISBN-13: 9780632037483.
2. Gerry Cooklin., Steven George Hayes., and John McLoughlin., “Introduction to Clothing
3. Manufacture”, Wiley-Blackwell Science, U.K., 2006, ISBN: 0632058463 | ISBN-13:9780632058464.92
4. Richard M. Jones., “The Apparel Industry”, Blackwell Science, U.K., 2006, ISBN: 1405135999 |ISBN-13: 9781405135993.
5. Kantilal Ila., “Apparel Industry in India”, NICTAS Publication, Ahmedabad, 1990, ISBN:8185472009 | ISBN-13: 9788185472003.
6. Raj kishore Nayak., and Rajiv Pandhya.,”Garment Manufacturing Technology”, Woodhead publications 2015, ISBN: 1782422323 | ISBN-13: 9781782422327.
7. ChutterA. J., “Introduction to Clothing Production Management”, Wiley-Blackwell Science, U.K., 1995, ISBN: 0632039396 | ISBN-13: 9780632039395.
8. Harold Carr, “The Clothing Factory”, Clothing and Footwear Institute, 1972. ISBN: B0012PP566.
9. Miller E., “Textile Properties and Behaviour in Clothing use”, Batsford Publication, 1992, ISBN:0713472359 | ISBN-13: 9780713472356.
10. Cooklin G., “Fusing Technology”, The Textile Institute, Manchester, 1990, ISBN: 1870812204 |ISBN-13: 9781870812207.
11. Jay Diamond., “Fashion Apparel and Accessories”, Delmar Publication, 1994, ISBN: 0827356242 | ISBN-13: 9780827356245.

E-Resources:

1. NPTEL – Apparel Manufacturing Technology
2. SWAYAM – Textile and Apparel Related Courses
3. Textile Learner – Apparel Manufacturing and Garment Technology

CO Mapping with PO & PSO:

CO	CO Description	PO Mapping	PSO Mapping
CO1	Understand the structure of the apparel industry, production planning, and manufacturing workflow.	–	–
CO2	Apply knowledge of accessories, trims, stitches, and seams in apparel product development and manufacturing.	PO1 (3)	PSO1 (2)
CO3	Analyze inspection, spreading, and cutting processes to improve material utilization and production efficiency.	PO2 (3) PO3 (2)	PSO2 (2)
CO4	Evaluate different production systems adopted in apparel manufacturing based on productivity, quality, and operational effectiveness.	PO3 (2) PO10 (2)	PSO2 (2)
CO5	Design apparel finishing and packaging strategies that meet quality standards, sustainability requirements, and consumer expectations.	PO3 (2) PO7 (1) PO9 (1)	PSO1 (2) PSO3 (2)

TT25C08	Woven Fabric Structure	L	T	P	C
		3	0	0	3

Course Objectives:

- To enable the students to learn about different structures of woven fabric and design the structure for different applications

Elementary Weaves: Introduction – methods of representing weave on point paper, construction of design, draft, and lifting plan, types of draft, heald calculation, order of denting; elementary weaves – plain, twill, satin, sateen and their derivatives – loom requirements.

Activity: Collect fabric samples with different weave structure & generic names, 3D visualization, Computer aided textile designing

Special Weaves I: Ordinary and brighten honey comb; huck-a-back and its modifications; mock Leno; crepe weaves; colour and weave effects; Bedford cords - plain and twill faced, wadded; welts and piques, wadded piques, draft and peg plan for these weaves; loom requirements.

Activity: Collect fabric samples with different weave structure & generic names, 3D visualization, Computer aided textile designing

Special Weaves II: Backed fabrics warp and weft, reversible and non-reversible fabrics; extra warp and extra weft figuring - single and double colour — loom requirements.

Activity: Collect fabric samples with different weave structure & generic names, 3D visualization, Computer aided textile designing

Pile Fabrics and Velveteen: Pile fabrics; warp pile - wire pile, terry pile, loose backed; weft pile – plain back and twill back velveteen, lashed pile, corduroy, and weft plush – loom requirements.

Activity: Collect fabric samples with different weave structure & generic names, 3D visualization, Computer aided textile designing

Special Fabrics: Double cloth, types of stitches; Damasks; Gauze and Leno principles – loom requirements; trade name of popular structures.

Activity: Collect fabric samples with different weave structure & generic names, 3D visualization, Computer aided textile designing

Course Outcomes:

Upon the completion of this course the student will be able to construct design, draft and peg plan and loom requirements for producing fabrics with

CO1: Plain, twill, satin and derivatives structures
CO2: Honey comb, crepe structures
CO3: Bedford cords, piques, backed fabrics, extra warp/weft figuring
CO4: Warp and weft pile structures
CO5: Double, damask, gauze and leno structures

References:

1. Grosicki Z. J., “Watson’s Textile Design and Colour”, Vol.1, Woodhead Publications, Cambridge England, 2004.
2. Grosicki Z. J., “Watson’s Advanced Textile Design and Colour”, Vol.II, Butterworths, London, 1989.
3. Grammar of Textile Design by H. NISBET, F.T.I.
4. Wilson J., “Handbook of Textile Design”, Textile Institute, Manchester, 2001, ISBN: 1 85573 5733.
5. Horne C.E., “Geometric Symmetry in Patterns and Tilings”, Textile Institute, Manchester, 2000, ISBN: 1 85573 4923.
6. Seyam A. M., “Structural Design of Woven Fabrics, Theory and Practice”, Textile Institute, Manchester, 2002, ISBN: 1 87037 2395.
7. GeornerD., “Woven Structure and Design, part 1: Single Cloth Construction”, WIRA, U.K., 1986, ISBN: 0900820179 | ISBN-13: 9780900820175
8. GeornerD., “Woven Structure and Design, Part 2: Compound Structures”, WIRA,U.K., 1989, ISBN: 090366951X | ISBN-13: 9780903669511
9. Jan Shenton., “Woven Textile Design”, Laurence King Publishing, 2014, ISBN: 178067337X | ISBN-13: 9781780673370.

E-Resources

1. https://textileschool4u.blogspot.com/2013/12/welts-and-piques.html
2. https://textileapex.com/what-are-stitched-double-cloths-classification-of-stitched-doublecloths/
3. https://www.slideshare.net/slideshow/fabric-structure-53197193/53197193
4. https://textilelibrary.wordpress.com/2011/04/20/lecture-notes-of-weaving-technology-ii/
5. https://www.sciencedirect.com/science/article/abs/pii/B9780081024973000052

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Understand the fundamental concepts of woven fabric structure, including yarn systems, weave types, and fabric construction parameters.	--	--
CO2	Apply knowledge of weave structures and fabric construction parameters to determine their influence on fabric properties and end-use requirements.	PO1 (3)	PSO1 (2)
CO3	Analyze woven fabric designs and structures with respect to strength, durability, appearance, and performance characteristics.	PO2 (3) PO5 (2)	PSO2 (2)
CO4	Evaluate woven fabric structures and select appropriate weave patterns, yarns, and construction parameters for specific apparel and textile applications.	PO3 (2) PO7 (1)	PSO3 (2)

FT25303	Basic Sewing Machinery Practice Laboratory	L	T	P	C
		0	0	4	2

Course Objectives

- To train the students in pattern making of apparels.
- To train the students in fundamentals of garment construction.

List of Experiments

1. Study of single needle sewing machine
2. Preparing samples for stitches – slip basting, slip stitch, running, back, overcasting, hemming, even basting,
3. Preparing samples for seams and seam finishes – Plain seam, double top stitch seam, lapped seam, slot seam, French seam, flat felt seam, pinked finish, edge stitched finish.
4. Preparing samples for Fullness - Darts, Tucks, Pleats, Gathers
5. Preparing samples for Necklines – Bias facing, Bias Binding and Fitted facing
6. Preparing samples for plackets – Continuous Bound Placket, Two Piece Placket, Fly Opening.

Course Outcomes

Upon completion of this practical course, the student would have practical experience on

- To take basic body measurements and then drafting and grading of basic patterns
- To learn the different techniques of pattern making and prepare different patterns
- To prepare patterns using the draping techniques
- To prepare samples for seams and stitches
- To prepare samples for fullness, necklines and plackets

References:

1. Harrold Carr., and Barbara Latham., “The Technology of Clothing Manufacture” Backwell Science, U.K., 1994,ISBN: 0632037482 | ISBN-13: 9780632037483.
2. Raj kishore Nayak., and Rajiv Pandhya.,”Garment Manufacturing Technology”, Woodhead publications 2015, ISBN: 1782422323 | ISBN-13: 9781782422327.
3. Jay Diamond., “Fashion Apparel and Accessories”, Delmar Publication, 1994, ISBN: 0827356242 | ISBN-13: 9780827356245.

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Apply body measurement techniques to draft and grade basic garment patterns accurately.	PO1 (3) PO3 (3)	PSO1 (3)
CO2	Analyze different pattern-making techniques and develop patterns for various garment components and styles.	PO2 (3) PO3 (3)	PSO1 (3)
CO3	Evaluate draping techniques and garment fit to determine suitable pattern development methods.	PO3 (3) PO5 (2)	PSO2 (3)
CO4	Create seam and stitch samples by selecting appropriate construction methods based on garment requirements.	PO3 (3) PO5 (2)	PSO2 (2)
CO5	Design garment samples incorporating fullness, necklines, and plackets to meet functional and aesthetic requirements.	PO3 (3) PO5 (2) PO7 (1)	PSO3 (2)

EN25C03	English Communication Skills Laboratory– I	L	T	P	C
		0	0	2	1

Course Objectives:

- The objectives of the course are to foster students' confidence and fluency in professional and social communication and to bridge the gap between academic English and industry expectations.

List of Activities

A. Elements of Effective Speaking and Listening

(i) Sharing life experience/ turning point in their life – SATORI

(ii) Situational Conversation – eg. Talking to a Senior about Internship Tips

(iii) Welcoming a Guest Speaker at a Seminar

(iv) Pictography to represent data using images or symbols

(v) B2-C1 Listening exercises include lectures, interviews, and discussions.

B. Mastering Presentations

(i) Presentation Skills – Non-verbal communication

(ii) Mini-Presentations: Topics like "My Dream Project," "Engineering in 2050," 3-minute technical pitches with logical flow

(iii) Technical Presentations with PPT

C. Group Discussion Strategies:

(i) Introduction to Group Discussions - Key skills for effective participation

(ii) Phases in a GD and Conversational Phrases in GD.

(iii) Group Discussions – Abstract and Factual topics

D. Resume & LinkedIn Optimization

(i) Building LinkedIn Profile – Drafting headlines and summaries

(ii) Social Media Optimisation

(iii) Preparing Video Resume

E. Podcast-Based Language Learning:

(i) Listening to podcast (motivational, career oriented, success stories)

(ii) Podcast Preparation – Purpose – Topic – Structure – Recording Tips - Publication of the Podcast

F. Mock Interviews and Communication Strategies:

(i) Listening – Job interview

(ii) Speaking – Mock interviews

Weightage: Continuous Assessment: 60%, End Semester Examinations: 40%.

Internal Assessment: 1. Listening (20 marks)
2. Video Resume (20 marks)
3. Creating a Podcast (30 marks)
4. Mock interview (30 marks)

End Semester Assessment: 1. Presentation with PPT (50 marks)
2. Group Discussion (50 marks)

References:

1. Floyd Kory, “Interpersonal Communication”, McGraw Hill Publication, 2023.
2. Bharadwaj Apoorva, “Leadership Communication Skills for Intercultural Management: Strategies for Effective Intercultural Management (Contemporary Themes in Business and Management)”, Routledge India; 1st edition, 2024.
3. Helen Spencer-Oatey and DomnaLazidou**, “**Making Working Relationships Work: The TRIPS Toolkit for Handling Relationship Challenges and Promoting Rapport”,Castledown Publishers,2023.
4. Presentations - Cambridge
5. Speaking Extra
6. Listening Extra – Miles Craven by Cambridge University Press
7. CVs, Resumes, and LinkedIn: A Guide to Professional English – Springer International Publishing

E-resources:

1. Train your mind to perform under pressure- Simon Sinek https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-under-pressure-capture-your-flag/
2. Brilliant way one CEO rallied his team in the middle of layoffs https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-before-numbers.html
3. Will Smith's Top Ten rules for success https://www.youtube.com/watch?v=bBsT9omTeh0

CO Mapping with PO & PSO:

	Description of CO	PO	PSO1
CO1	Communicate effectively in everyday professional situations with confidence		
CO2	Deliver well-organised and effective presentations.	PO9(3)	PSO1(1) PSO3(2)
CO3	Participate in group discussions and express ideas clearly and confidently.	PO8(2) PO9(3)	PSO3(2)
CO4	Create professional video resumes and participate in interviews effectively.	PO9(2)	PSO3(3)
CO5	Create, record and publish motivational podcasts.	PO9(2) PO11(1)	PSO2(2) PSO3(3)

Semester IV

FT25401	Pattern Engineering - I	L	T	P	C
		3	0	2	4

Objectives:

- To introduce students to human anthropometrics from the scientific and technological viewpoint
- To equip students with comprehensive pattern making skills

Study of Body Measurements and Sizing Systems: Anthropometry- Human Anatomy, Body Ideals-Eight head theory, Ten Head Theory, body proportions, height and weight distribution.

Body Measurements – Importance, Principles of taking body measurements, Methods of taking body measurements for child, women & men, standard measurement chart for children, men and women. **Tools for clothing construction** – Introduction, important tools & its types - their function.

Activity: Analyze the body shape variations within the Indian population and examine the standard methods used for taking accurate body measurements for apparel design and construction

Practicals:

1. Measuring the Form – Male, female and child.
2. Formulating standard measurement chart.

Basics of Pattern Making: Introduction to pattern making and methods. pattern making tools, types & their function. Preparing and Measuring the Form, Pattern making terminologies, Trueing, blending, pattern grain line, balance line terms, notches, seam allowance, jog seam, dart points, pleats, flares, gather and true bias. Development of pattern - Drafting and draping methods - Basic men's block - bodice, sleeves, trousers, and women's block - bodice, sleeves, trousers, skirt

Activity: Analyze the standard seam allowances used for different categories of garments and evaluate how grain line orientation influences garment design, fit, drape and performance.

Practicals:

1. Drafting the basic pattern set using the above measurement chart.
2. Pleat tuck and pin tuck.

Pattern Layout: Preparation of fabric for cutting – Importance of grain in fabric cutting. Checking and straightening the fabric grain and fabric ends. – Rules in pattern layout – Types of layout. Layout for asymmetrical designs, Bold designs, Checked and One-way design. Economy of fabrics in placing pattern – Adjusting the fabrics to patterns. Rules for placement of fabric if not sufficient. Fabric cutting – Transferring pattern markings. Stay stitching & Ease stitching. True Bias – Introduction, preparation and uses of true bias. Draft a garment with any two style variation using your own measurement.

Activity: Design Garment Styles and Prepare the Corresponding Marker Plans and Drafting Procedures

Pattern Alterations and Grading: Fitting and Pattern alteration**:** Fitting – Definition – Principles for good fit. Causes for poor fit, checking the fit of a garment, solving fitting problems in various garments-basic principles. Fitting techniques. Pattern alteration - importance of altering patterns. Principles for pattern alteration. Common pattern alterations in a blouse. Alteration of pattern for irregular figures Grading process, grade rules, and types of grading system manual and computerized grading

Activity: Design garment styles for three different sizes and develop detailed grading plans for each style across three size ranges.

Principles of Dart Manipulation: Dart manipulation- single dart series-slash-spread technique, pivotal transfer technique. Two dart series- slash spread and pivotal transfer technique. Graduated and radiating darts. Parallel, asymmetric and intersecting darts. Types of added fullness and Contouring Principle.
Activity: Design Three Garment Styles incorporating Various Dart Types, and Develop Their Patterns Using Dart Manipulation Techniques (Slash-and-Spread and Pivot Transfer Methods)

Practicals:

1. Single dart series slash spread technique
2. Single dart series pivotal transfer technique
3. Double dart series slash spread technique
4. Double dart series pivotal transfer technique.
5. Graduated and radiating darts.

Course Outcomes: Upon completion of this course, the student would be able to

- Understand Anthropometry concepts and important body measurements
- Prepare patterns for basic blocks using drafting and draping techniques
- Develop grading and in pattern alteration
- Apply dart manipulation techniques to design, variation in garment components
- Prepare patterns for basic collar and sleeve components

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Project (15%), Assignment Programs (25%), Practical (25%), Internal Examinations (30%)

References:

1. Harrold Carr., and Barbara Latham., “The Technology of Clothing Manufacture” Blackwell
2. Science, U.K., 1994, ISBN: 0632037482 | ISBN-13: 9780632037483.
3. Gerry Cooklin., Steven George Hayes., and John McLoughlin., “Introduction to Clothing
4. Manufacture”, Wiley-Blackwell Science, U.K., 2006, ISBN: 0632058463 | ISBN-13:9780632058464.
5. Helen Joseph Armstrong, “Pattern Making for Fashion Design” Pearson Education
6. (Singapore)Pvt. Ltd.,2005 2. Winifred Aldrich, “Metric Pattern Cutting” Blackwell Science
7. Ltd., 1994
8. Gerry Cooklin, “Master Patterns and Grading for Women’s Outsizes”, Blackwell Scientific Publications, 1995.
9. Gerry Cooklin, “Master Patterns and Grading for Men’s Outsize”, Blackwell Scientific

Publications, 1992.
10. Jeenne Price and Bernard Zamkoff, “Grading Techniques for Modern Design” Fairchild
11. Publications, 1990.
12. Amaden-Crawford Connie, “The Art of Fashion Draping (3rd edition)” Om Books
13. International Publications, 2005
14. Winifred Aldrich, “Metric Pattern Cutting” Blackwell Science Ltd., 1994

E-resources:

1. NPTEL – Fashion and Clothing Technology Courses.
2. SWAYAM – Textile and Fashion Technology Courses
3. Fashion2Apparel – Pattern Making and Garment Construction Resources

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Understand anthropometric concepts and important body measurements used in pattern development.	–	–
CO2	Apply drafting and draping techniques to prepare basic garment block patterns.	PO3 (3) PO5 (2)	PSO1 (3)
CO3	Analyze grading methods and pattern alteration techniques for different body sizes and garment requirements.	PO2 (2) PO3 (3)	PSO2 (3)
CO4	Evaluate dart manipulation techniques and their influence on garment fit, style, and design variations.	PO3 (3) PO5 (2)	PSO2 (2)
CO5	Design collar and sleeve patterns for specific garment applications based on functional and aesthetic requirements.	PO3 (3) PO5 (2) PO11 (2)	PSO3 (2)

FT25402	Garment Construction I	L	T	P	C
		3	0	2	4

Objectives:

- To teach the students about types of seams and stitches, sewing threads & their quality.
- To impart knowledge on various garment parts and their variations.
- To impart knowledge on use of accessories for garments.

Spreading and Cutting: Basics of fabric spreading, modes of spreading, different fabric packages, spreading tension, uniformity and alignment, woven fabric lay, knitted fabric lay, types of fabric lay, Lay planning principles. Marker making, principles of marker making, types of markers, marker planning and marker efficiency, and fabric design parameters on markers, matching and grain line. Fabric cutting methods, latest fabric cutting equipments, and record keeping in cutting room, advancements in cutting room technology

Activities: Prepare one fourth patterns for one garment style with different sizes and develop two different marker plans and study the marker efficiency

Basic Sewing Techniques: Seams: Definition, Types of seams, seam quality, seam performance, factors to be considered in the selection of seam, seam finishes, seam defects. Stitches: Definition, stitch classes, stitch parameters, factors to be considered in the selection of stitches. Stitching defects. Sewing Thread: Types, construction, sewing thread quality, selection of sewing thread.

Practicals:

1. Fabric laying using pin table for understanding symmetry and matching
2. Sewing practice of – superimposed seam, lapped seam, bound seam and flat seam.

Activities: Identification of the seam types in commonly used garments.

Garment Components for Men's and Women's Top: Men's and women's tops – basic bodice blocks, collars, sleeves, cuffs, plackets – types, pleats, gathers and darts, functional purpose of components in garment construction.

Practicals:

1. Sewing practice of seam types – superimposed seam, lapped seam, bound seam and flat seam

Activities: Calculation of sewing thread consumption for different types of stitch.

Garment Components for Men and Women: Men's and women's bottom – trousers basic blocks, pockets – side pocket, welt pocket, patch pocket, yoke, skirt basic blocks, waist bands, panels, functional purpose.

Practicals:

1. Sewing of different types of neckline finishes
2. Sewing of different types of darts, pleats, tucks and gathers
3. Sewing of different types of plackets

4. Sewing of different types of pockets
5. Sewing of different types of sleeves
6. Sewing of different types of collars
7. Sewing of different types of yokes

Activities: create a lookbook (album) for various garment components.

Garment Accessories: Labels, linings, interlinings, wadding, lace, braid, elastic, hook and loop fastening, shoulder pads, eyelets and laces, zip fasteners, buttons

Activity: Preparation of Swatch book of trims and accessories

Outcomes:

After successful completion of this course, the students should be able to acquire knowledge on,

- Types of seams and stitches, sewing threads & their quality,
- Various garment parts and their variations,
- Use of accessories for garments.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Project (15%), Assignment Programs (25%), Practical (25%), Internal Examinations (30%)

References:

1. Jacob Solinger, “Apparel Production Handbook”, Reinhold Publications,1998
2. Carr H and Latham B., “The Technology of Clothing Manufacturing”, Blackwell Science, U.K.,1994
3. Ruth E. Glock, Grace I. Kunz, “Apparel Manufacturing, Sewn Product Analysis”, fourth edition, Pearson Education, ISBN: 8177580760159 4
4. Laing R.M., Webster J, “Stitches & Seams”, The Textile Institute, India,1998
5. Shaeffer Claire, “Sewing for the Apparel Industry”, Prentice Hall, New Jersey, 2001
6. Singer, “Sewing Lingerie”, Cy De Cosse Incorporated, 1991.
7. Patty Brown & Janett Rice, “Ready-To-Wear Apparel Analysis’”, Third Edition, PrienticeHall Inc., New Jersey,ISBN:0130254347.

E-resources:

1. NPTEL Online Courses on Apparel Manufacturing, Garment Construction, Sewing Technology, and Production Planning, IITs, India

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Apply appropriate seams, stitches, and sewing threads in garment construction based on functional and quality requirements.	PO1 (3) PO2 (2)	PSO1 (2)
CO2	Analyze various garment components and their design variations to achieve desired fit, functionality, and aesthetics.	PO2 (3) PO3 (2)	PSO2 (2)
CO3	Evaluate the selection and application of garment accessories and trims for enhancing product quality, appearance, and consumer acceptance.	PO3 (2) PO5 (2)	PSO3 (2)

FT25403	Textile Chemical Processing	L	T	P	C
		3	0	2	4

Objectives:

- To enable the students to learn about pre-treatments involved in the wet processing of textiles, dyeing and printing of textiles

Introduction To Chemical Processing: Operation sequence in chemical processing of cotton, silk, wool, rayon, polyester, polyamide, polyester and cellulosic blend materials with emphasis on the objectives of each operation

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

Practicals:

1. Acid/ enzymatic de-sizing of cotton fabrics and its evaluation.
2. Scouring of cotton fabrics, polyester/cotton blend and its evaluation.
3. Peroxide bleaching of cotton fabric and its evaluation.
4. Mercerization of cotton hank and its evaluation.

Dyeing: Stages involved in dyeing process, principle of application of direct, reactive, vat, acid, disperse and natural dyes; principles of working of loose fibre, yarn and fabric processing machines.

Practicals:

1. Dyeing of cotton material with different dyes – direct/ reactive/ vat and Sulphur.
2. Dyeing of polyester with disperse dye using HTHP machine.
3. Determination of colour fastness for textile materials (wash, light and rubbing).

Printing: Styles of printing- direct, discharge, resist; ingredients of print paste; methods of printing; digital printing , garment printing,; special prints -flock, foam, foil, glitter, kadi, leather, pearl and rubber

Practicals:

1. Develop designs with different techniques like tie-dye, clamp dyeing and shibori.
2. Printing of cotton fabric using screen and block printing technique.
3. Printing of cotton fabric using batik technique and stencils.

Finishing: Printing methods and styles of printing; general constitution of printing paste, printing with pigments, principles of transfer and ink-jet printing, dyeing and printing faults, assessment of fastness properties of dyed and printed goods ; garment dyeing and washing; Finishing - Calendering, shrink proofing, antistatic finish, softening, water and flame proofing, UV protection, antimicrobial finish, resin finishing – crease recovery, wash and wear and durable press finishes; Standard methods of assessment of all the above finishes.

Practicals:

1. Assessment of water repellent fabric
2. Assessment of flame retardant fabric

Computer Color Matching Concepts: Fundamentals of colour science, assessment of colour of dyed and printed goods; basics of colour matching technique; assessment of whiteness and yellowness indices and colour difference; pass/fail decision making; Eco friendly chemical processes, banned dyes and chemicals.

Practicals:

1. Determination of whiteness and yellowness index
2. Determination of color parameters in fabric using spectrophotometer
3. Printing of cotton fabric using batik technique and stencils.

Course Outcomes: Upon completion of this course, the student would be able to

- Explain the preparatory process in chemical processing
- Explain the classes, machines, stages, and application of dyes
- Discuss about the ingredients, types and machines and faults in printing
- Understand the various methods and application of finishing
- Understand the measurement of strength of colour and colour difference

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Project (15%), Assignment Programs (25%), Practical (25%), Internal Examinations (30%)

References:

1. Trotman E. R., “Dyeing and Chemical Technology of Textile Fibres”, B.I Publishing Pvt. Ltd., New Delhi, 1994, ISBN: 0471809101 | ISBN-13: 9780471809104
2. Karmarkar S.R., “Chemical Technology in Pre-treatment processes of Textiles”, Elsevier Publications, Newyork,1999, ISBN: 044450060X | ISBN-13: 9780444500601
3. Shenai V. A., “Chemistry of Dyes and Principles of Dyeing”, Sevak Publications, Mumbai, 1995, ISBN: B0007BFE9Y.
4. Shenai V. A., “Technology of Printing”, Sevak Publications, Mumbai, 1996
5. Miles W. C., “Textile Printing”, Wood head Publication, 2003, ISBN 0 901956 76 1
6. Hall A.J., “Textile Finishing”, 2nd ed., McGraw Hill, 1995.
7. Marsh J.T., “Introduction to Textile Finishing” Vol. II, New Age, 1996
8. Heywood D. ”Textile Finishing”, Woodhead Publishing Ltd.,2003 ISBN 090195681
9. Shenai V.A., “Technology of Finishing”, Vol. X, Usha, 1998
10. Schindler W.D and Hauser P., “Chemical Finishing of Textiles”, Wood head Publications, ISBN: 1855739054.
11. Yin-Ling Lam, Chi-Wai Kan & Chun-Wah Marcus Yuen, "Developments in functional finishing of cotton fibres – wrinkle-resistant, flameretardant and

antimicrobial treatments", Textile Progress, Vol. 44, Nos. 3 - 4, September-December 2012,175–249.
12. Jones B. W., “Garment Dyeing: Ready to Wear Fashion from the Dyehouse”, Textile Progress, Vol. 19, No. 2, 1988, ISBN 1870812131.
13. Roshan Paul (Ed.), "Denim – Manufacture, Finishing and Applications", Woodhead Publishing, 2015.
14. Reife A. and Freeman H.S., “Environmental Chemistry of Dyes and Pigments”, Wiley, 1996, ISBN: 0471589276.
1.

E-resources:

2. NPTEL Online Courses on Textile Wet Processing, Textile Chemistry, Dyeing, Printing, and Finishing Technologies, IITs, India.
3. SWAYAM MOOCs on Textile Chemical Processing, Color Science, Sustainable Textile Processing, and Textile Testing.
4. Textile Learner – Learning resource for textile wet processing, dyeing, printing, finishing, color matching, and quality evaluation.

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Understand the preparatory processes involved in textile chemical processing and their significance in fabric preparation.	–	–
CO2	Apply knowledge of dye classes, dyeing machines, dyeing stages, and applications in textile coloration processes.	PO1 (3) PO2 (2)	PSO1 (2)
CO3	Analyze printing ingredients, printing methods, machinery, and defects to improve print quality and production efficiency.	PO2 (3) PO3 (2)	PSO2 (2)
CO4	Evaluate various textile finishing methods and select appropriate finishing techniques for specific end-use applications.	PO3 (2) PO7 (1)	PSO2 (2)
CO5	Design procedures for measuring color strength and color difference to ensure quality control and product consistency in textile processing.	PO3 (2) PO5 (2)	PSO3 (2)

FT25404	Apparel Machineries and Equipment	L	T	P	C
		2	0	2	3

Objectives:

- To impart knowledge on the machineries and equipments used for garment production
- To instruct on latest developments in the garment production machineries.

Spreading Machines: Fabric inspection machines, Types of Fabric Packages. Types of Fabrics – One Way – Two Way Fabrics – Their effect on spreading. Methods of Fabric spreading. Spreading equipments. Marker planning, Marker efficiency, Factors affecting marker efficiency.

Practicals:

1. Study on the working principle of spreading machine

Activities: Collect pictures of different fabrics with faults/ defects

Cutting Machines: Introduction to cutting machines. Types and functions of cutting machines – straight knife, round knife, band knife cutting machines. Notches, drills, die cutting machines. Computerised cutting machines. Maintenance of cutting machines.

Practicals:

1. Study on the working mechanism of different cutting machines

Activities: Prepare a preventive maintenance schedule for cutting machines

Sewing Machines: Basic parts of sewing machine –primary and auxiliary parts and their functions. Bobbin case / Bobbin hook, Throat plate– Take up devices – Tensioners – Feed dog – Pressure foot. Types of needles – Parts of needles and their function. Needle finishes. Adjustments of Stand height – pedal – Needle Bar – Stitch length selection – Feed timing – Needle and Bobbin Thread Tension – Stitch cycle timing diagram; Basic parts and functions of chain stitching machine.

Practicals:

1. Evaluation of the strength and consistency of stitches produced by different settings on the SNLS machine.

Activities: collect the pictures along with salient features of latest sewing machines, Collection of sewing needles and calculation of needle number

Multi Thread Sewing Machines: Over lock machines - Types of Over lock machines. Parts and their functions. Threading diagram for over lock machines. Stitch Cycle Diagram for over lock machines – Adjustment of Needle height, Feed dog height, angle, Differential feed ratio, Position of upper and lower knives, loopers. Defects and Remedies. Flat lock machines – Types. Parts and their functions. Threading diagram of flat lock machines – Stitch cycle diagram. Adjustment of parts – Needle height, feed dog height, differential feed ratio, loopers.

Practicals:

1. Study on the threading, tensioning and working principle of button hole machine
2. Evaluation of the strength and consistency of stitches produced by different settings on the chain stitch machine.
3. Evaluation of the strength and consistency of stitches produced by different settings on the overlock machine.
4. Evaluation of the strength and consistency of stitches produced by different settings on the flatlock machine.

Activities: Create a threading diagram using 3D model for flat lock and overlock sewing machines / thread the feed off the arm machine and produce stitch samples.

Outcomes:

After successful completion of this course, the students should be able to,

- Acquire knowledge in different methods of spreading of fabrics with respect to type of fabric and to calculate the marker efficiency.
- Describe the basic principles of working of different types of cutting machineries used in apparel production.
- Develop skill in setting and adjustment parts of sewing machines.
- Develop skills for recognize various parts and their working principles in advanced garment sewing machines.
- Acquire knowledge on special machineries used in apparel production

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Project (15%), Assignment Programs (25%), Practical (25%), Internal Examinations (30%)

References:

1. Harold Carr and Barbara Latham, The Technology of Clothing Manufacture, Om Book Service, 2002.
2. Shaeffer Claire, Sewing for the Apparel Industry, Prentice Hall, New Jersey, 2001.
3. Singer, "Sewing Lingerie", Cy DeCosse Incorporated, 1991.
4. Laing R.M. and Webster J, "Stitches and Seams", The Textile Institute, Manchester, 1999
5. Technical Advisory Committee of AAMA, "A New Look at Apparel Mechanization", 1978.
6. Jacob Solinger, Apparel Production Handbook, Reinhold Publications, 1998.

E-resources:

1. SWAYAM MOOCs on Fashion Technology, Apparel Manufacturing, and Industrial Engineering Applications in Garment Production.

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Understand different methods of fabric spreading and marker planning with respect to fabric characteristics and marker efficiency.	–	–
CO2	Apply the operating principles of various cutting machines used in apparel production for efficient fabric cutting.	PO1 (3) PO2 (2)	PSO1 (2)
CO3	Analyze the setting, adjustment, and performance of sewing machine components for effective garment production.	PO2 (3) PO5 (2)	PSO2 (3)
CO4	Evaluate the working principles and operational performance of advanced garment sewing machines used in industrial applications.	PO3 (3) PO5 (2)	PSO2 (2)
CO5	Develop appropriate machine selection and production solutions using special machinery for apparel manufacturing requirements.	PO3 (3) PO11 (2)	PSO3 (2)

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FT25405	Fashion Design and Illustration	L	T	P	C
		0	0	4	2

Objectives:

- To enable the students to familiarize with fashion designing and illustration techniques.
- Acquaint with the steps involved in drawing and to gain skill in illustration and design garments for personal / individual taste.

List of Experiments:

1. Basic human proportion, Anatomy and model drawing, 8, 10, 12 head theory, Straight, Flesh, Motion posture, Elongation figure, Body figures and features-
2. Hair styling, Figure drawing, Body Movement, Hand movement, Face drawing and detailing, Full-fledged fashion figure front view, back view and different angle.
3. Garment details- Collars- varieties, Cuffs- varieties, Sleeves- varieties, Yokes varieties, Neckline- varieties, Pockets- varieties, Style manipulation,
4. Illustration of shirt- varieties, Trouser -varieties, Gown -varieties, = Sketching- folds and Curves of different fabric drapes.
5. Rendering Techniques-, Fabric rendering of different varieties of fabrics, Prints, Woven's, Knit, Wool, Fur, Lustrous, Dark, Sheer, lace, Embellishment etc.
6. Photo analysis- different garments of kids, Male and Female, Experimenting with collage as a method of illustration, Croquis and Flat sketches, Male, Female and
7. Kids, development of costume on croquis using elements of fashion.
8. Theme board and Mood borad creation and definition- Portfolio presentation using rendering techniques, Product development through fashion illustration in apparel and accessories.

Course Outcomes

Upon completion of this course, the student would be able

- To develop motifs, draw objects and shade them
- To illustrate fabric drapes and shading with different color mediums.
- To illustrate different fabric swatches and garment components
- To understand human anatomy and illustrate basic figures

Weightage: Continuous Assessment: 60%, End Semester Examinations: 40%.

Assessment Methodology: Speaking & Listening (10 Marks), Presentations (15 Marks) Group Discussion (10 Marks), Resume & LinkedIn (10 Marks), Podcast-Based Learning (10 Marks), Mock Interview (5 Marks), End Semester Practical Assessment – 40 Marks

References

1. Comdex Fashion Design- Vol-1 Fashion Concepts
2. Advanced Fashion Sketch Book, Bina Abling, OM Book Service,India (2007)
3. Basic fashion design Styling 978-2-940411-39-9
4. Sapna sarkas "Fashion and sketch book" 978-93-81031-39-1
5. Harold Carr "Fashion design and product development"

6. Fashion Design illustration Children Ireland
7. verekes “Fashion designers hand book for adobe illustration Centers” 978-1-4051-6055-1
8. Anmol Roy “Fashion designing and technologies” 978-81-8411-304-4
9. Figure Drawing for Fashion, Isao Yajima, Graphic-Sha; First Edition (1987)
10. Fashion Art for the Fashion Industry, Rita Gersten, Fairchild Books (1989) Fashion Illustration Flat drawing
11. Eugeniakim “Saturday night ha”t0-307-33794-4
12. Tatham Seamas, “fashion design drawing course” 978-0-7641-2473-0
13. Fashion Drawing – The Basic Principles, Anne Allen and Julian Seaman, Anova Books.
14. Fashion illustration and Presentation, Manmeet Sodhia, Kalyani Publishers.
15. Fashion Source Book, Kathryn Mckelvey, Blackwell Science
16. Encyclopedia of fashion details, Patrick John Ireland, Batsford.
17. Fashion Illustration, Colin Barnes, Little Brown and Co. (UK) (April 1995).
18. Snap Fashion Sketch Book, Bill Glazer, Prentice Hall; 2 edition (2007).

E-Resources:

1. NPTEL Online Courses on Fashion Design, Apparel Design, Fashion Illustration, and Product Development, IITs, India

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Apply design principles to develop motifs, draw objects, and create shaded illustrations using appropriate rendering techniques.	PO3 (3) PO5 (2)	PSO1 (3)
CO2	Analyze fabric drapes, folds, and textures to illustrate garments using different color rendering mediums.	PO3 (3) PO5 (2)	PSO2 (3)
CO3	Evaluate fabric swatches and garment components to produce accurate fashion illustrations and design presentations.	PO3 (3) PO5 (2)	PSO2 (2)
CO4	Create fashion figures by applying principles of human anatomy, body proportions, and fashion illustration techniques.	PO1 (2) PO3 (3)	PSO3 (2)

FT25406	Functional Clothing Designing	L	T	P	C
		0	0	4	2

Objectives:

- To make the student acquire sound knowledge of the material characteristics required for functional clothing
- To acquaint student of the mechanism, chemistry and evaluation of chemical finishes for the functional textiles

List of Experiments

1. Learning the specific requirements for different categories like sports-functional, protective, and medical wear.
2. Study of heat transfer, thermal insulation, and breathable textiles.
3. Study of elastomeric, synthetic, and regenerated fibres with specialized properties.
4. Designing patterns that provide maximum mobility for active users.
5. Illustrate garments for specific needs like firefighting, industrial work, or medical suits (e.g., masks, foot covers)
6. Learning specialized seams (French, lapped) and finishes that enhance garment strength and water resistance.
7. Designing adaptive clothing for the physically challenged, elderly, or maternity/lactation periods.
8. Analysis of fiber, yarn and fabric for flame proof, heat resistant, ballistic resistance, electrical conduction, bacterial protection,
9. Illustration of Functional clothing used in the medical field and in hygiene; military combat clothing; protective
10. Standards and test method for protective fabric performance - Flame retardant finishes, Liquid repellent finishes, Antistatic, Liquid repellent, antibacterial, UV protection, mite protection;

Outcomes:

- Understand functional apparel categories and specialized fibre, yarn and fabric properties.
- Apply principles of thermal comfort, finishes and testing methods for protective textiles.
- Design functional and adaptive garments ensuring comfort and mobility.
- Illustrate and construct functional garments using appropriate seams and techniques.

Weightage: Continuous Assessment: 60%, End Semester Examinations: 40%.

Assessment Methodology: Speaking & Listening (10 Marks), Presentations (15 Marks) Group Discussion (10 Marks), Resume & LinkedIn (10 Marks), Podcast-Based Learning (10 Marks), Mock Interview (5 Marks), End Semester Practical Assessment – 40 Marks

References:

1. Adanur S., “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., 1995
2. Pushpa Bajaj and Sengupta A.K., “Protective Clothing”, The Textile Institute, 1992.
3. Horrocks A.R. and Anand S.C., “Handbook of Technical Textiles”, Wood head Publishing
4. Limited, Cambridge, UK.
5. Anand S.C., Kennedy J.F., Miraftab M. and Rajendran S., “Medical Textiles and Biomaterials for Health Care”, Wood head Publishing Limited, Cambridge, UK.
6. Chellamani K.P. and Chattopadhyay D., “Yarns and Technical Textiles”, SITRA, 1999.
7. Scott R.A., “Textiles for Protection”, Wood head Publishing Limited, Cambridge, UK.
8. Saville.B.P., “Physical Testing of Textiles”, Wood head Publishing Limited, Cambridge, UK.
9. Fan Q., “Chemical Testing of Textiles”, Wood head Publishing Limited, Cambridge, UK.
10. Long A.C., “Design and Manufacture of Textile Composites”, Wood head Publishing Limited, Cambridge, UK.
11. Fung W., “Coated and Laminated Textiles”, Wood head Publishing Limited, Cambridge, UK.71

E-Resources:

1. NPTEL Online Courses on Technical Textiles, Functional Clothing, Protective Textiles, and Smart Textile Materials, IITs, India.

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Understand functional apparel categories and specialized fibre, yarn, and fabric properties used in protective and performance clothing.	–	–
CO2	Apply principles of thermal comfort, functional finishes, and testing methods in the evaluation of protective textiles.	PO2 (3) PO3 (2) PO7 (1)	PSO2 (2)
CO3	Analyze material characteristics and performance requirements to develop suitable functional and adaptive garment solutions.	PO2 (3) PO5 (2)	PSO1 (2) PSO2 (2)
CO4	Design functional garments by incorporating appropriate materials, construction techniques, seams, and performance features for specific end-use applications.	PO3 (3) PO5 (2)	PSO1 (3) PSO3 (2)

EN25C04	English Communication Skills Laboratory – II	L	T	P	C
		0	0	2	1

Course Objectives:

- The objectives of the course are to build students' advanced communication skills for workplace readiness and develop intercultural competence for effective collaboration in global and virtual teams. Prepare students for competitive exams with focused skill-building and test-oriented practice.

List of Activities

Stage Ready – Impactful Public Speaking.

(i) Simulate a formal event such as an academic conference, convocation, or awards ceremony, where students roles including Master of Ceremonies (MC), Role as a dignitary, and a Commentator

(ii) Visual Prompt Storytelling: Use random images to create spontaneous stories, focusing on plot, setting, and character,

(iii) **Digital Presentation - Record** a short video explaining a project or technical concept, using slides, voiceover, and visual aids (to be uploaded using google classroom or drive link)

Professional and Application-Oriented Writing

(i) Résumé Preparation: Design ATS-friendly résumés tailored to various job descriptions, using action verbs and quantifiable impact. ·

(ii) Design engaging content for poster presentation relevant to their domain.

Receptive Skills in Workplace Communication·

(i) Reading articles related to their domain and discuss in groups

(ii) Visit company websites, make inferences and present in the class

(iii) Listen to recorded mock interviews and take detailed notes. Summarise key points and action items in a professional format and make a presentation.

Intercultural Communication

(i) Assertive vs Aggressive communication

(ii) Role play activities – workplace communication in intercultural/crosscultural contexts

From Campus to Career: Industry Skills and Global Exam Preparation

(i) Participate in HR interviews using AI tools or peer interviewers, responding to behavioural questions using methods like STAR (Situation, Task, Action, Result)

(ii) Practice Verbal Ability in competitive exams like UPSC, SSC, CDS, TNPSC, etc.

Weightage: Continuous Assessment: 60%, End Semester Lab Examinations: 40%.

References:

1. Lucas, Stephen, and Paul Stob. The Art of Public Speaking. Thirteenth edition, McGraw- Hill Education, 2020.
2. Abrahams, Matt. Think Faster, Talk Smarter: How to Speak Successfully When You're Put on the Spot. Simon & Schuster, 2023.
3. Beshara, Tony. Powerful Phrases for Successful Interviews, Rev. ed., McGraw-Hill, 2023.
4. Papalia, Anna. Interviewology: The New Science of Interviewing. Harper Business, 2024.
5. Verbal Ability and Reading Comprehension by Ajay Singh McGraw Hill Education 2020

E-resources:

1. Purdue OWL – Online Writing Lab (Academic and professional writing help) https://owl.purdue.edu/
2. Canva Resume Builder (Creative, ATS-friendly resume design) https://www.canva.com/resumes/
3. BBC Learning English – Pronunciation https://www.bbc.co.uk/learningenglish/english/features/pronunciation
4. India Bix website

CO Mapping with PO & PSO:

	Description of CO	PO	PSO1
CO1	Understand basic industry-related reading materials.	-	-
CO2	Design and present a domain specific poster	PO9(3)	PSO1(2) PSO3(3)
CO3	Deliver effective digital presentations	PO9(3)	PSO2(1)
CO4	Communicate appropriately in intercultural/cross cultural contexts	PO9(3)& PO11(1)	PSO3(3)
CO5	Perform in interviews and competitive exams successfully	PO9(3)	PSO3(1)

FT25407	Standards for Textile and Apparel Industries	L	T	P	C
		1	0	0	1

Overview of Standards:

- Basic concepts of standardization; Purpose of Standardization, marking and certification of articles and processes; Importance of standards to industry, policy makers, trade, sustainability and innovation. Objectives, roles and functions of BIS, Bureau of Indian Standards Act, ISO/IEC Directives; WTO Good Practices for Standardization. Important Indian and International Standards.

Standards For Textile & Apparel Technology

1. **FABRIC PROPERTIES**

IS 1969 - Tensile Properties of Fabrics IS 6489 - Tear Properties of Fabrics
IS 15891 - Determination of Bending Length
IS 8357 - Method for Assessment of Fabric Drape
IS 4681: Method for determination of recovery from creasing of textile fabrics by measuring the angle of recovery
IS 10971 - Determination of fabric propensity to surface fuzzing and to pilling Part - 1 Pilling box method
IS 11056 - Method for determination of air permeability of fabrics
IS 1313 - Methods for Determination of Flammability and Flame Resistance of Textile Fabrics
IS 686 - Methods for Determination of Colour Fastness of Textile Materials to Daylight
IS 766- Method for Determination of colourfastness of Textile Materials to Rubbing
IS 765 - Method for determination of colour fastness of textile materials to washing

2. **GARMENT PROPERTIES**

IS 11161: Textiles - Seam Types - Classification and Terminology
IS 9030 - Method for determination of seam strength of jute fabrics including their laminates
IS 12675 - Guide to garment quality
IS 15312 - Method of Test for Seam Puckering on Materials Sewn by Industrial Sewing Machines

CO Mapping with PO & PSO:

CO	Description of CO	PO	PSO
CO1	Analyze fabric properties by conducting and interpreting standard textile tests to assess quality and performance characteristics.	PO2 (3) PO4 (2) PO5 (3)	PSO2 (3)
CO2	Evaluate garment quality and performance using standard testing methods to ensure compliance with industry specifications and quality standards.	PO2 (3) PO4 (2) PO11 (2)	PSO3 (2)