KUMARAGURU COLLEGE OF TECHNOLOGY,

An autonomous Institution affiliated to Anna University, Chennai

COIMBATORE – 641 049.

B. Tech TEXTILE TECHNOLOGY

REGULATION 2024

I - IV Semesters

Department of Textile Technology

VISION

To be a Centre of Excellence in textile technology and management with basic and applied research for the fulfilment of societal needs.

MISSION

- **Develop industry relevant curriculum,** innovative teaching and project-based learning methods that enables students to be efficient professionals.
- **Motivate Faculty** to update their knowledge and skills through continuous learning.
- **Provide holistic student development** by creating opportunities for lifelong learning and to develop entrepreneurship skills.
- **Undertake inter-disciplinary research** and development/Internship/Consultancy in the field of Textile Technology to support the industry and society.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates of the B. Tech - Textile Technology Programme will be able to:

- PEO: 1 Hold leadership responsibilities in Textile and related segments such as product development, production, technical services, quality assurance and marketing.
- PEO: 2 Become successful entrepreneur in Textile and related field and contributing to societal, technological and industry development.
- PEO: 3 Partake professional qualifications/ certifications in Textile Technology related areas by pursuing specialized studies in engineering and business.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

Graduates of the Textile Technology Undergraduate Program will have the ability to:

PSO1: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization for Process Optimization, Cost and Value analysis, Productivity improvement, Solutions to quality issues and Product development in textile and related fields.

PSO2: Demonstrate learned techniques, experiments, modern engineering tools and software to estimate the optimum utilization of resources such as raw materials, machineries, manpower and to predict the properties of fibre, yarn, fabric and garments as per the end uses.

PROGRAM OUTCOMES (POs)

Graduates of the Textile Technology Undergraduate Program should have the ability to:

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WKS)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, ma ke effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

POll: Life-Long Learning: Recognize the need for, and have the preparation and ability for independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

KUMARAGURU COLLEGE OF TECHNOLOGY

DEPARTMENT OF TEXTILE TECHNOLOGY
REGULATION 2024
B.Tech Textile Technology Curriculum

Semester I

S. No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24HST101	Heritage of Tamils	Theory	HS	1	0	0	0	1
2	24EET104	Foundations of Electrical and Electronics Engineering	Theory	ES	3	0	0	0	3
3	24MAI112	Computational Linear Algebra and Calculus	Embedded	BS	3	0	2	0	4
4	24CYI105	Textile and Apparel Chemistry	Embedded	BS	3	0	2	0	4
5	24MEI101	Engineering Graphics	Embedded	ES	2	0	2	0	3
6	24INP102	Innovation Practicum - 1	Practical	ES	0	0	2	0	1
7	24ADP001	Basics of Artificial Intelligence	Practical	ES	0	0	2	0	1
8	24HSP111	Holistic Wellness- 1	Practical	HS	0	0	2	0	1
9	24INP101	Design Thinking	Practical	HS	0	0	2	0	1
10	24INO1-	FCLF General stack - 1	Practical	OE	0	0	2	0	1
								Total Credits	20
								Total Contact Hours/week	28

Semester II

S.No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24HST102	Tamils and Technology	Theory	HS	1	0	0	0	1
2	24HST103	Effective Communication	Theory	HS	2	0	0	0	2
	24HST104	Professional Communication	Theory	HS	2	0	0	0	
	24HSJ102	Fluency through Practice	Project	HS	0	0	0	4	
3	24MET106	Basics of Mechanical Engineering	Theory	ES	3	0	0	0	3
4	24TTT101	Introduction to Textiles	Theory	PC	1	0	0	0	1
5	24MAI122	Advanced Computational Calculus	Embedded	BS	3	0	2	0	4
6	24PHI103	Applied Physics for Textile Technology	Embedded	BS	3	0	2	0	4
7	24INP103	Innovation Practicum - 2	Embedded	ES	0	0	2	0	1
8	24CSI101	Logical thinking and Problem Solving	Embedded	ES	3	0	2	0	4
9	24HSP112	Holistic Wellness- 2	Practical	HS	0	0	2	0	1
10	24INO1--	FCLF General stack - 2	Practical	OE	0	0	2	0	1
								Total Credits	**22**
								Total Contact Hours/week	**30**

Semester III									
S.No	**Course code**	**Course Title**	**Course Mode**	**Course Type**	**L**	**T**	**P**	**J**	**C**
1	24TTI201	Textile Fibres	Embedded	PC	3	0	2	0	4
2	24TTI202	Yarn Manufacturing Technology - I	Embedded	PC	3	0	2	0	4
3	24TTI203	Weaving Technology - I	Embedded	PC	3	0	2	0	4
4	24TTJ204	Internship camp / Mini Project- I	Project	PRJ	0	0	0	0	1
5	24MAI232	Applied Statistics for Engineers	Embedded	BS	3	0	2	0	4
6	24HSP005	Mastering Conversations	Practical	HS	0	0	2	0	1
7	24INM201	Universal Human Values-II: Understanding Harmony	Theory	HS	1	0	0	0	1
8	24INO2--	FCLF – General Stack-3	Practical	OE	0	0	2	0	1
9	24INP201	Innovation Practicum -3	Practical	ES	0	0	2	0	1
10	24EII225	Measurements and Instrumentation for Textile Industries	Embedded	ES	3	0	2	0	4
								Total Credits	**25**
								Total Contact Hours/week	**30**

Semester IV									
S.No	**Course code**	**Course Title**	**Course Mode**	**Course Type**	**L**	**T**	**P**	**J**	**C**
1	24HSP006	Mastering Group Discussion and Presentation Skills	Practical	HS	**0**	**0**	**2**	**0**	**1**
2	24TTT205	Characteristics of Textile Fibres	Theory	PC	3	0	0	0	3
3	24TTI206	Yarn Manufacturing Technology-II	Embedded	PC	3	0	2	0	4
4	24TTI207	Weaving Technology-II	Embedded	PC	3	0	2	0	4
5	24TTI208	Textile Design and Structures	Embedded	PC	2	0	2	0	3
6	24TTI209	Knitting Technology	Embedded	PC	3	0	2	0	4
7	24INM202	Environmental Sci. & Sustainability	Embedded	HS	1	0	2	0	2
8	24INO2-	FCLF – Technical Stack -1	Practical	OE	0	0	2	0	1
9	24INO2-	FCLF – Emerging Stack - 1	Practical	OE	0	0	2	0	1
10	24INP204	Innovation Practicum - 4	Practical	ES	0	0	2	0	1
								Total Credits	**24**
								Total Contact Hours/week	**33**

SEMESTER I

24HST101	தமிழர் மரபு / HERITAGE OF TAMILS (Common to all Departments)	L	T	P	J	C
		1	0	0	0	1
HS		SDG	4, 11, 16			
Pre-requisite courses	-	Data Book / Code book (If any)	-			

Course Objectives:

The purpose of taking this course is to:

1	தமிழ் மமமொழி மறற்றுமம் இலகக்கியதத்தின் அடிபப்படை அமம் சஙக்கடை அறிமுகபப்டுதது் தல், அதனஙி மமதனொண்மைகமகளமம் முதல் நவீனமகளமம் வடையிமலனொடவரச் சி் மையவிட கக்கம் மசய்யுதல். Introduce students to the foundational aspects of Tamil language and
2	தமிழகத்தின் மசழுமமயனொன கலனொசம் ொர பொரமப் பரியத்மத அறிமுகபப்டுத்துதல், பொமற ஓவியக் கமலயிலிருநத்து நவீன ம ிறப்ப கமலயினப்படி அதனஙி கமல சவளிபப்பொடுகமள ஆரொயத்தல். Familiarize students with the rich cultural heritage of Tamil Nadu, exploring its artistic expressions from rock art paintings to contemporary sculptures.
3	தமிழகதத்தின் நொைட்டுபப்புறக் கமலகளஙி மறற்றுமம் வீரவிமளயொைட்டுகமள அறிதல் - தினணகக்மகொைமம்பொடுகடை டமஆொய்தல் - இநத்திய கதசிய இயகக்கத்தில் தமிழரட்கினஙி பஙக்கினை அறிதல் . To know the folk arts and heroic ames of Tamilnadu-explore the concept of thinai -to know the

Course Outcomes

	After successful completion of this course, the students shall be able to	Revised Bloom's Taxonomy Levels (RBT)
CO1	தமிழ் சமொழி மறற்றுமம் இலகக்கியதத்தின் அடிபப்படம அறிமவ மமமப்படுத்தறுதல். மமமொழி பணஙி மபொைட்டில் எவ்மவொறு இடைநத்தறுளட்டது எனப்பைத டைரத்தல்.	U
CO2	பழஙக்மகொல மபொைற ஓவியஙக்கள், ம ிறப்பம் என கைலகளஙி நவீன மகொலமவ்வடை எவ்மவறறு படயிகக்கிறது எனப்பைத புரிநத்துசகளொளுதல்.	U
CO3	நொைட்டுபப்புறக் கைலகளஙி தறக்கொபப்றுக் கமலடமகளொகவுமம், டைலல் ஆடமகொகக்கியத்தை கமமப்படுத்துமம் விதமொகவறுமம் அைமவைத அறிநத்து கைலகளஙி மீமதனொன ஆரவ்த்தை அதிகரிகக்கச் மசயத்தல் - தமிழரக் ளினஙி அகதத்திடை, புறதத்திடை கமகளொைமம் பொைட்டினை புரிநத்து மமகளொளுதல். இநத்திய பணஙி மபொைட்டில் தமிழரட்கினஙி பஙக்டகிபப்ைப அறிதல்.	Ap

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)
	1	2	3	4	5	6	7	8	9	10	11	

Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1							3	2	2		2		
2							3	3	2		2		
3							3	2	2		2		

Course Content

மமமொழி மறற்ரூம் இலகற்கியம் இநற்திய சமொழிகற் கூடுமற்பஙற்களற் – திட ம ொவிட சமொழிகளற் – தமிழற் ஒரு மசமற்சமொழி – தமிழற் மசவற்விலகற்கியஙற் களற் - சஙற் க இலகற்கியத்தினற் சமய மசொரபறற்ற தனற் மைம – சஙற் க இலகற்கியத்திலற் பகிரதலற் அறமற் – திருகற்குறளிலற் கமமலமொணற் மைமகற் கருதற்துகற்களற் – தமிழற்கற் மகமொபற்பியஙற் களற் , தமிழகதற்திலற் சமண சமபளதற்த சமயஙற் களினற் சதமொட கற்கமற் -பகற்தி இலக்கியமற், ஆழற்மவமொரக் ளற் மறற்றுமற் மநொயனற்மமமொரக் ளற் – ம ிறற்றிலகற்கியஙற் களற் – தமிழிலற் நவீன இலகற்கியத்தினற் வளரச் ம ி – தமிழற் இலகற்கிய வளரச் ம் ியிலற் மபமொரதிமயமொரற் மறற்றுமற் மபமொட திமதமொசனற் ஆகிகமயமொரினற் பஙற்களிபற்பு. **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	**3 Hours**
மரபு – பமொறற ஓவியஙற்களற் முதலற் நவீன ஓவியஙற் களற் வறர – சிறற்பகற்கறற நடுகலற் முதலற் நவீன ம ிறற்பஙற் களற் வடை – ஜமற்சபமொனற் ம ிலைலகளற் – பழஙற் குடியினரற் மறற்றுமற் அவரக் ளற் தமயொரிகற்குமற் மைகவினைனபற் மமபமொருமை்களற், சபொமற்மைமகளற் – கதரற் மசயற் யுமற் கலைல – சுடுமணற் ம ிறற்பஙற் களற் – மநமொமைடுபற்புற மதயற் வஙற் களற் – கூமரிமுமைனயிலற் திருவளற்ளுவரற் ம ிலைல – ஙைசகற் கரூவிகளற் – மிருதஙற் கமற், பைற, வீடமை, மயமொழற், மநமொதஸற் வரமற் – தமிழரக் ளினற் சமூக சபமொருட ம ொமதமொர மவமொழற்வில் கமகமெவில்களினற் பஙற்கு. **HERITAGE – ROCK ART PAINTINGS TO MODERN ART SCULPTURES** 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,	**3 Hours**
நொடடுற் பற்புறகற் கறறகளற் மறற்றுமற் வீ விறறயமொடடூகளற் மதருகற்கூதற்து, கரமகமொைட் மற், விலற் லுபற்மபமொை்டு, கணிமயனொணற் கூதற்து, ஒயிமலமொைட் மற், கமதனொல் மபமொைவகற்கூதற்து, ம ிலமற்மபமொைட் மற், வளரி, புலிமயமொைட் மற், தமிழரக் ளினற் விடைமயமொடூகளற்.	**3 Hours**

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Ciabatta, Valari, Tiger dance - Sports and Games of Tami	
தமிழரக் ளினி் தறறகக்&ொடப்பொடுகள் தமிழகத்தின் மதொவரங் களுமி், வலிலங் குகளுமி் – சதொலி் மகொபப்பியமி் மறறுமி் சங்க இலகக்கியத்திலி் அகமி் மறறுமி் புறகக்மகொைசபொடுகளி் – தமிழரக் ளி் கமபொறறிய அறகக்மகொைமி் பொடு – சங் கமகொலத்திலி் தமிழகத்திலி் எழுத்தறிவுமி், கலி்வியுமி் – சங் கமகொல நகரங் களுமி் துைறமுகங் களுமி் – சங் கமகொலத்திலி் ஏறறுமதி மறறுமி் இறகக்குமதி – டகலி் டகநத மநொடுகளிலி் தமிழரக் ளின் மவறறி. **THINAI CONCEPTS OF TAMIL** 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	**3 Hours**
இநதிய கதசிய இயகக்மி் மறறுமி் இநதிய பண் தமிழரக் ளின் பங்களிபபு இநதிய வி்டுதைலபப் கமபொரில் தமிழரக் ளின் பங் கு பிறபபகுதிகளில் தமிழ்ப் பண் மபொைடின் மதொகக்மி் – சுயமரிமயொைத இநதிய மருதத்துவத்திலி், ம ித்த மருததுவத்தின் பங்கு ைகமயழுத்துபபடிகளி் - தமிழ்ப் புத்தகங்களின் அசசு வரமலொறு. **CONTRIBUTIONS OF TAMIL TO INDIAN NATIONAL MOMENT 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.	**3 Hours**

Theory Hours:	**15**	**Tutorial Hours:**	**0**	**Practical Hours:**	**0**	**Project Hours:**	**0**	**Total Hours:**	**15**

Learning Resources

Reference books:

1. தமிழக வரமலொறு – மகக்ளுமி் பண் மபொடுமி் – கக.கக. பளி்டை (மடவியீடு: மபைட நூலி் மறறுமி் கலி்வியியலி் பணிகளி் கழகமி்).
2. கணினித்தமிழ் – முைனவரி் இல. சுநதரமி். (வி்டகனி் பிரசுரமி்).
3. கீழடி – ைவைக நதிகக்கடையிலி் சங் கமகொல நகர மநொகரிகமி் (சதொலி்லியலி் துைற
4. சபொரைனை – ஆறறுமங்கடை மநொகரிகமி். (சதொலி்லியலி் தை மவளியீடை)
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 Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Textbook 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)

Online Educational Resources:

1. https://www.youtube.com/watch?v=IKPwEmsmuZc&list=PLMMrJE4pHZmc0iJZIE6lBpFoPK_9Y325e
2. https://www.youtube.com/watch?v=j6_ddjn_gLc&list=PLMMrJE4pHZmc0iJZIE6lBpFoPK_9Y325e&index=2
3. https://docs.google.com/presentation/d/1pf0jbyuDTNdvlcKMnOfoPjbqha7JqdOc/edit#slide=id.p1
4. https://www.youtube.com/watch?v=IKPwEmsmuZc&list=PLMMrJE4pHZmc0iJZIE6lBpFoPK_9Y325e&index=1

Assessment (Theory course)
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE), Assignments, Quiz, Library Record

Course Curated by

Expert from Industry	Expert(s) from Higher Education Institutions	Internal Expert
Mr.Vijayan Ramanathan , Project manager, Toppan Merrill. Technologies, Coimbatore	Dr. Aninditha Sahoo, IIT, Madras Dr.P.R.Sujatha Priyadharshini, Anna University, Chennai Dr. E. Justin Ruben, CIT, Coimbatore	Suriya Prakash Department of Language

Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24EET104	FOUNDATIONS OF ELECTRICAL AND ELECTRONICS ENGINEERING (Common to CE & TT)	L	T	P	J	C
		3	0	0	0	3
ES		SDG	7, 9, 12			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	impart knowledge on power system structure, apparatus and its operation
2	familiarize the students about the operation of Electrical and Electronic circuits
3	provide significance of energy conservation and safety in Electrical Installations

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	analyse the components of electrical power system and interconnections.	An
CO2	apply Ohm's Law and Kirchhoff's Laws to solve basic problems in electrical circuits.	Ap
CO3	compare the structure and principle of operation of Electrical motors and choose the motor for suitable applications.	Ap
CO4	analyse the operation of electronic devices, circuits and instrumentation systems.	An
CO5	apply Electrical safety and energy conservation measures.	An

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	2	2											
2	2	2											
3	2	2	1										
4	1	1	1										
5				1	1	1							

Course Content

ELECTRIC POWER SYSTEM — **9 Hours**

Structure of Power system: Single line diagram, Generation of power: Layouts of Hydro power station, Thermal power station, Solar power plant, Wind energy conversion system. Types of substations -Types of wires and cables, Domestic wiring.

ELECTRIC CIRCUITS Basic circuit elements and sources, Ohms law, Kirchhoff's laws, Series and Parallel connection of circuit elements (simple problems), Single phase AC series circuit: Voltage, Current, Power, Energy, Power factor in R-L series circuit.	**9 Hours**
ELECTRICAL MACHINES (Qualitative treatment Only) Single phase Transformers - Separately Excited DC motor - PM DC motor - Single phase Capacitor start and run induction motor - Three phase squirrel cage induction motor - PM Stepper motor - BLDC motor drive.	**9 Hours**
ELECTRONIC CIRCUITS PN junction diode - Full wave rectifier – Bipolar Junction transistors – Single phase bridge inverter (VSI) - Block diagrams of Online UPS, Digital Energy meter - Types of transducers- Introduction to smart sensors and automation systems.	**9 Hours**
ELECTRICAL SAFETY AND ENERGY CONSERVATION Earthing, Protective devices: Switch fuse unit - Miniature circuit breaker - Earth leakage circuit breaker-Lightning arrester - Safety precautions - PPE and First Aid - Energy conservation measures in domestic and industrial facilities.	**9 Hours**

Theory Hours:	**45**	**Tutorial Hours:**	**0**	**Practical Hours:**	**0**	**Project Hours:**	**0**	**Total Hours:**	**45**

Learning Resources

Textbooks

1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj - Basic Electrical and Electronics Engineering, 3rd Edition, McGraw Hill Education, 2021
2. S.L. Uppal, G.C. Garg - Electrical Wiring, Estimating and Costing, 6th Edition, Khanna Publishers, 2022

Reference books

1. P.S. Bimbhra - Electrical Machinery, 8th Edition, Khanna Publishers, 2023
2. V.K. Mehta, Rohit Mehta - Principles of Electrical Engineering, 2nd Edition, S. Chand Publishing, 2022
3. B.L. Theraja, A.K. Theraja - A Textbook of Electrical Technology - Vol. 2: AC & DC Machines, 25th Edition, S. Chand Publishing, 2023
4. Adel S. Sedra, Kenneth C. Smith - Microelectronic Circuits, 8th Edition, Oxford University Press, 2023
5. Robert L. Boylestad, Louis Nashelsky - Electronic Devices and Circuit Theory, 12th Edition, Pearson, 2023

Online Resources (Web Links)

1. https://www.coursera.org/learn/electronics
2. https://archive.nptel.ac.in/courses/108/105/108105053/

Assessment (Theory course)
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE)

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**		**Internal Expert(s)**
Mr. S. Jaya kumar	Dr.N.Senthilnathan		Dr. P. Thirumoorthi
Swagat Industries Ltd, CBE Mr. Lakshmiprasad Bosch Global Software Technologies, CBE	Professor/EEE Kongu Engineering College Dr. S. Balamurugan Professor - EEE Amrita Vishwa Vidyapeetham		Professor Department of EEE
Recommended by BoS on	14.08.2024		
Academic Council Approval	27	**Date**	24.08.2024

24MAI112	COMPUTATIONAL LINEAR ALGEBRA AND CALCULUS (Common to BT, FT, TT)	L	T	P	J	C
		3	0	2	0	4
BS		SDG	4, 7, 9			
Pre-requisite courses	-	Data Book / Code book (If any)	-			

Course Objectives:

The purpose of taking this course is to:

1	develop and understanding of the solution techniques for systems of linear equations and their applications in engineering problems.
2	familiarize students with the concept of eigenvalues and eigenvectors, and their significance in transforming real-world systems.
3	apply differential calculus to solve real-life optimization problems involving rate changes and extrema.
4	enhance proficiency in evaluating integrals using analytical and numerical methods for solving area and volume problems in engineering.
5	introduce ordinary differential equations and their numerical solutions for modelling dynamic systems in various engineering disciplines.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	apply matrix operations (Gauss Jordan, Gauss Seidel) to solve systems of linear equations in textile manufacturing and material composition problems.	Ap
CO2	apply eigenvalues and eigenvectors to simplify textile stress-strain matrices and design systems in fashion technology.	Ap
CO3	apply differential calculus to optimize garment fitting, fabric draping, and bio-responses in biotechnological textiles by analysing changes in variables.	Ap
CO4	analyse and estimate changes in textile production processes and biological systems with variable data points by utilizing numerical differentiation techniques (Newton's, Lagrange's methods).	An
CO5	solve integration problems using analytical and numerical methods (Trapezoidal, Simpson's rule) for calculating fabric area or volume in garment design and textile engineering.	Ap
CO6	apply numerical methods (Euler's method, Taylor series, Runge Kuta) to solve first-order ordinary differential equations in dynamic biotechnological processes such as enzyme kinetics or fluid flow in textile materials.	Ap

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	3	2		3	2		2	1	2			
2	3	3	2		3	2		2	1				
3	3	2	3		3	2		2	1				
4	3	3	2		3	2		2	1				
5	3	2	2		3	2		2	2	2			
6	3	3	2		3	2		2	1				

Course Content:

SYSTEM OF LINEAR EQUATIONS Rank of a matrix – Consistency of a system of linear equations - Rouche's theorem - Linearly dependent and independent vectors – Solution of a system of linear equations - Row Echelon form method Numerical Method - Solution of a system of linear equations by Gauss Jordan and Gauss Seidel Method. **Practical Component** Solve a system of linear equations using Gauss Jordan and Gauss Seidel methods and interpret the results for a circuit analysis problem. Use MATLAB to find the rank of a matrix and check the consistency of a system of linear equations, applying the results to a mechanical structure problem.	**9 Hours** **6 Hours**
EIGENVALUES AND EIGENVECTORS Eigenvalues and Eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors –Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation. Numerical Method - Dominant Eigen value by Power Method. **Practical Component** Implement the Power Method in MATLAB to find the dominant eigenvalue of a matrix representing a dynamic system (e.g., vibration analysis of a mechanical structure). Use MATLAB to perform orthogonal transformations and diagonalize a symmetric matrix in a physical system (e.g., stress-strain analysis).	**9 Hours** **6 Hours**

DIFFERENTIAL CALCULUS Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable - Numerical Method - Numerical differentiation by Newton's Forward and Backward Method (Equal intervals), Lagrange's Method (Unequal Intervals). **Practical Component** Use MATLAB to compute numerical differentiation using Newton's Forward and Backward methods for a data set representing temperature changes over time. Apply Lagrange's method for numerical differentiation to an unequal interval data set, such as population growth data.	**9 Hours** **6 Hours**
INTEGRAL CALCULUS Definite and Indefinite integrals - Techniques of Integration: Substitution rule, Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction. Numerical Method - Numerical integration by Trapezoidal and Simpson's rule. **Practical Component** Implement MATLAB to numerically integrate a function using the Trapezoidal rule, solving for areas under curves in engineering problems (e.g., fluid flow). Use Simpson's rule in MATLAB for numerical integration, applied to solve real-world volume problems in physics or engineering.	**9 Hours** **6 Hours**
FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS Leibnitz's equation – Bernoulli's equation – Numerical Methods - Solving first ODE by Euler's formula, Taylor series and Runge Kutta method of 4th order. **Practical Component** Solve a first-order ODE using Euler's method in MATLAB and apply it to model the cooling process of an object. Implement the Runge Kutta method of the 4th order in MATLAB to solve a dynamic system, such as the motion of a pendulum or a mass-spring system.	**9 Hours** **6 Hours**

Theory Hours: 45	Tutorial Hours: 0	Practical Hours: 30	Project Hours: 0	Total Hours: 75

Learning Resources

Textbooks

1. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 9th Edition, New Delhi, 2023.
2. Grewal B.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 2013.

Reference books

1. Kreyzig E., "Advanced Engineering Mathematics", 10th Edition, John Wiley and sons, 2011.
2. Weir, MD, Hass J, Giordano FR, "Thomas' Calculus", Pearson education 15th Edition, 2023.
3. Steven.C.Chapra, "Applied Numerical Methods with Matlab for Engineers and Scientists",4th Edition, Tata McGraw Hill Co. Ltd, 2017.
4. Dennis G. Zill and Michael R Cullen, "Differential equations with boundary value problems", 7th Editon, Brooks/Cole Cengage Learning.2009.
5. Ron Larson and Bruce H. Edwards, "Calculus", 12th Edition Brooks/Cole Cengage Learning.2022.
6. James W. Demmel Applied Numerical Linear Algebra" 9th Edition, SIAM, 1997

Online Resources (Web Links)

1. MIT Open Courseware: Linear Algebra (Free) https://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/
2. Coursera: Numerical Methods for Engineers https://www.coursera.org/learn/numerical-methods-engineers
3. Khan Academy: Differential Calculus (Free) https://www.khanacademy.org/math/calculus-1
4. MIT OpenCourseWare: Differential Equations (Free) https://ocw.mit.edu/courses/mathematics/18-03sc-differential-equations-fall-2011/

Assessment (Embedded course)
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Mr. Ramesh V.S., STEPS Knowledge Services Private Limited, Coimbatore. Mr.Jayakumar Venkatesan, Valles Marineris International Private Limited- Chennai. Mr. Imran Khan, GE Transportation Company, Bangalore.	Dr.T.Govindan, Government College of Engineering, Srirangam, Trichy. Dr.C.Porkodi, PSG College of Technology, Coimbatore. Dr.P.Paramanathan, Amrita Vishwa Vidyapeetham, Coimbatore.	Dr. R.Marudhachalam Dr. Vijitha Iyer Dr. A.Ezhilarasi, Department of Maths

Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24CYI105	TEXTILE AND APPAREL CHEMISTRY (Common to TT & FT)	L	T	P	J	C
		3	0	2	0	4
BS		SDG	6, 9, 12			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	provide a deep understanding of chemical principles in polymer science, dyeing, and textile finishing for sustainable production.
2	equip students with advanced polymerization techniques and chemical additives knowledge for engineering high-performance, eco-friendly textiles.
3	develop analytical skills in water treatment and waste management for resource conservation and minimizing environmental impact in textiles.
4	introduce emerging technologies such as nanotechnology and bio-based polymers, preparing students for innovation in smart textiles and sustainable fashion.
5	promote the application of green chemistry principles, enabling students to contribute to sustainable and ethical practices in the textile industry.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	apply polymerization mechanisms to solve challenges in developing novel polymers for textile applications	Ap
CO2	analyse the effects of polymer structures on material properties to distinguish between various polymer-based textile products	An
CO3	apply different polymer processing techniques to solve challenges in textile manufacturing processes	Ap
CO4	apply sustainable materials and chemical additives in textile production processes to develop eco-friendly textile products	Ap
CO5	interpret the interaction between dyes and fibers to optimize dyeing processes for various fabric types, ensuring efficiency and sustainability	An
CO6	evaluate and recommend water treatment processes and recycling strategies to address the environmental challenges of the textile industry	E

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team work	9 Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1	3	2						2			3		
2		3	2		2								

3	*2*			*2*				*2*			2		
4			*2*				*2*						
5						*2*	*2*						
6	2			3		1	3			2	2		

Course Content	
POLYMER CHEMISTRY Introduction – Functionality - Degree of polymerisation - classification - Mechanism - (Free Radical Mechanism, coordination polymerisation - Ziegler-Natta Polymerization) - Effect of polymer structure on properties- Degradations - chemical, thermal, mechanical and photo degradations. Polymer characterization techniques (GPC, DSC, TGA, FTIR). **Practical Component:** • Determination of Polymer Melting Points and Moulding Characteristics • Determination of Polymer Solution Viscosity at Different Concentrations	**9 Hours** **4 Hours**
POLYMER PROCESSING Polymer Processing: Calendaring - compression – injection - extrusion - blow moulding - foaming - fibre spinning (melt, dry and wet spinning) - 3D printing of polymers and textiles Speciality chemicals: plasticizers - anti-aging additives - antioxidants - UV stabilizers - blow agents - crosslinking agents - Applications: Smart Textiles (Conducting polymers), Biopolymers and Biodegradable polymers	**9 Hours**
DYE AND FIBER INTERACTIONS Bonding: Ionic - covalent - co-ordinate covalent bonds - hydrogen bonding - Vanderwaal's forces - Interaction of proteins and enzymes with fibres. Dyes: Introduction - Chromophore and auxochromes - Hypochromic and Bathochromic effects - Classification of dyes based on different parameters - Significance and limitations of natural and synthetic dyes - Interaction between Fibers and dyes - Dyes substrate affinity (dyes for cellulose fibres, silk). **Practical Component:** • Preparation of Standard solution - Sodium Carbonate • Preparation of Standard Dye Solutions • Synthesis of Methyl orange • Estimation of Dye Concentration Using Spectrophotometry • Determination of Dye Nature Through pH Analysis • Determination of Dyeing Effectiveness on Fabric using Synthetic dyes • Determination of Natural Dye Extraction Efficiency from Various Sources • Determination of Dye Solubility in Various Solvents	**9 Hours** **16 Hours**
WATER TECHNOLOGY Introduction - Hardness of water - Disadvantages of hard water in textile industry Softening Processes: External treatment (Demineralisation process) - Internal treatment (colloidal, carbonate, phosphate and calgon conditioning) - Desalination (Reverse osmosis, Electrodialysis) - Advanced oxidation processes for wastewater treatment - Water recycling and reuse in textile industry **Practical Component:** • Determination of total, temporary and permanent hardness by EDTA method	**9 Hours**

• Estimation of DO by Winkler's method • Estimation of Alkalinity by Indicator method • Estimation of Chloride by Argentometric method	**8 Hours**
EMERGING TECHNOLOGIES IN SUSTAINABLE TEXTILES Introduction to sustainable textiles - Green Chemistry in Textile Production (Principles and Solvent - free and Water-free textile processing) - Bio-based and Sustainable Polymers (Polylactic acid (PLA) - Nanotech in Sustainable Textiles (Carbon nanotubes and graphene in textiles, Nanofibers and their production methods) - Sustainable Raw Materials (Natural Fibers, Recycled – Pet fibres, Textile waste and Bio-Based Fibers) - Eco-Friendly Dyeing and Finishing. **Practical Component**: • Determination of Decolourisation of Dyeing Effluent	**9 Hours** **2 Hours**

Theory Hours: 45	Tutorial Hours: 0	Practical Hours: 30	Project Hours: 0	Total Hours: 75

Learning Resources

Textbooks:

1. Gowariker, V. R., Viswanathan, N. V., & Sreedhar, J. Polymer Science., New Age International Publishers, New Delhi (2016).
2. Dara, S. S., & Umare, S. S. A Textbook of Engineering Chemistry., S. Chand and Company Limited, New Delhi (2014).
3. Jain, P. C., & Jain, M. Engineering Chemistry (17th ed.)., Dhanpat Rai and Sons, New Delhi (2018).
4. Singh, A., Vairam, S., & Suba Ramesh. Chemistry for Engineers., Wiley India Ltd, New Delhi (2010).

References:

1. Seymour, R. B., & Carraher, C. E. Jr. Polymer Chemistry (6th ed.)., Plenum Publishing Corporation, New York (2003).
2. Finar, I. L. Organic Chemistry., Pearson Publishers, London (2012).
3. Hungar, K. Industrial Dyes: Chemistry, Properties and Applications., Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim (2004).
4. Khan, M. M. J., Ng, B. K. S., & Goh, S. C. K. The Handbook of Sustainable Textiles., Springer, Singapore (2022).

Online Resources (Weblinks)

1. NPTEL - Polymer Chemistry
   https://nptel.ac.in/courses/104/105/104105039/
2. NPTEL - Polymer Reaction Engineering
   https://nptel.ac.in/courses/103/105/103105110/
3. NPTEL - Processing of Polymers and Polymer Composites
   https://nptel.ac.in/courses/112/104/112104221/
4. SWAYAM - Polymer Processing and Moulding Techniques
   https://onlinecourses.swayam2.ac.in/cec21_mg15/preview
5. NPTEL - Chemistry of Dyes and Pigments
   https://nptel.ac.in/courses/104/104/104104123/

6. SWAYAM - Textile Chemistry
   https://swayam.gov.in/nd2_cec20_he03/preview
7. NPTEL - Water and Wastewater Treatment
   https://nptel.ac.in/courses/103/106/103106118/
8. SWAYAM - Water Quality and Wastewater Management
   https://onlinecourses.swayam2.ac.in/cec21_ge11/preview
9. NPTEL - Sustainable Materials and Green Buildings
   https://nptel.ac.in/courses/124/105/124105016/
10. NPTEL - Green Chemistry and Catalysis
    https://nptel.ac.in/courses/104/106/104106098/

Assessment (Embedded course)
CAT, Activity and Learning Task(s), One-minute paper, Think-pair-share, MCQ, End Semester Examination (ESE), Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
Dr. Muthuraja Perumal General Manager - Research & Development Rohith Industries, APIIC Industrial Park, Andhra Pradesh	Dr. Venkatakrishnan Professor, School of Chemical Sciences Indian Institute of Technology (Mandi), Himachal Pradesh, India	Dr K Kalapriya, AP- III, Mr. K Karthik, AP- II, Department of Chemistry	
Recommended by BoS on	16.08.2024		
Academic Council Approval	No.27	**Date**	24.08.2024

24MEI101	ENGINEERING GRAPHICS (Common to AE, AU, CE, FT, ME, MR, TT)	L	T	P	J	C
		2	0	2	0	3
ES		SDG		4, 9, 11		

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	understand the importance of graphics in the design process, including visualization, communication, and documentation.
2	develop proficiency in constructing various curves, orthographic projections, and using drafting tools.
3	gain the ability to project and section simple solids and develop lateral surfaces and isometric projections.
4	learn to use AutoCAD for sketching, editing objects, and creating detailed engineering drawings.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	apply the construction of curves such as ellipses, parabolas, and hyperbolas to accurately visualize and communicate design ideas using drafting tools.	Ap
CO 2	analyze the projections of points, lines, and planes to determine true lengths and inclinations for effective representation of objects in design.	An
CO 3	evaluate the projections and sections of solids like prisms, pyramids, cylinders, and cones to create accurate sectional views and true shapes in engineering drawings.	An
CO 4	create developments of surfaces for simple solids and construct isometric projections to enhance the design process with three-dimensional visualizations.	An
CO 5	design free-hand sketches of orthographic views using AutoCAD.	Ap
CO 6	apply AutoCAD commands to demonstrate object selection and editing techniques, enabling precise modifications in engineering drawings.	Ap

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	2	2			2								
2		2		2						2			
3		2	2				2						
4	2		2		2								
5	2				2					2			
6	2				2					2			

Course Content

PLANE CURVES, PROJECTION OF POINTS, LINES AND PLANES • Importance of graphics in design process, visualization, communication, documentation and drafting tools, Construction of curves - ellipse, parabola, and hyperbola by eccentricity method only. Orthographic projection of points. • Construction of cycloid — Construction of spirals - Construction of involutes of square and circle. • Drawing of tangents and normal to the above curves. • Projections of straight lines located in first quadrant - determination of true length and true inclinations. • Projections of plane surfaces - polygonal lamina and circular lamina, located in the first quadrant and inclined to one reference plane.	**6 Hours** **6 Hours**
PROJECTION AND SECTION OF SOLIDS • Projection of simple solids - prism, pyramid, cylinder and cone. Drawing views when the axis of the solid is inclined to one reference plane. • Sectioning of simple solids - prisms, pyramids, cylinder and cone. Obtaining sectional views and true shape when the axis of the solid is vertical and cutting plane inclined to one reference plane.	**6 Hours** **6 Hours**
DEVELOPMENT OF SURFACES, ISOMETRIC PROJECTIONS • Development of lateral surfaces of truncated prisms, pyramids, cylinders and cones. • Isometric projection, Isometric scale, Isometric views of simple solids, truncated prisms, pyramids, cylinders and cones.	**6 Hours** **6 Hours**
FREE-HAND SKETCHING AND INTRODUCTION TO AUTOCAD • Free hand sketching techniques, sketching of orthographic views from given pictorial views of objects, including free-hand dimensioning. Free hand sketching of isometric views from orthographic views. • Introduction to Drafting Software (AutoCAD) & its Basic Commands. Introduction to coordinate systems, object selection methods, selection of units and precession. Annotation and dimensions, Object properties.	**6 Hours** **6 Hours**
DRAWING ORGANIZATION AND HOUSE PROJECT AutoCAD - Sketching – line, circle, arc, polygon, rectangle and ellipse. Working with object snaps, layers and object properties. Editing the objects – copy, move, trim, extend, working with arrays, mirror, scale, hatch, fillet and chamfer. Isometric views of simple solid blocks.	**6 Hours** **6 Hours**

Theory Hours:	Tutorial Hours:	Practical Hours:	Project Hours:	Total Hours:
30	0	30	0	60

Learning Resources

Textbooks:

1. Basant Agrawal and CM Agrawal, Engineering Drawing, McGraw-Hill, New Delhi, First Edition, 2008.
2. Venugopal K. and Prabhu Raja V., Engineering Graphics, New Age International (P) Limited, New Delhi, 2008.

References:

1. Nataraajan K.V., Engineering Drawing and Graphics, Dhanalakshmi Publisher, Chennai, 2005.
2. Warren J. Luzadder and Jon. M. Duff, Fundamentals of Engineering Drawing, Prentice Hall of India Pvt. Ltd., New Delhi, Eleventh Edition, 2005.

3. Gopalakirishna K.R., Engineering Drawing (Vol. I & II), Subhas Publications, 2001.
4. James Leach, AutoCAD 2017 Instructor, SDC Publications, 2016.

Online Resources (Open sources):

1. https://www.khanacademy.org/math/differential-calculus
2. https://nptel.ac.in/courses/106105171
3. https://swayam.gov.in/nd1_noc19_cs42/preview

Assessment (Embedded course)
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by

Expert from Industry	**Expert from Higher Education Institutions**	**Internal Expert**
Mr. G. Vergin Vino Design Engineer TANCAM, Chennai	Dr. V. Prabhuraja Professor Department of Mechanical Engineering PSG College of Technology, Coimbatore	Dr. K. M Senthil Kumar Associate Professor Department of Mechanical Engineering

Recommended by BoS on	17.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24INP102	INNOVATION PRACTICUM – 1 (Common to all Departments)	L	T	P	J	C
		0	0	2	0	1
ES		SDG	9, 11, 12			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	analyse the effectiveness of systems thinking and problem-solving methodologies in applying data-driven insights for innovative solution design.
2	evaluate the impact of transdisciplinary collaboration on creating functional hardware prototypes through fabrication techniques.
3	understand the future trends and implications of technology in developing innovative products.

Course Outcomes:

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	recall the fundamental principles of custom hardware design.	R
CO2	understand the appropriate tools and their applications for solving hardware-related problems.	U
CO3	apply systems engineering concepts to real-world hardware design challenges.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team work	9 Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1	2		1										
2	2				1								
3		2	2	1									

Course Content

Engineering Fundamentals and Innovation Why engineering? The concept of street fight engineering - Real-world design process and problem-solving methodology - Data-driven insights and concept generation - Case studies of successful engineering innovations.	**3 Hours**
Transdisciplinary Systems and Manu'Futuring Transdisciplinary systems to accelerate innovation - Manu'Futuring: Technology in hardware manufacturing and manufacturing of hardware technologies - Future scopes with product case studies.	**6 Hours**

Building Custom Hardware How to build a basic custom hardware - Electronics fundamentals and components - Software for hardware control - Fabrication techniques.	**6 Hours**
System Thinking and Engineering Introduction to system thinking - Real world as a system - Concept of system engineering and its application – iLenSys.	**7 Hours**
Creativity Time and Tech Teardown Creativity exercise: Apply system thinking to a real-world problem - Tech teardown: Analyse a product or system to understand its engineering principles - Presentation: Present your creative project and tech teardown with an engaging title	**8 Hours**

Theory Hours:	0	Tutorial Hours:	0	Practical Hours:	30	Project Hours:	0	Total Hours:	30

Learning Resources

Textbooks:

1. Sanjoy Mahajan - Street Fighting Mathematics
2. Donald Knuth - The Art of Computer Programming
3. Think like a programmer: An introduction to creative problem solving
4. Thinking in Systems: A Primer

References:

1. Learning to code: How to think like a programmer
2. How to find innovative ideas: Ramesh Raskar's note
3. Case study: How Tesla changed the auto industry
4. Ultimate Guide: How to develop a new electronic hardware product

Online Resources (Weblinks)

1. https://www.ifixit.com/Teardown?srsltid=AfmBOorwzDG9RhJoL3L5tlZ_Dr4sVcey-vPC-pkKTj2E0mWJWtFYlikY
2. https://www.symmetryelectronics.com/technology-teardowns/

Assessment (Practical course)
Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by

Expert from Industry	Expert from Higher Education Institutions	Internal Expert
Dr. Mahesh Veezhinathan Director - Innovation Practicum Associate VP - Forge. Innovation	-	Dr. Samuel Ratna Kumar P S Assistant Professor – III Department Mechanical Engineering

Recommended by BoS on	17.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24ADP001	BASICS OF ARTIFICIAL INTELLIGENCE (Common to all Departments except CS, IT, AD)	L	T	P	J	C
		0	0	2	0	1
ES		SDG	8, 9, 16			
Pre-requisite courses	-	Data Book / Code book (If any)	-			

Course Objectives:

The purpose of taking this course is to:

1	introduce students to the fundamentals of Artificial Intelligence (AI) and Generative AI, and its key concepts
2	enable students to explore and experiment with common generative AI models and tools for generating text, images, audio, video, and code
3	equip students with the techniques and best practices for crafting effective prompts for AI models

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	understand the fundamentals of AI and generative AI, including its potential impact, issues, limitations, and ethical concerns and its practical use cases in real-world scenarios.	U
CO 2	explore common generative AI models and tools for text, code, image, audio, and video generation.	E
CO 3	apply common prompt engineering techniques and approaches for writing effective prompts.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team work	9 Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1	2						2						
2	2		2										
3					2					2			

Course Content

Introduction to Artificial Intelligence (AI) **Practical Component** Introduction to Artificial Intelligence (AI) - Generative AI Overview and Use Cases - Impact and Examples of AI - Application Domains for AI - Generative AI Applications. AI Concepts, Terminology - Cognitive Computing (Perception, Learning, Reasoning) -	**8 Hours**

Terminology and Related Concepts of AI- Machine Learning Techniques and Training - Deep Learning - Neural Networks - Natural Language Processing, Speech, Computer Vision - Self Driving Cars. AI: Issues, Concerns and Ethical Considerations - AI Ethics, Regulations, Governance, and ESG. The evolution and future of AI - The AI Ladder - The Journey for Adopting AI Successfully - Hotbeds of AI Innovation.	
Generative AI: Introduction and Applications **Practical Component** Introduction and Capabilities of Generative AI - Applications of Generative AI - Tools for Text Generation - Tools for Image Generation - Tools for Audio and Video Generation - Tools for Code Generation	**6 Hours**
Generative AI: Prompt Engineering Basics **Practical Component** Introduction to Prompt and Prompt Engineering - Best Practices for Prompt Creation - Common Prompt Engineering Tools - Hands on Lab: Getting to Know Our AI Prompting - Experimenting with Prompts - Naive Prompting and Persona Pattern. Prompt Engineering Techniques and Approaches - Text-to-Text Prompt Techniques - Interview Pattern Approach - Chain-of-Thought Approach - Tree-of-Thought Approach - Future of Human-Crafted Prompts - Text-to-Image Prompt Techniques - Hands-on Lab: Effective Text Prompts for Image Generation.	**7 Hours**
Project and Wrap Up **Practical Component** Graded Quiz Final Project: Generating Text, Images, and Code.	**9 Hours**

Theory Hours:	0	Tutorial Hours:	0	Practical Hours:	30	Project Hours:	0	Total Hours:	30

Learning Resources

Textbooks:

1. George F. Luger "Artificial Intelligence: Structures and Strategies for Complex Problem Solving" (6th Edition), Pearson, 2021.
2. Anna Jordan, Robert S. Menzies, Kristine P. Schwab, "AI-Powered Creativity: Generative AI and the Future of Content Creation" Routledge, 2023.

References:

1. https://platform.openai.com/docs/overview
2. https://towardsdatascience.com/
3. https://gemini.google.com/

Online Resource (Weblinks)

1. Introduction to Artificial Intelligence (AI) | Coursera
2. Generative AI: Introduction and Applications | Coursera
3. Generative AI: Prompt Engineering Basics | Coursera

Assessment (Practical course)

MCQ, Mini project and viva-voce

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
-	-	Dr. S. Sangeetha, Associate Professor

		Department of AI&DS	
Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24HSP111	HOLISTIC WELLNESS-1 (Common to all Department)	L	T	P	J	C
		0	0	2	0	1
HS		SDG	2, 3			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	introduce first-year students to the foundational concepts of holistic wellness, emphasizing the integration of physical, mental, emotional, and Internal well-being.
2	create a balanced lifestyle that promotes overall health and happiness through practical activities.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	understand the basic principles of holistic wellness.	U
CO 2	apply strategies for maintaining physical health, including nutrition and exercise	Ap
CO 3	practice mindfulness techniques to enhance mental and emotional well-being.	Ap
CO 4	develop a personal wellness plan incorporating various aspects of holistic health.	C

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team	G Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1						2		1					
2						2							
3						1							
4						2							

Course Content

INTRODUCTION TO HOLISTIC WELLNESS: • Overview of holistic wellness: physical, mental, emotional, and internal health. • The importance of balance in overall well-being.	**4 Hour**

• Hands-on activity: Self-assessment of current wellness status.	
PHYSICAL WELLNESS: • Importance of physical activity and exercise. • Understanding nutrition and its role in health. • Sleep hygiene and its impact on well-being. • Hands-on activity: Designing a personalized fitness and nutrition plan.	**14 Hours**
MENTAL AND EMOTIONAL WELLNESS: • Stress management techniques. • The role of Yoga, mindfulness and meditation in mental health. • Emotional intelligence and its impact on relationships. • Hands-on activity: Practicing Yoga, mindfulness and emotional regulation exercises.	**6 Hours**
INTERNAL WELLNESS: • Exploring the concept of Internal wellness. • The role of purpose and meaning in life. • Introduction to meditation and reflective practices. • Hands-on activity: Developing a personal reflection, Yoga and meditation routine.	**4 Hours**
INTEGRATING WELLNESS PRACTICES: • Combining physical, mental, emotional, and Internal wellness practices into daily life. • Developing a balanced wellness plan. • Hands-on activity: Creating a comprehensive personal wellness plan.	**2 Hours**
Theory Hours: 0 **Tutorial Hours: 0** **Practical Hours: 30** **Project Hours: 0**	**Total Hours: 30**

Learning Resources

Textbooks:

1. Jayanna, Krishnamurthy., Science C Practice of Integrative Health C Wellbeing Lifestyle., White Falcon Publishing (2020).
2. Rosenberg, Marshall Bertram., Nonviolent Communication: A Language of Life., Puddle Dancer Press, Encinitas, CA (2015).

References:

1. B.K.S Iyengar., Yoga: The Path to Holistic Health., Dorling Kindersley Limited, City of Publication (2001)
2. Goleman Daniel., Emotional Intelligence., Bloomsbury India, India, (2021).
3. James Allen., As a Man Thinketh., Maple Press, Noida, (2010)
4. Swami Budhanandha., Will power and its development., Advaita Ashrama Mayavati, Pithoragarh, Himalayas from its Publication Department, Calcutta. (2001)
5. Kalderdon Adizes Ichak., What Matters in Life: Lessons I Learned from Opening My Heart ., WS Press, Newtown, PA (2023)

Online Resources (Weblinks)

1. Learning Suryanamskar
2. Yoga for well-being
3. Nutritional Educational contents
4. Introduction to Psychology
5. Guided Meditation
6. Simplified physical exercises instructions
7. Simplified Physical Exercises
8. Life skills and value education
9. James Allen Library

Assessment (Practical course)
Participation, Practical activities and assignments, personal wellness plan and reflection.

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
		Dr. Ezhilarasi Principal- KCT	
Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24INP101	DESIGN THINKING (Common to all Department)	L	T	P	J	C
		0	0	2	0	1
ES		SDG	9			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	introduces first-year engineering students to Design Thinking, focusing on practical, user-centered problem-solving techniques
2	empathize with users, generate ideas, and create models to test and refine their solutions
3	understand iteration, empathy, and critical reflection to cultivate a creative mindset

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	apply problem-solving techniques and the Design Thinking process to engineering problems using simple models	Ap
CO 2	understand user needs through various empathy techniques and develop/refine models iteratively based on user insights.	U
CO 3	reflect critically on their learning journeys and the emotional demands of problem-solving. Collaborate effectively in teams to develop innovative solutions	Ap

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	1		2			2		2			1		
2	1							2			1		
3	1		2			2		1			1		

Course Content

Introduction to Problem Solving and Ground Rules Introduction to problem-solving strategies without mentioning Design Thinking-Emphasize problem-solving attitudes, mindsets, and behaviours necessary for iterative problem solving (e.g., openness to failure, patience, empathy)-Set ground rules for the course, including incentives for creative risk-taking and penalties for non-participation or lack of reflection-Overview of the Design Thinking process and its importance.	**6 Hours**
Empathy and Problem Definition	

Techniques for understanding user needs, including observation, interviews, **surveys** and **focus groups**-Importance of secondary research as a complement for the above-mentioned methods-Introduction to empathy cycles: involve students in two empathy cycles before and after problem definition-Finetuning problem definition based on user insights.	**6 Hours**
Ideation and Concept Modelling Brainstorming ideas and selecting feasible solution-Creating concept modelling to visualize ideas-Include an empathy cycle after students propose solutions, allowing them to revisit and reshape their solutions based on further insights from users.	**6 Hours**
Prototyping and Testing with Models Building basic prototypes using simple materials (e.g., cardboard, clay)- Introduction to different prototyping methods (e.g., **low-fidelity** vs **high-fidelity models**) for different contexts: product design, space design, policy, and digital/e-commerce solutions-Conduct an empathy cycle after the prototype is developed to gather user feedback and refine the prototype.	**6 Hours**
Iteration and Final Modelling Project Students refine their prototypes based on feedback from the empathy cycle-Finalize prototypes for presentation based on consistent feedback loops.	**6 Hours**
Presentation, Reflection, and Learning Summaries Students present their final projects and reflect on their learning journeys, including how their understanding of problem-solving and empathy evolved during the course-**Learning Summary Activity:** Each student presents their individual journey and learning outcomes from the empathy cycles and iterations-Peer review and group discussions.	**6 Hours**

Theory Hours:	**0**	**Tutorial Hours:**	**0**	**Practical Hours:**	**30**	**Project Hours:**	**0**	**Total Hours:**	**30**

Learning Resources

Textbooks:

1. Handbook of Design Thinking, Christian Muller – Roterberg, Kindly Direct Publishing
2. The Art of Innovation, Tom Kalley
3. **E Balaguruswamy (2022), Developing Thinking Skills (The way to Success), Khanna Book Publishing Company**

Online Resources (Weblinks)

1. Survey and focus group design guides
2. Guidance on Designing, Administering and Analyzing Focus Groups and Interviews
3. Empathy mapping tools
4. How to Make a Concept Model
5. Brainstorming Techniques: 15 Creative Activities
6. 10 Brainstorming Techniques for Developing New Ideas
7. Brainstorming templates
8. 5 Common Low-Fidelity Prototypes and Their Best Practices
9. UX Prototypes: Low Fidelity vs. High Fidelity
10. Low-fidelity vs. High-fidelity Design Prototypes (and when to use which)

Case study 1: Iterative Design and Prototype Testing of the NN/g Homepage

Case study 2: Using iterative design to optimise the user flow of a product

11. Reflective practice toolkit

Assessment
Formative: Assignments, Mini project

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institutions**	**Internal Expert(s)**	
		Dr. Padhmanand Sudhagar R Department of Bio-Tech Dr. Arul H Department of Physics	
Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

SEMESTER II

24HST102	தமிழரும் தமதொழில் நுட்பமும்/ TAMILS AND TECHNOLOGY	L	T	P	J	C
		1	0	0	0	1
HS		SDG	4, 8			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	தமிழரக்ளின் மதசவு மறற்ரும் மபொடனத் தமதொழிலற்நுைற்பத்னத அறிமுகபற்படுத்தூதல், சங்க மகொல கைற்டிை தமதொழிலற்நுைற்பதன்ன விளகற்குதல், கமகொயிலற்கள் மறற்ரும் சிறற்பக்கனலகனள ஆமரொயற்தல். introducing weaving and pottery technology of Tamils -Explaining the building
2	கபற்பல், இரூம்பூ, ம ம ொணையங்கள், மணி ைரூமவொகற்கூம் தமதொழிறற்மசொனலகள், ஆகியவற்னற விளகற்கம் தசய்தல், தமிழகத்தின் தமதொலற்லியல் மசொனற்றுகளின் பழனமனய ைணரத்தூதல். explain Ship, Iron, Coins, Beads Making Factories. Realizing the Antiquity of Archaeological Evidence of Tamil Nadu
3	கவமளொண்ணம மறற்ரூம் அறிவியல் தமினழபற் பறற்றி அறிதல், இனணயத்தில் தமிழின் கதனவனய ைணரத்துதல்,தமிழ் தமன்தமபொருள்கனள அறிமுகம்தசயற்தல். knowledge of Agricultural and Scientific Tamil, Realizing the need for Tamil on the

Course Outcomes:

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	தமிழரக் ளின் மதசவு மறற்ரூம் மபொடனத் தமதொழிலற்நுைற்பத்தின் முகற்கியத்தூவத்திடன அறிந்து தமகொள்ளுதல். சங்கமகொல தமிழரற்வளரத்த அழகுகற் கனலகனளதற் தமதொிந்துதமகொள்ளுதல். know the importance of weaving and pottery technology of Tamils-To	U
CO 2	கபற்பல் கைடு் மற் கனல, இரும்பூத் தமதொழிறற்மசொனல, ம ம ொணையங்கள் அசச் டித்தல்,மணி ைரூமவொகற்கூம் தமதொழிறற்மசொனலகள், சிலபற்பதிமகொரத்திலற் ைள்ள மணிகளின் வனகனய அறிதலற். knowledge of ship building, ironworks, coinage, minting, and beads	U
CO 3	கவமளொண்ணம மறற்றும் ம ரப்ற்மபொடச தமதொழில்நுைற்பதன்ன அறிந்து தமகொள்ளல். அறிவியல் தமிழ் மறற்ரூம் கணிட ித் தமினழப் மபொிந்து தமகொளற்ளூதல். know agriculture and irrigation technology. Understanding Scientific	Ap

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)	

	1	2	3	4	5	6	7	8	9	10	11	Program Specific Outcomes (PSO)	
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	2		2				3	2	2		2		
2	2		2				3	2	2		2		
3	2		2				3	2	2		2		

Course Content

மதசவு மற்ும் மபொறனதத் தமதொழில்நுட்பம்: சங்க மகொலத்தில் மதசவுதத் தமதொழில் - மபொடனதத் தமதொழில்நுைம்பம் - கருப்பு சிவப்பு மபொண்ைங்கள் - மபொண் ைங்களில் கீறல் குறிPடுகள். Weaving Industry during Sangam Age - Ceramic technology - Black and Red	**3 Hours**
வடிவனமப்பு மற்ும் கடடிடத் தமதொழில்நுட்பம்: சங்க மகொலத்தில் வடிவனமப்பு மற்றுமம் கைட்டுமமொட ங்கள் ரூ சங்க மகொலதத்தில் வீைட்டுப் தமபொரைள்களில் வடிவனமப்பு - சங்க மகொலத்தில் கைட்டுமமொட தமபொரைள்களும் ம டுகல்லும் -சிலப்பதிமகொரதத்தில் கமனை அனமப்பு பற்றிய விவரங்கள் - மமொமல்லபுரச் சிறப்பங்களும், கமகொவில்களும் - கமசொழர் மகொலதத்ுப் தபருங்கமகொயில்கள் மற்றும் பி வழிமபொைதல் தலங்கள் - ம ம ொயக்கர் மகொலக் கமகொயில்கள் - மமொமதிரி கைன்ைனமப்புகள் பற்றி அறிதல், மதனர மீ ட ம ொைச்சி அம்மன் ஆலயம் மறற்றும் திருமனல ம ம ொயக்கர் மம மொல் - தசைட்டிம ம ொைடு வீடுகள் - மபிரிைட்டிஷ் மகொலதத்தில் தசண்டனயில் இந்கமதொ- மசொகமரொதடசிக் கைட்டிைக் கனல. 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 Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during	**3 Hours**
உறப்பத்திதத் தமதொழில் நுட்பம்: கபப்பல் கைட்டுமம் கனல - ைகமலொகவியல் - இரும்பும்புத் தமதொழிறம்மசொனல - இரும்னப ைருக்குதல், எஃகு - வரமலொறற்றுச் மசொனற்றுகமளொக தசமப்பு மற்றும் தங்க ம ம ொணயங்கள் - ம ம ொணயங்கள் அசச் டிதத்தல் - மணி ைரும்மவொக்கும் தமதொழிறம்மசொனலகள் - கல் மணிகள், கண் மணொடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்தண் டுகள் -தமதொலல்லியல் மசொனற்றுகள் - கிலப்பதிமகொரத்தில் மணிகளின் வனகைள்	**3 Hours**

making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidence - Gem stone types described in Silappathikaram.	
கவமளொண் னம மறற்றும் மாார்ப்மபொறசத் தமதொழில் நுட்பம்: அனண, மஏொி, குளங்கள், மதகு - கமசொழரமகொலக்கமுழழித்தமம்பின் பமரொமமொிப்பு - மகொல்ம னைகளுக்மகொக வடிவனமக்கப்பைை கிணறுகள்- கவமளொண் கவமளொண்னமச் மசொரந்்த தசயல் மபொடுகள் - கைல் மசொர் அறிவு - மீன்வளம் - முத்துக்கமுளித்தல் - தபருங் கைல் குறித்த பண்னைய அறிவு - அறிவுமசொர் சமூகம். Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of 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.	**3 Hours**
அறிவியல் தமிழ் மறற்மும் கணித்தமிழ்: அறிவியல் தமிழின் வளரச் சி - கணித்தமிழ் வளரச் சி - தமிழ் நூல் கனள மின் தமன்தமபொருை்கள் ைருமவொக்கம் - தமிழ் இனணயக் கல் விக்கழகம் - இனணயத்தில் தமிழ் அகமரொதிகள்- தமசொறக்னவத் திை்ைம். 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.	**3 Hours**

Theory Hours: 15	Tutorial Hours: 0	Practical Hours: 0	Project Hours: 0	Total Hours: 15

Reference books

1. தமிழக வரலொறு மக்களும் பண் பொடும் கக.கக. பிள் ளள (வவளியீடு: தமிழ் நொடு பொை்நூல் மறற்றும் கல் வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முளனவர் இல. சுந்தரம். (விகைனை் பிரசுரம்).
3. கீழடி - ளவளக நதிக்களரயில் சங்ககொல நகர நொகரிகம் (வதொல் லியல் துளற வவளியீடு).
4. வபொருளந - ஆறற்றங்களர நொகரிகம். (வதொல் லியல் துளற வவளியீடு).
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 Tarnils 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 Textbook 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 Bookand Educational Services Corporation> Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by: RMRL) - Reference Book.

Online Resources

1. https://www.youtube.com/watch?v=Gp1ratX2sOE&list=PLtyn2o7hocf40PtPibRqJTf_dQL3eOtLl
2. https://www.youtube.com/watch?v=jteRvnNiD6w

Assessment (Theory course)

CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE), Assignments, Quiz, Library Record

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
-	-	-

Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24HST103	EFFECTIVE COMMUNICATION	L	T	P	J	C
		2	0	0	0	2
HS		SDG	4, 8			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to

1	enhance students' abilities to communicate ideas effectively, both orally and in writing, by developing skills in organizing thoughts clearly and logically and expressing them through well-structured paragraphs and concise summaries.
2	enable students to critically evaluate and synthesize information from multiple sources and utilize suitable writing techniques and formats to produce professional-quality content tailored to various contexts.
3	foster active listening, critical reading, and reflective thinking, empowering students to create engaging, relevant, and informative content by applying effective communication strategies across diverse platforms.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	demonstrate proficiency in delivering ideas effectively, both in speaking and writing, with a deeper understanding of the content and the ability to convey complex ideas through well-structured paragraphs and summaries.	Ap
CO2	create and present original content by evaluating information from multiple sources and employing appropriate formats and writing strategies across various professional contexts.	C
CO3	produce engaging and informative content through active listening, reading, reflection, and effective communication skills.	E

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team work	9 Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1							2	2	3		3		
2							2	2	3		3		
3							2	2	3		3		

Course Content

Text Analysis

Composition of Coherent Paragraphs (Expository, Descriptive, Narrative, Evaluative) - Loud Reading (Reading Extracts will be given were students identify the main idea of paragraphs or sections and debrief)	**6 Hours**
Visual & Written Analysis Process writing (Drafting effective introduction, process and conclusion using appropriate transition words and phrases) - Describing Visuals (Line graph, Bar Chart, Flow Chart, Pie Chart, Table, Tree diagram) - Note Making & Summarizing	**6 Hours**
Professional Correspondence Crafting Professional Emails - Writing Instruction for Manuals - Reading technical documents (Reading extracts will be given to construct sentences from the new words found in the document)	**6 Hours**
Research and Documentation Library Reading (Identify at least three sources and extract information, Summarize the main ideas and key findings from each source, compile them findings into a brief report that includes the main points, sources, and relevance to the topic)- Report Writing (Title Page, Abstract, Introduction, Methodology, Results, Discussion, Conclusion and recommendation)	**6 Hours**
Talk Analysis and Podcast Skills Listening to and analyzing TED talks – Preparing Podcast-PRISM (Professional Rhetoric Improvement and Speech Mastery) to share facts, opinions and experiences - Writing Reviews on products.	**6 Hours**

Theory Hours:	**30**	**Tutorial Hours:**	**0**	**Practical Hours:**	**0**	**Project Hours:**	**0**	**Total Hours:**	**30**

Learning Resources

References:

1. Swamy, V. R. Narayana. Strengthen Your Writing. Orient Longman, 2003.
2. Sasikumar, V., and P. V. Dhamija. Spoken English: A Self-Learning Guide to Conversation Practice. Tata McGraw Hill, New Delhi (1993).
3. Maison, Margaret M. Examine Your English. Orient Longman, 1999.
4. Rizwi, Ashraf. Effective Technical Communication. Tata McGraw Hill, 2005.
5. Pickett, Nell Ann, and Ann A. Laster. Technical English: Writing, Reading, and Speaking.
6. Harpercollins College Div, 1993.

Online Resources (Weblinks)

1. https://owl.purdue.edu/owl/general_writing/academic_writing/paragraphs_and_paragraphing/index.html
2. https://learnenglish.britishcouncil.org/skills/writing/upper-intermediate_b2/describing-trends
3. https://hbr.org/2016/07/how-to-write-email-with-military-precision
4. https://owl.purdue.edu/owl/subject_specific_writing/professional_technical_writing/reports_and_memos/index.html

Assessment (Theory course)

CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE)

Course Curated by

Expert from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Mr.Vijayan Ramanathan , Project manager, Toppan Merrill. Technologies, Coimbatore	Dr. Aninditha Sahoo, IIT, Madras Dr.P.R.Sujatha Priyadharshini, Anna University, Chennai Dr. E. Justin Ruben, CIT, Coimbatore	Dr. Arokia Lawrence Vijay Dr. Sreejana Dr. Tissaa Department of English
Recommended by BoS on	16.08.2024	
Academic Council Approval	No:27	**Date** 24.08.2024

24HST104	PROFESSIONAL COMMUNICATION (Common to all Departments)	L	T	P	J	C
		2	0	0	0	2
HS		SDG	4, 8			
Pre-requisite courses	-	Data Book / Code book (If any)	-			

Course Objectives:

The purpose of taking this course is to

1	develop students' abilities to craft clear, concise, and well-structured technical content and professional communications
2	enhance students' communication skills in team settings
3	equip students with cross-cultural communication skills and effective listening techniques

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	demonstrate proficiency in crafting clear, concise, and well-structured technical content and professional communications, including emails that meet industry standards.	Ap
CO2	communicate effectively in team settings, showcasing collaboration, conflict resolution, and leadership skills, while employing creative writing techniques to convey complex ideas.	An
CO3	apply principles of cross-cultural communication and effective listening techniques to engage successfully in diverse, globalized professional environments.	Ap

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1						2	1	3	1		3		
2						2	3	3	2		3		
3						1	1	3	1		3		

Course Content

Mastering Professional Communication Industry-specific terminology (Business / Technical Register) - Crafting professional emails - Essential elements of an effective email (subject line, salutation, body, closing) - reading and responding to email communication – Networking Emails - Analyzing and interpreting technical texts (Loud Reading).	**6 Hours**
Navigating Digital Media	

Introduction to Digital media and online communication tools (instant messaging, video conferencing, social media, blogs, forums) - Listening and analyzing advanced audio materials - Creative & Blog Writing (General & Technical).	**6 Hours**
Technical Writing Techniques Writing Reflective Essays / Experience Sharing, Process writing, Transcoding graphics (interpreting technical texts), Writing Reviews (Research Articles & Books).	**6 Hours**
Building a Professional Digital Presence Creating Digital Profile - Overview of different digital platforms (LinkedIn, GitHub, personal websites) - Setting Up a LinkedIn Profile – Crafting a Video Resume – Digital Etiquette and Professionalism - Cross-cultural communication and diversity awareness.	**6 Hours**
Social Responsibility in Practice Environmental and social responsibilities - Case studies and real-world applications - Project Work - Writing Project reports.	**6 Hours**

Theory Hours: 30	**Tutorial Hours: 0**	**Practical Hours: 0**	**Project Hours: 0**	**Total Hours: 30**

Learning Resources

Reference books

1. Baker, W., & Ishikawa, T. Transcultural Communication Through Global Englishes: An Advanced Textbook for Students. Routledge, 2021.
2. Bodnar, O., Fedak, S., Hinsirovska, I., Denysiuk, N., Perenchuk, O., Plavutska, I., ... & Shchur, N. English for Study and Work: A Coursebook In-class Activities. 2017.
3. Doff, A., Thaine, C., Puchta, H., Stranks, J., & Lewis-Jones, P. Cambridge English Empower Advanced Student's Book. Cambridge University Press, 2016.
4. Hewings, M., Thaine, C., & McCarthy, M. Cambridge Academic English C1 Advanced Student's Book: An Integrated Skills Course for EAP. Cambridge University Press, 2012.
5. Beer, D. F., & McMurrey, D. A. A Guide to Writing as an Engineer. John Wiley & Sons, 2019.

Online Resources (Web Links)

1. https://hbr.org/2016/07/how-to-write-email-with-military-precision
2. https://ocw.mit.edu/courses/comparative-media-studies-writing/21w-732-scientific-and-technical-communication-spring-2015/
3. https://www.coursera.org/learn/digital-media
4. https://owl.purdue.edu/owl/subject_specific_writing/professional_technical_writing/reports_and_memos/index.html

Assessment (Theory course)
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE)

Course Curated by

Expert from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Mr.Vijayan Ramanathan , Project manager, Toppan Merrill. Technologies, Coimbatore	Dr. Aninditha Sahoo, IIT, Madras Dr.P.R.Sujatha Priyadharshini, Anna University, Chennai Dr. E. Justin Ruben,	Dr. Arokia Lawrence Vijay Dr. Hema Department of English

	CIT, Coimbatore		
Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24HSJ102	FLUENCY THROUGH PRACTICE (Common to all Programmes)	L	T	P	J	C
		0	0	0	4	2
HS		SDG	4, 9, 12			
Pre-requisite courses	-	Data Book / Code book (If any)	-			

Course Objectives:

The purpose of taking this course is to:

1	develop professional communication skills, including technical writing, public speaking, and collaborative discourse.
2	foster creativity and critical thinking by producing real-world academic and professional outputs such as book chapters, journal articles, and intellectual property.
3	instil awareness of global and ethical communication practices, contributing to sustainability and social impact.
4	enhance students' language fluency through project-based learning relevant to engineering

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	analyse and apply effective communication techniques in professional contexts.	An
CO2	collaborate in teams to design and execute language-based projects with real-world applications.	Ap
CO3	develop critical thinking and problem-solving skills through research, analysis, and presentation of technical content.	An
CO4	produce publishable-quality written and spoken outputs, such as book chapters, journal articles, and copyrighted content.	C

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1		2	2	1			3	2	2	1	2		
2		3	2	1			3	2	2	1	2		
3		2	2	2			3	2	2	1	2		
4		3	1	1			3	2	2	1	1		

Course Content

• Introduction to Activity Based Learning • Research and Initial Project Planning • Technical Writing and Documentation • Creative Writing • Drafting and Editing Techniques • Teamwork and Peer Collaboration • Public Speaking and Presentation Skills • Challenges to Opportunities • Cross-Cultural Communication and Global Ethics Intellectual Property and Copyrighting Publication – English for research Writing Digital Communication & Social Responsibility	**60 Hours**

Theory Hours:	0	Tutorial Hours:	0	Practical Hours:	0	Project Hours:	60	Total Hours:	60

Learning Resources

Reference books

1. Mahesh Kumar, Dr.Soma. Soft Skills: Enhancing Personal and Professional Success, McGraw Hill,2023.
2. Maxwell, John C. Developing the leader within you, Harper Collins, 2018.
3. Ansarian, Loughman, and Teoh, Mei Lin. Problem-based Language Learning and Teaching: An Innovative Approach to Learn a New Language. Singapore, Springer Nature Singapore, 2018.
4. Savin Baden, M., Major, C. H. (2004). Foundations of Problem Based Learning. United Kingdom: McGraw-Hill Companies, Incorporated.

Online Resources (Weblinks)

1. https://www.sciencedirect.com/science/article/pii/S2590291123002735
2. https://www.cal.org/adultesl/pdfs/problem-based-learning-and-adult-english-language-learners.pdf
3. https://www.apu.ac.jp/rcaps/uploads/fckeditor/publications/polyglossia/Polyglossia_V16_Ng.pdf

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Mr.Vijayan Ramanathan , Project Manager, Toppan Merrill. Technologies, Coimbatore	Dr. Aninditha Sahoo, IIT, Madras Dr.P.R.Sujatha Priyadharshini, Anna University Chennai Dr. E. Justin Ruben, CIT, Coimbatore	Dr. Arokia Lawrence Vijay Dr. SG Mohanraj Department of English

Recommended by BoS on	16.08.2024		
Academic Council Approval	No:27	Date	24.08.2024

24MET106	BASICS OF MECHANICAL ENGINEERING (Common to TT and FT)	L	T	P	J	C
BS		3	0	0	0	3
		SDG	8, G			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	provide students with foundational knowledge in key areas of Mechanical Engineering, which is essential for understanding and applying mechanical principles across various engineering fields.
2	apply principles in practical scenarios and Analyzing systems like engines, refrigeration units, and mechanical forces to solve real-world engineering problems.
3	develop problem-solving skills and learn to apply mechanical concepts to design, analyze, and optimize engineering systems.
4	equips them with the knowledge to understand how mechanical systems operate and lays the groundwork for more advanced courses and professional work in industries like manufacturing, energy, and automation.
5	understanding the basics of mechanical systems and processes, students are better prepared for internships, industrial projects, and professional careers.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	apply the fundamental concepts in developing various mechanisms	Ap
CO2	analyze the laws of thermodynamics to solve problems related to energy transfer and evaluate the performance of thermodynamic processes.	An
CO3	demonstrate the working principles of IC engines, VCR C VAR systems.	Ap
CO4	evaluate the various manufacturing processes to select the appropriate technique for producing textile-related components.	An
CO5	design power transmission systems by integrating suitable drives and gears to ensure optimal mechanical performance	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team	G Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2

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

Course Content

BASICS OF MECHANISMS Terminology and definitions- degree of freedom-Kutzbach criterion-Grashoff's law-Kinematic inversions of 4-bar chain and slider crank chains-Description of common mechanisms-single,double and offset slider mechanisms- Quick return mechanisms	**G Hours**
LAWS OF THERMODYNAMICS First law of thermodynamics – statement and application, steady flow of energy equation, Second law of thermodynamics. Heating and Expansion of Gases, Expression for work done, internal energy, hyperbolic and polytropic processes. Properties of Steam, Dryness fraction, latent heat, total heat of wet steam.	**G Hours**
INTERNAL COMBUSTION ENGINES Classification of IC engines, Main components of IC engines, working of a 4 stroke and 2 stroke petrol and diesel engine, differences between 4 stroke and 2 stroke engines. Refrigeration and Air Conditioning: principle of vapour compression and vapour absorption refrigeration systems. Air conditioning, terminology and classifications. Humidification and Air conditioning	**G Hours**
MANUFACTURING PROCESSES Basic principles of Arc and Gas Welding, Soldering and Brazing, Extrusion, Forging, Rolling, and Drawing Processes. Milling – Types, Operations and Equipment's	**G Hours**
POWER TRANSMISSION Types of drives, belt drives – flat and V belts, rope drives, chain drive, gear drives – spur, helical, bevel and worm gears (Descriptive treatment only) – gear trains, simple and compound.	**G Hours**

Theory Hours: 45	**Tutorial Hours: 0**	**Practical Hours: 0**	**Project Hours: 0**	**Total Hours: 45**

Learning Resources

Textbooks:

3. Venugopal. K. and Prabu Raja, "Basic Mechanical Engineering", Anuradha Publications, Chennai, 2011.
4. A Textbook of Engineering Thermodynamics. PK Nag. Tata McGraw-Hill Education, 2017.

References:

6. Rao N., "Manufacturing Technology: Foundry, Forming and Welding", Tata McGraw Hill Co., New Delhi, Paperback Edition. 2019 James Brown, "Advanced Machining Technology Handbook", McGraw Hill, New York,2019.
7. Rattan S.S, "Theory of machines", Tata MC Graw-Hill publishing company Ltd., New Delhi, 2019.

8. Shigley J.E and Uicker J.J. “Theory of machines and mechanisms”, McGraw- Hill, Inc. 2017.
9. Shanmugam G, Palanichamy M S, “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Company, New Delhi, 2nd Edition, 2018.
10. Pravin Kumar - Basic Mechanical Engineering -Pearson Education 2017.

Online Resources (Weblinks)

1. https://archive.nptel.ac.in/courses/112/107/112107144/
2. https://onlinecourses.nptel.ac.in/noc22_me28/preview
3. https://archive.nptel.ac.in/courses/112/105/112105123/

Assessment (Theory course)
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE)

Course Curated by			
Expert from Industry	**Expert from Higher Education Institution**	**Internal Expert**	
Mr. Fazil, Lead Engineer, CAE Optimization, Ford Motors Private Limited, Chennai 600096.	Dr. M.Balasubramanian, Assistant Professor Department of Mechanical Engineering, Anna University Regional Campus Coimbatore – 641 046	Mr. P.Pradeep, Assistant Professor – II, Department of Mechanical Engineering,	
Recommended by BoS on	17.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24TTT101	INTRODUCTION TO TEXTILES	L	T	P	J	C
		1	0	0	0	1
PC		SDG	12			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	introduce students to textiles they encounter daily and break down their components.
2	explore the creation of yarns and fabrics from fibers and their everyday applications.
3	introduce textile coloration and finishing techniques that enhance the properties of fabrics in everyday products.
4	break down the apparel manufacturing process and quality considerations.
5	introduce students to technical textiles and their specialized applications in various industries.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	analyze everyday textile products by identifying their fiber composition, fabric structure, and finishing techniques through reverse engineering.	A
CO 2	demonstrate an understanding of textile formation (spinning, weaving, coloration, and garmenting) processes, and their application in creating common textile products.	An
CO 3	explain the role and significance of technical textiles in various industries and evaluate their specialized functions in enhancing product performance.	An

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium - 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team	G Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1	2					2				1		1	
2	2			1						1			2
3	2		1							1		1	

Course Content

UNDERSTANDING EVERYDAY TEXTILES	3 Hours

• Introduction to Textiles in Daily Life: Fabrics in clothing, home textiles (e.g., bedsheets, curtains), accessories (e.g., bags). • Materials and Fibers: Overview of natural (cotton, wool) vs. synthetic (polyester, nylon) fibers. • Reverse Engineering Task: Students will bring an item of clothing or home textile and analyze its composition. • Correlating with Personal Experience: Discussions on why certain fabrics are used in different products (e.g., comfort, durability).	
YARN AND FABRIC FORMATION • Yarn Types and Properties: Spun vs. filament yarns; importance of yarn count and twist. • Basic Fabric Structures: Woven, knitted, and non-woven fabrics. • Reverse Engineering Task: Students will examine the structure of a fabric they own (e.g., T-shirt, jeans) to identify its weave/knit pattern. • Correlating with Usage: Discuss the role of fabric structure in functionality (e.g., strength in jeans, stretch in T-shirts).	**3 Hours**
TEXTILE COLORATION AND TREATMENTS • **Introduction**: Pre-treatment, dyeing, printing, finishing • **Reverse Engineering Task**: Students will investigate how dyeing processes affect an item they own (e.g., dyed fabrics, printed fabrics). • **Correlating with Experience**: Discuss why certain dyes are applied to specific textiles (e.g., Vat dyes, Disperse dyes)	**3 Hours**
APPAREL MANUFACTURING AND QUALITY CONTROL • **Introduction to Apparel Manufacturing**: From fabric to finished product (cutting, sewing, assembly). • **Quality Control Measures**: Inspection techniques, comfort and fit tests, durability tests. • **Reverse Engineering Task**: Students will trace the steps involved in making a garment they wear, from fabric to final stitching. • **Correlating with Day-to-Day Use**: Understanding how quality control affects the durability and comfort of clothing.	**3 Hours**
TECHNICAL TEXTILES • **Introduction and classification -** Protective textiles, medical textiles, geotextiles, automotive textiles, sports textiles, and more. • **Reverse Engineering Task**: Students will examine an example of a technical textile product and identify its specific requirements (e.g., sportswear - moisture-wicking, medical bandages - antimicrobial, etc). • **Correlating with Real-World Use**: Discuss the functional role of technical textiles in enhancing performance, safety, and durability in specific applications.	**3 Hours**
Theory 15 **Tutorial Hours: 0** **Practical Hours: 0** **Project Hours: 0**	**Total Hours: 15**

Learning Resources

Textbooks:

1. Murthy, H.S., 2016. Introduction to textile fibres. CRC Press.
2. Kozłowski, R.M. and Mackiewicz-Talarczyk, M., 2020. Introduction to natural textile fibres. In Handbook of natural fibres (pp. 1-13). Woodhead Publishing.
3. Burns, E.J., 2004. Introduction: Why Textiles make a difference. In Medieval Fabrications: dress, textiles, clothwork, and other cultural imaginings (pp. 1-18). New York: Palgrave Macmillan US.
4. Mahadevan, M.G., 2005. Textile Spinning, Weaving C Designing. Abhishek Publications.
5. Hamdani, S.T.A., 2017. Introduction to weaving. In Structural Textile Design (pp. 31-46). CRC Press.
6. Wardman, R.H., 2017. An introduction to textile coloration: principles and practice. John Wiley C Sons.
7. Broadbent, A.D., 2001. Basic Principles of Textile Coloration. Society of Dyers and Colorists.

References:

1. Shishoo, R., 2015. Introduction to textiles in sport. In Textiles for sportswear (pp. 3-16). Woodhead Publishing.
2. Shishoo, R., 2012. Introduction: trends in the global textile industry. In The global textile and clothing industry (pp. 1-7). Woodhead Publishing.

Online Resources (Weblinks)

1. https://www.textileschool.com/119/textile-an-introduction/#google_vignette
2. https://www.britannica.com/topic/textile
3. https://gphisar.ac.in/wp-content/uploads/2022/09/TEXTILE-FUNDAMENTALS.pdf
4. https://sj-mqt.org/makerspace-blog/introduction-to-textiles

Assessment (Theory course)
CAT, Activity and Learning Task(s), MCQ

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert
M. Balaji General Manager, Poppy's Tiruppur	Dr. M. Senthil Kumar Associate Professor PSG College of Technology	Dr Saminathan R, Department of Textile

Recommended by BoS on	14.08.2024		
Academic Council Approval	No.27	**Date**	24.09.2024

24MAI122	ADVANCED COMPUTATIONAL CALCULUS (Common to BT, FT, TT)	L	T	P	J	C
		3	0	2	0	4
BS		SDG	3, 9, 12			
Pre-requisite courses	-	Data Book / Codes books (If any)	-			

Course Objectives:

The purpose of taking this course is to:

1	apply Taylor's series expansion to approximate functions of two variables and use Lagrange's method of undetermined multipliers for optimizing such functions.
2	develop proficiency in solving higher-order linear differential equations with constant coefficients using numerical techniques such as Taylor's series and Runge-Kutta methods.
3	set up and evaluate double and triple integrals in cartesian coordinates for calculating areas and volumes of various two- and three-dimensionl regions.
4	attain expertise in using numerical methods such as Trapezoidal and Simpson's rules to evaluate double and triple integrals for areas and volumes when analytical solutions are difficult.
5	examine and apply Laplace transforms to solve differential Equations to represent dynamic systems across different engineering fields.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	apply Taylor's series expansion to approximate stress distribution in textile materials under varying load conditions.	Ap
CO 2	use Lagrange's method to optimize dyeing processes in fashion industry to minimize cost while meeting color consistency constraints.	Ap
CO 3	apply Runge-Kutta methods to model and predict the growth rates of microbial populations in biotechnology applications.	Ap
CO 4	use Euler's method to solve heat conduction problems in textile manufacturing processes for better thermal management.	Ap
CO 5	evaluate the volume of fabric needed for complex garment patterns using triple integrals to ensure accurate material estimation.	E
CO 6	solve differential equations for the response of biosensors to varying stimuli using Laplace transforms to improve sensor design.	Ap

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	3	2	1	2	1	1	2					

2	2	3	3	1	2	2	1	2					
3	2	3	2	3	2	1	1	2					
4	2	3	2	2	2	1	1	2					
5	2	2	3	1	2	1	1	2					
6	2	3	2	3	3	2	1	2					

Course Content

FUNCTIONS OF SEVERAL VARIABLES Total derivatives – Differentiation of composite functions – Taylor's series expansion – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers	**9 Hours**
Practical Component • Taylor's series expansion of function of two variables. • Maxima and Minima of a function of two variables.	**6 Hours**
HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS Linear equations of second and higher order with constant coefficients – Rules and Problems for finding the particular integral – Initial value problems - Single step methods: Taylor's series method – Truncation error – Euler and Improved Euler methods – Fourth order Runge–Kutta method	**9 Hours**
Practical Component • Solution of second order ordinary differential equations by Euler and improved Euler method. • Solution of second order ordinary differential equations by Runge Kutta method of 4th order.	**6 Hours**
MULTIPLE INTEGRALS Double integration in Cartesian coordinates – Area as double integrals-Triple integration in Cartesian coordinates – Volume as triple integrals – Numerical double integration – Trapezoidal rule – Simpson's rule.	**9 Hours**
Practical Component • Area and volume using multiple integrals. • Numerical double integration by Trapezoidal and Simpson's rule	**6 Hours**
LAPLACE TRANSFORMS Definition - Properties: Superposition, Shift in t or Time Delay, Shift in s, Time Derivatives, Time Integral- Initial Value Theorem - Final Value Theorem.	**9 Hours**
Practical Component • Solution of transcendental functions using Laplace transforms. • Heaviside functions	**6 Hours**
INVERSE LAPLACE TRANSFORMS Definition - Properties -Inverse transforms using convolution method and partial fractions method -Solution of linear ordinary differential equations of second order with constant coefficients.	**9 Hours**
Practical Component • Inverse Laplace Transforms. • Solution of differential equations using inverse Laplace transform.	**6 Hours**

Theory	Tutorial	Practical	Project	Total
Hours: 45	Hours: 0	Hours: 30	Hours: 0	Hours: 75

Learning Resources

Textbooks
1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44th Edition, 2014. 2. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010. 3. Sastry S.S, "Introductory Methods of Numerical Analysis", PHI Learning Pvt. Ltd, 5th Edition, 2015. 4. Grewal B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science, Khanna Publishers, 10th Edition, New Delhi, 2015.
Reference books
1. Veerarajan T., “Engineering Mathematics (for First Year)”, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Third Edition, 2011. 2. Kandasamy P., Thilagavathy K., and Gunavathy K., “Engineering Mathematics”, S. Chand & Co., New Delhi, (Reprint) 2014. 3. Kandasamy P., Thilagavathy K. and Gunavathy K., “Numerical Methods”, S. Chand Co. Ltd., New Delhi, 2007.
Online Resources (Weblinks)
1. https://www.khanacademy.org/math/integral-calculus

Assessment
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
Mr. Ramesh V.S., STEPS Knowledge Services Private Limited, Coimbatore. Mr. Jayakumar Venkatesan, Valles Marineris International Private Limited- Chennai. Mr. Imran Khan, GE Transportation Company, Bangalore.	Dr. T. Govindan, Government College of Engineering, Srirangam, Trichy. Dr. C. Porkodi, PSG College of Technology, Coimbatore. Dr. P. Paramanathan, Amrita Vishwa Vidyapeetham, Coimbatore.	Dr. R.Maruthachalam Dr.S.Sathiyapriya Ms. S.Arunadevi Department of Mathematics	
Recommended by BoS on	16.08.2024		
Academic Council Approval	27	**Date**	24.08.2024

24PHI103	APPLIED PHYSICS FOR TEXTILE TECHNOLOGY (Common to TT & FT)	L	T	P	J	C
		3	0	2	0	4
BS		SDG	7, 9			

Pre-requisite courses	High School Education	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	introduce fundamental principles of light-matter interaction, quantum mechanics, and heat transfer, emphasizing their applications in laser technology, energy systems, and material science.
2	provide hands-on experience through experiments related to laser optics, quantum mechanics, and energy efficiency, reinforcing theoretical concepts with practical applications.
3	develop analytical skills in evaluating and solving problems in green energy, dielectric materials, and nanomaterials using advanced experimental techniques.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	apply principles of light-matter interaction and laser technology to solve problems in laser systems, such as imaging gyroscopes and material characterization.	Ap
CO 2	analyse and Interpret quantum concepts like wave-particle duality, Schrödinger's equation, and quantum tunnelling, and demonstrate their applications through experiments like determining Planck's constant.	An
CO 3	evaluate the performance of green energy systems, such as solar cells and wind devices, and measure solar cell efficiency experimentally.	E
CO 4	analyse the properties and preparation of dielectric and nanomaterials, and apply this knowledge in experiments to determine band gaps and magnetic susceptibility	An
CO 5	apply by investigate principles related to heat transfer, thermal expansion, and plasma characteristics, in experiments to determine the thermal conductivity of poor conductors.	Ap
CO 6	analyse and draw results by performing hands-on application of skills in experiments (data analysis, and result interpretation) in quantum mechanics, laser optics, and material properties, reinforcing theory through lab practice.	An

Co	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)
	1	2	3	4	5	6	7	8	9	10	11	

	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	2											
2	3												
3	3										2		
4	3										2		
5	3	2											
6	3	2											

Course Content

APPLIED OPTICS — **9 Hours**

Interaction of light and matter - Quantization of electromagnetic radiation – Absorption, Spontaneous emission and Stimulated emission - Einstein's theory of stimulated emission- Population inversion - Sources of excitation - Active medium -Laser beam output- Nd-YAG laser - CO_2 laser - Applications – Laser Imaging and Holography- Laser gyroscopes

Practical Component — **6 Hours**

Semiconductor laser:

a. Determination of wavelength of laser
b. Determination acceptance angle and numerical aperture of an optical fibre.
c. Determination of particle size

Spectrometer – Determination of wavelength of mercury source using grating

QUANTUM PHYSICS — **9 Hours**

Necessity of quantum mechanical picture- Planck's concept (hypothesis) - Wave-particle duality - de-Broglie waves - Physical significance of wave function - Schrodinger equation- Time independent and time dependent equation - Particle in a box- Eigen values and Eigen function-

Superposition Principle- Quantum mechanical tunnelling through a barrier.

Practical Component — **4 Hours**

Determination of Planck's constant – Electroluminescence method.

Compound pendulum – Determination of acceleration due to gravity

GREEN ENERGY — **9 Hours**

Introduction to Green energy – Solar energy: Energy conversion by photovoltaic principle – Solar cells – Efficiency measurements – Types (First, Second and Third Generation) of Solar Cells - Wind energy: Basic components and principle of wind energy conversion systems – Ocean energy: Wave energy – Wave energy conversion devices. Futuristic Energy: Hydrogen – Methane Hydrates – Carbon capture and storage (CCS). — **6 Hours**

Practical Component Determination of efficiency of solar cell	
DIELECTRIC AND NANO MATERIALS: Basic definitions -Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – different types of break down mechanism. Nanomaterials-Preparation of Nanomaterials -Top- down, Bottom-up, Ball milling, Laser ablation techniques, Thermal evaporation technique and applications **Practical Component** Determination of band gap of a semiconductor Determination of magnetic susceptibility of a solid material – B-H curve apparatus Non-uniform bending – Determination of Young's modulus Melde's string – Determination of frequency of a tuning fork	**9 Hours** **8 Hours**
HEAT AND PLASMA Treatment: Introduction - Transfer of heat energy- Thermal expansion of solids and liquids – expansion joints- Bimetallic strips- Theory of heat conduction in solids- rectilinear flow of heat- Determination of thermal conductivity of a bad conductor - Lee's & Charlton's disc method- Properties of plasma- types of plasma- thermal and non-thermal plasma- Production of glow discharge plasma-Cold plasma- applications. **Practical Component** Determination of thermal conductivity of a bad conductor – Lee's Disc method	**9 Hours** **6 Hours**

Theory Hours: 45	Tutorial Hours: 0	Practical Hours: 30	Project Hours: 0	Total Hours: 75

Learning Resources

Textbooks:

1. Avadhanulu, M. N., Kshirsagar, P. G., and Murthy, T. V. S. Arun., A Textbook of Engineering Physics., S. Chand Publications, New Delhi (2018).
2. Gaur, R. K., and Gupta, S. L., Engineering Physics., Dhanpat Rai Publishing Co Pvt Ltd, New Delhi.
3. Beiser, Arthur., Mahajan, Shobhit., and Choudhury, S. Rai., Concepts of Modern Physics., McGraw Hill Education, New Delhi (2017).
4. Rajendran, V., Applied Physics., Tata McGraw Hill Publishing, New Delhi (2017).

References:

1. Lal, Brij., and Subrahmanyam., Properties of Matter., S. Chand & Co Ltd, New Delhi (2014).
2. Prakash, Satya., Quantum Mechanics., Pragati Prakashan Publishers, Meerut (2015).
3. Thiagarajan, K., and Ghatak, Ajoy., Lasers: Fundamentals and Applications., Springer Science & Business Media, Berlin (2010).
4. Ultrasonics: Fundamentals, Technology, Applications, Second Edition., Marcel Dekker, New York (1988).
5. Silfvast, William., Laser Fundamentals., Cambridge University Press, Cambridge (2018).
6. Çengel, Yunus A., and Ghajar, Afshin J., Heat and Mass Transfer: Fundamentals and Applications., McGraw-Hill Education, New York (2014).
7. Chen, Francis F., Introduction to Plasma Physics and Controlled Fusion., Springer, Cham (2016).

Online Resources (Weblinks)
1. https://nptel.ac.in/courses/115105104 2. https://ocw.mit.edu/courses/physics/8-04-quantum-physics-i-spring-2013/ 3. https://nptel.ac.in/courses/108108078

Assessment (Embedded course)
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
-	-	Dr.E.Shobhana Dr.S.Inbakumar, Department of Physics	
Recommended by BoS on	16.08.2024		
Academic Council Approval	No:27	**Date**	24.08.2024

24INP103	INNOVATION PRACTICUM – II	L	T	P	J	C
		0	0	2	0	1
ES	(Common to All branches)	SDG	G, 11, 12			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	equip students with essential tools and techniques for leveraging open-source technologies to develop proof-of-concepts and prototypes
2	provide hands-on experience and participants will gain a comprehensive understanding of the entire product development process
3	final prototyping, empowering them to transform their ideas into tangible outcomes

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	analyse the effectiveness of various electronic tools and techniques in product development processes	An
CO 2	develop and implement functional software prototypes using open-source tools	Ap
CO 3	design and fabricate 3D models using digital fabrication techniques	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team	G Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1	3	2	2	2	2								
2	2	2	2		2								
3	2	2	3	2	2								

Course Content

INTRODUCTION TO OPEN-SOURCE TOOLS AND TECHNIQUES Explore the concept of open-source, its underlying principles and its contrast with proprietary software, Discuss the advantages of using open-source tools, such as lower costs, increased innovation, educational value, and community support, walk through to the commonly used open-source tools for electronics design (KiCad, FreeCAD), software development (Python, Eclipse), and fabrication (Cura, LinuxCNC).	**3 Hours**

ELECTRONICS FUNDAMENTALS AND TOOLS Introduction to basic electronic components (resistors, capacitors, transistors, etc.), Understanding of electronic circuits and their functions, Hands-on practice with CircuitJS and Falstad, Simulating and analysing electronic circuits, Introduction to Arduino and Raspberry Pi, exploring their capabilities and applications, Designing PCBs using KiCad and EasyEDA, Understanding PCB fabrication processes	**6 Hours**
SOFTWARE PROTOTYPING AND TOOLS Benefits of rapid prototyping in product development, Iterative design and testing, Wireframing tools (Balsamiq, Figma), UI design tools (Sketch, Figma), Programming languages (Python, JavaScript), Testing frameworks (Selenium), No-code platforms (Bubble, Adalo, Wix, AppGyver), Building functional prototypes without extensive coding	**6 Hours**
FABRICATION AND PROTOTYPING Overview of fabrication techniques (3D printing, laser cutting, CNC machining), Prototyping methods for physical products, using tools like Blender, TinkerCAD, or Fusion 360, Creating 3D models for physical prototypes, Hands-on experience with laser cutting and engraving, Understanding their applications and limitations	**7 Hours**
SIMULATION s DEMONSTRATION Integrated project demonstration, explaining the design process, technical choices, and outcomes, simulation showcase to demonstrate their understanding of various technical tools and prototyping techniques	**8 Hours**

Theory Hours:	Tutorial Hours:	Practical Hours:	Project Hours:	Total Hours:
0	0	30	0	30

Learning Resources

Textbooks:

1. Damir Godec, Joamin Gonzalez-Gutierrez, Axel Nordin, Eujin Pei, Julia Ureña Alcázar, A guide to additive manufacturing, Springer – 2022. https://doi.org/10.1007/978-3-031-05863-9
2. Introducing SolidWorks, Dassault Systems.

References:

1. Insight into Electronics
2. Microcontroller Programming with Arduino and Python
3. Fundamentals of 3D modelling

Online Resources (Weblinks)

1. Google Play store apps:
   a. https://play.google.com/store/apps/details?id=com.electronicslab
   b. https://play.google.com/store/apps/details?id=it.android.demi.elettronica
2. https://engservices-ece.sites.olt.ubc.ca/files/2020/01/SolidWorks-3D-Printing-Tutorial-R2.pdf

Assessment (Practical course)

Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by

Expert from Industry	Expert(s) from Higher Education Institution		Internal Expert
Dr. Mahesh Veezhinathan Director - Innovation Practicum Associate VP - Forge. Innovation	-		Dr. Samuel Ratna Kumar P S Assistant Professor – III Department Mechanical Engineering
Recommended by BoS on	17.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

24CSI101	LOGICAL THINKING AND PROBLEM SOLVING	L	T	P	J	C
		3	0	2	0	4
ES	(Common to all Programmes)	SDG	8, 9			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	gain a comprehensive understanding of computing systems, including their classification, processing units, memory structures, storage hierarchies, and the essential functions and types of operating systems
2	develop strong logical and analytical thinking skills, enabling the systematic analysis and solution of computational problems using reasoning techniques, algorithms, and flowcharts.
3	acquire a solid foundation in C programming, mastering the use of data types, operators, control structures, and input/output operations to create efficient and effective programs.
4	apply advanced programming techniques, including the use of arrays, structures, pointers, and functions, to solve complex real-world problems with a focus on modular and efficient coding practices.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	understand the basic concepts of hardware, software, Operating systems, and the logic behind the functioning of the Computing systems.	U
CO2	apply logical thinking and reasoning to solve computing problems using tools like algorithms and flowcharts.	Ap
CO3	understand the structured programming paradigms, memory organization and how the language can be used as a tool to solve problems.	U
CO4	develop simple programs using data types, operators, control structures, pointers, and functions as appropriate in real world applications.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team work	9 Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1	2												
2	3	2	1								3		
3		1									2		
4	3	2	1								3		

Course Content	
FUNDAMENTALS OF COMPUTERS AND COMPUTING Generations of computers, and classification of computers (supercomputers, mainframes, minicomputers, microcomputers). Processing Units (CPU, GPU, TPU), memory (RAM, ROM), storage devices and hierarchy, input / output and peripheral devices. System software, application software. Operating Systems - Functions (process management, memory management, file system management, device management, security), types of operating systems (desktop, mobile, networking, distributed, real-time, embedded). **Number Systems**: Introduction to different number systems (binary, octal, decimal, hexadecimal), conversions between number systems, and binary arithmetic (addition, subtraction, multiplication, division). **Practical Component** Exploring hardware and software components	**6 Hours** **4 Hours**
LOGICAL THINKING, REASONING AND TOOLS Problem Analysis – Logical Thinking vs Critical Thinking vs Design Thinking - Inference – Inductive Reasoning – Deductive Reasoning – **Logical Thinking Tools: Algorithms**: Definition and importance, characteristics of algorithms (finite, clear and unambiguous, well-defined inputs and outputs, feasible). Algorithm representation Techniques: Pseudocode, stepwise refinement, and top-down design. **Flowcharts**: Symbols used in flowcharts, creating flowcharts, and examples of flowchart-based problem-solving. **Practical Component** Algorithm writing and Flowcharts,	**8 Hours** **4 Hours**
PROGRAMMING PARADIGMS AND INTRODUCTION TO C PROGRAMMING **Programming Paradigms**: Structured programming - functional programming - object-oriented programming. **Introduction to C Programming**: History of C - features of C - structure of a C program – input / output statements. **Data Types**: Primitive data types (int, char, float, double) - derived data types, typecast. **Operators**: Arithmetic operators - relational operators - logical operators - bitwise operators - assignment operators - operator precedence. **Conditional Statements**: If - if-else - nested if - switch-case. **Looping Statements**: For loop - while loop - do-while loop. Pre-processor Directives and Command line arguments, Storage Classes. **Practical Component** Programs on Operator precedence, Decision Making, Iterations	**11 Hours** **10 Hours**
ARRAYS AND STRUCTURES **Collections**: Arrays – 2D Arrays – String Manipulation. **Structures and Unions**: Definition - declaration - accessing members - differences between structures and unions - applications. **Practical Component** Programs on Arrays, Structures, Union,	**10 Hours** **6 Hours**
POINTERS AND FUNCTIONS **Pointers**: Definition - declaration - pointer arithmetic - pointers and arrays. **Functions**: Definition - declaration - types of functions (user-defined, library functions) - parameter passing (by value, by reference) pointers and functions, recursion. **Practical Component**	**10 Hours**

Pointers and Functions. Additional programs on Files to be discussed.	6 Hours

Theory Hours:	45	Tutorial Hours:	0	Practical Hours:	30	Project Hours:	0	Total Hours:	75

Learning Resources

Textbooks:

1. Kanetkar, Yashavant. Let Us C. BPB Publications, New Delhi (2023).
2. Rajaraman, V. Fundamentals of Computers. PHI Learning, New Delhi (2020).
3. Dromey, R.G. How to Solve it by Computer. Prentice Hall International, New York (2008).

Reference

1. Cormen, Thomas H., Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. Introduction to Algorithms. MIT Press, Cambridge (2022).
2. Balagurusamy, E. Programming in ANSI C. McGraw Hill Education, New York (2021).
3. Kernighan, Brian W., and Dennis M. Ritchie. The C Programming Language. Prentice Hall, New York (2017).
4. Patterson, David A., and John L. Hennessy. Computer Organization and Design: The Hardware/Software Interface. Morgan Kaufmann, San Francisco (2017).

Online Resources (Weblinks)

1. https://nptel.ac.in/courses/106105214
2. https://www.coursera.org/learn/computer-fundamentals
3. https://www.khanacademy.org/computing/computer-science/algorithms
4. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/
5. https://www.geeksforgeeks.org/c-programming-language/

Assessment (Embedded course)
CAT, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
-	-	Dr. S. Kavitha, Department of Information Technology

Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	Date	24.08.2024

24HSP112	HOLISTIC WELLNESS-II (Common to all Department)	L	T	P	J	C
		0	0	2	0	1
HS		SDG	3, 4			

Pre-requisite courses	Holistic Wellness-I	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	build on the foundation laid in Holistic Wellness -I and deepening into the practices and principles of holistic wellness.
2	explore advanced techniques in mental, emotional, and spiritual well-being, with an emphasis on creating sustainable wellness habits.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	apply advanced techniques in mindfulness, meditation, and stress management.	Ap
CO 2	understand the role of community and social connections in wellness.	U
CO 3	develop resilience and adaptability in maintaining wellness.	E
CO 4	refine and sustain a personalized holistic wellness plan.	E

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium - 2, Weak-1)											Program Specific Outcomes (PSO)	
	1 Engineering Knowledge	2 Problem Analysis	3 Design/Development of Solutions	4 Conduct Investigations of Complex Problems	5 Engineering Tool Usage	6 The Engineer and The World	7 Ethics	8 Individual and Collaborative Team	G Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2
1						2		2					
2						2							
3						2				3			
4						2				3			

Course Content

ADVANCED MINDFULLNESS AND MEDITATION: • Deepening mindfulness practices for enhanced mental clarity. • Exploring different forms of meditation (e.g., guided, transcendental, movement-based). • Hands-on activity: Daily meditation practice and journaling reflections.	**6 Hours**
EMOTIONAL RESILIENCE AND MENTAL HEALTH:	**6 Hours**

• Building emotional resilience through positive psychology practices. • Cognitive-behavioural strategies for managing stress and anxiety. • Hands-on activity: Developing and practicing a resilience toolkit.	
SOCIAL AND ENVIRONMENTAL WELLNESS: • The impact of social connections and community on wellness. • Creating a supportive environment for personal growth. • Hands-on activity: Building a community wellness project or group activity.	**6 Hours**
INTERNAL GROWTH AND PURPOSE: • Exploring the deeper aspects of internal wellness and self-actualization. • Reflective practices for discovering life purpose and meaning. • Hands-on activity: Creating a vision board or personal mission statement.	**6 Hours**
SUSTAINING WELLNESS PRACTICES: • Strategies for maintaining wellness habits over the long term. • Adapting wellness plans to life changes and challenges. • Hands-on activity: Revising and finalizing a long-term personal wellness plan.	**6 Hours**

Theory Hours:	**0**	**Tutorial Hours:**	**0**	**Practical Hours:**	**30**	**Project Hours:**	**Total Hours: 30**

Learning Resources

Textbooks:

1. Hanh, Thich Nhat. The Miracle of Mindfulness: An Introduction to the Practice of Meditation. Beacon Press, Boston (1975).
2. Tolle, Eckhart. The Power of Now: A Guide to Spiritual Enlightenment. New World Library, Novato (1997).
3. Patel, Kamlesh. Heartfulness Way: Heart-Based Meditations for Spiritual Transformation, Kamlesh Patel, 2018.

References:

1. Goleman Daniel., Emotional Intelligence., Bloomsbury India, India, (2021).
2. James Allen., As a Man Thinketh., Maple Press, Noida, (2010)
3. Swami Budhanandha., Will power and its development., Advaita Ashrama Mayavati, Pithoragarh, Himalayas from its Publication Department, Calcutta. (2001)
4. Rosenberg, Marshall Bertram., Nonviolent Communication: A Language of Life., Puddle Dancer Press, Encinitas, CA (2015).
5. Jayanna, Krishnamurthy., Science C Practice of Integrative Health C Wellbeing Lifestyle., White Falcon Publishing (2020).
6. Lipton, Bruce., The Biology of Belief 10th Anniversary Edition: Unleashing the Power of Consciousness, Matter C Miracles, Hay House, Carlsbad (2015).
7. Kalderdon Adizes Ichak., What Matters in Life: Lessons I Learned from Opening My Heart
8. ., WS Press, Newtown, PA(2023).
9. Murphy, Joseph., The Power of Your Subconscious Mind [Original Edition (Complete)], Prentice-Hall, Englewood Cliffs (1963).

10. Kamlesh D. Patel., Designing Destiny: The Heartfulness Way, Heartfulness Institute, Chennai (2021)

Online Resources (Weblinks)

1. Introduction to Psychology
2. Guided Meditation
3. Life skills and value education
4. James Allen Library

Assessment (Practical course)
Participation, Practical activities and assignments, personal wellness plan and reflection.

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
		Dr. Ezhilarasi Principal- KCT	
Recommended by BoS on			
Academic Council Approval	No: 27	**Date**	24.08.2024

SEMESTER III

24TTI201	TEXTILE FIBRES	L	T	P	J	C
		3	0	2	0	4
PC		SDG	9, 12			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:	
The purpose of taking this course is to:	
1	Introduce the classification of textile fibres and the essential properties of fibre-forming polymers and explore how polymer structure influences key fibre properties.
2	Provide knowledge on the structure, manufacturing, properties, and applications of natural, regenerated, synthetic, and high-performance fibres.
3	Familiarize students with the types of specialty fibres and their applications, and to explain post-spinning processes and their impact on fibre performance and characteristics.
4	Develop skills for fibre identification using standard techniques such as microscopy, solubility, moisture absorption, flammability, and chemical testing.

Course Outcomes		
After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Classify different types of fibers, structure and properties. Spinning systems	U
CO 2	Identify and classify different types of natural fibers based on their origin and basic properties.	Ap
CO 3	Describe the manufacturing processes, properties, and applications of regenerated fibers.	Ap
CO 4	Illustrate the production methods, characteristics, and uses of synthetic fibers.	Ap
CO 5	Summarize the features of specialty fibers and Outline the various post-spinning operations	U
CO 6	Identify the different types of fibres, evaluate their properties	An

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	2									2		
2	3	3	2	2	3						2	2	

3	3	3	2	3	2						2	3	
4	3	2		3	3						2		
5	3	2	2	2	3			2	2		2		
6	3	2	3	2	3			2	2		2		2

Course Content

INTRODUCTION Classification of fibres, essential properties of fibre forming polymers- molecular structure and orientation, degree of polymerisation. Relationship between polymer structure and fibre properties - moisture absorption, mechanical, chemical and thermal properties. Polymer extrusion techniques – melt, dry, wet, gel spinning. **PracticalComponent:** • Identify the density of polymers • Determination of molecular weight of the polymers using viscometry	**9 Hours** **6 Hours**
NATURALFIBRES Cellulosic fibres – Cotton, Jute, Linen, Coir – morphology, chemical and physical structure, properties, applications Protein fibres – Wool, Silk - morphology, chemical and physical structure, properties, applications **PracticalComponent:** • Identification of cellulosic and protein fibres by microscopy, solubility, moisture absorption, flammability • Analyse the Maturity Ratio and content of cotton fibre	**9 Hours** **6 Hours**
REGENERATED FIBRES Regenerated Cellulosic fibres – Viscose Rayon, Cellulose Acetate - Manufacturing process, structure, properties, applications Regenerated Protein fibres – Soyabean and Caesin Manufacturing process, structure properties, applications **PracticalComponent:** • Identification of fibres by microscopy, solubility, moisture absorption, flammability	**9 Hours** **4 Hours**
SYNTHETICFIBRES Melt Spinning – Polyester, Polyamides, Polyolefins – Rawmaterial, polymerization, spinning process, structure, properties and applications Solution Spinning – Poly Acrylonitrile, polyurethane - Rawmaterial, polymerization, spinning process, structure, properties and applications High performance fibres – Aramid, Carbon, Glass - Rawmaterial, polymerization, spinning process, structure, properties and applications **PracticalComponent:** • Identification of fibres by microscopy, solubility, moisture absorption, flammability • Effect of acid on polymers under various factors (Temperature/ time/ Concentration). • Effect of alkali on polymers under various factors (Temperature/ time/ Concentration).	**9 Hours** **8 Hours**

SPECIALITY FIBRES AND POST SPINNING PROCESS Bicomponent fibres, SAP fibres – properties and application Drawing - Structural changes in polymer, Heat setting - methods and applications Texturizing : Airjet, Draw and False twist texturing, Spin finish applications **Practical Component:** • Determination of spin finish using Soxhlet apparatus method • Determination of blend proportion of different blended yarns	**9 Hours** **6 Hours**

Theory Hours:	Tutorial Hours:	Practical Hours:	Project Hours:	Total Hours
45		30		75

Learning Resources

Textbooks:

1. Bunsell, Anthony R., ed. *Handbook of properties of textile and technical fibres*. Woodhead Publishing, 2018.
2. Mather, R. R., Wardman, R. H., & Rana, S. Chemistry of textile fibres. Royal Society of Chemistry, Royal society of Chemistry,2023

References:

1. Eichhorn, Stephen, John WS Hearle, Michael Jaffe, and Takeshi Kikutani, eds. "Handbook of textile fibre structure: volume 2: Natural, regenerated, inorganic and specialist fibres." (2009).
2. Gupta V. B. and Kothari V. K. (Editors), "Manufactured Fibre Technology", Kluwer Academic Publishers, 1997.
3. Kozłowski, Ryszard M., and Maria Mackiewicz-Talarczyk. "Introduction to natural textile fibres." In *Handbook of natural fibres*, pp. 1-13. Woodhead Publishing, 2020.

Online Educational Resources:

1. https://onlinecourses.swayam2.ac.in/cec19_te01/preview

Assessment (Embedded course)

SA, Activity and Learning Task(s)* , Mini project, MCQ, End Semester Examination (ESE)
Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)

R. SENTHIL KUMAR General Manager M/s.Reliance Industried Ltd Tirupur	Dr. N. Gobi Associate Professor Department of Textile Technology Anna University Chennai		R. Sukanya Devi, Assistant Professor
Recommended by BoS on	07.05.2025		
Academic Council Approval	No. 28	**Date**	26.06.2025

24TTI202	YARN MANUFACTURING TECHNOLOGY-I	L	T	P	J	C
		3	0	2	0	4
PC		SDG	7, 8, 9			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	Understand modern ginning process and machinery including contamination removal. Study the principles of opening and cleaning of natural textile fibres.
2	Comprehend the carding principles and operations: Study the fiber individualization and cleaning process in Carding
3	Analyze the operation of combing process of cotton fibres. Study the fiber parellelisation in Combing
4	Analyze the operation of drawing and study the fiber parellelisation
5	Explore the importance and mechanism of roving process.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Discuss the concepts and mechanism of ginning, opening and cleaning of blow room machines.	An
CO 2	Evaluate the principle and mechanism of fibre individualization in carding.	E
CO 3	Discuss the impact of parallelization of fibers concept & mechanism in comber process.	E
CO 4	Analyse the concept of fibre parallelization in draw frame.	An
CO 5	Explain the principle and working of speed frame.	An
CO6	Demonstrate the various parameters from blow room to roving frame such as speed, draft, setting,	E

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	2						2	2			3		
2		3			2		2					2	2
3	2		1					2			2		
4	3	3										2	
5	3			1		2							2
6		3	3	3				2		2	2	3	

Course Content

GINNING AND BLOW ROOM

Theory

Introduction to Short-staple Spinning. Study of different types of gins – saw gin, roller gin and double roller gin. Effect of ginning performance on fibre quality. Modern ginning plant arrangement includes contamination cleaners. Raw material storage (warehouse).

Concept of mixing, effect of fibre quality on yarn quality including recycled fibres, bale management- Objectives of blow room –Opening, Cleaning, Blending. Arrangement of an opener and beater- feeding, opening, grid and their interaction. Ideal Blow Room Arrangement- Opening (Manual and Automatic Bale Openers, Waste and Sliver), Precleaners (new generation Precleaners). Blending, Fine cleaning Intermediate cleaning, Fine cleaners)- Concepts of opening intensity and cleaning efficiency -Storing, Condensation and Chute feed. Safety systems- Metal, heavy particle, fire prevention. Contamination types and detectors. Waste Collection and Removal, Dust Removal.

Machinery configuration for various levels of trashy and contaminated raw material. Factors influencing opening and cleaning-intensity of opening-fibre loss, fibre damage and their control.

12 Hours

Practical 1. Determination of opening intensity & Arriving Mixing Plan 2. Determination of cleaning efficiency and nep generation.	**6 Hours**
CARDING **Theory** Objectives of carding – opening, cleaning, short fibre removal, and dust removal, nep removal, fibre individualization, hooks theory. Operating Principle of a modern card (from chute feed to coiling). Geometry, Types and Selection of card clothing for cotton& synthetics blends. Auto levelling- need, types and its impact on sliver quality. Salient features of new generation cards-integrated draw frame, modular arrangement, maximum carding area, automatic grinding. Maintenance of cards. Speeds and draft distribution, settings & production calculation.	**9 Hours**
Practical 1.Analysis of Working mechanism and calculation of draft distribution & production calculation in carding machine. 2.Demonstrate the setting between various zones of carding machine & evaluate the nep content in the drafted web.	**6 Hours**
COMBING **Theory** Objectives and need of Comber-comber preparatory, Positioning of combing. Working Principle of Comber Preparatory- modern Lap formers. Working Principle of modern comber- combing sequence-Timing Diagram. Operations in detail- Feed, Nipper Assembly, Circular and Top Comb, Detaching, Sliver formation and coiling. Noil Extraction Theory- forward and backward feed-factors influencing combing-fractionating efficiency. Modern developments in comber-Automatic feeding and lap transport system. Speeds, Settings and Production Calculation.	**10 Hours**
Practical 1. Determination of speed, draft, production & combing cycle of comber. 2. Estimation of variation in comber noil between heads & machines and Nep removal efficiency.	**6 Hours**

DRAWFRAME **Theory** Objectives - Principle of doubling and drafting, Improving Evenness. Drafting system - draft theory – drafting force-drafting wave - actual and perfect draft-roller slip and eccentricity. Operating Principle of modern draw frames- creel (feed), drafting zone, condensing and coiling. Autolevelling (short-term levelling)- Blending. Modern Developments in Draw Frame (single and double delivery, Improvements in functioning)-Speeds, Settings and Production Calculation.	**6 Hours**
Practical 1.Determination of speed, draft distribution and A%. 2. Demonstrate the roller setting in draw frame.	**6 Hours**
ROVING FRAME **Theory** Objectives of Roving - Principle and working, flyer twisting. Operation in detail- Drafting- Rollers, Aprons, Spacers. Operation in detail- Winding- Flyer & Types, Bobbin lead Vs Flyer lead, Bobbin build. Machine Drive Mechanism- Bobbin Building Mechanism, Electronic (Independent) Drive System. Accessories- Creel Stop Motion, Roving Stop Motion, Roving Tension Monitoring, Over Head Clearers-Package faults. Automation- Doffing and Bobbin Transport system. Draft, twist and production calculations.	**8 Hours**
Practical 1. Study of drafting systems (rollers, spacers) of a roving frame and determination of cots shore hardness. 2. Determination of Roving Tension and study of material variation in roving.	**6 Hours**

Theory Hours:	**45**	**Tutorial Hours:**	**0**	**Practical Hours:**	**30**	**Project Hours:**	**0**	**Total Hours:**	**75**

Learning Resources
Textbooks:
1. Oxtoby E, “Spun Yarn Technology”, Butter worth’s, London, New Edition 2002. 2. Carl A Lawrence, “Fundamentals of Spun Yarn Technology”, CRC Press, 2023.

References:

1. Klein. W, Manual of Textile Technology, Short Staple Spinning Series, Vol 1-3, The Textile Institute 2014
2. Handbook of Yarn Production: Technology, Science and Economics, Woodhead Publishing, 2003.
3. Textile and Fashion-Materials, Design and Technology, Woodhead Publishing, 2015
4. Chattopadhyay R., Technology of Carding, NCUTE, IIT Delhi, 2003.
5. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002
6. Salhotra K. R. & Chattopadhyay R., Book of papers on "Blow room and Carding", IIT Delhi 1998.
7. Duraiswamy I, Chellamani P &Pavendhan A., "Cotton Ginning" Textile Progress, The Textile Institute, Manchester, U.K., 1993.
8. Lord P. R., Yarn Production: Science, Technology and Economics", The Textile Institute, Manchester, U.K., 1999.
9. Arkady Cherakassky, Two-dimensional mathematical model of the carding process, Textile research journal P. 169 – 175, March 1994
10. Manufacturing Excellence in Spinning Mills, A, Kanthimathinathan, Taylor and Francis publications 2022

Assessment (Theory course)

SA, Activity and Learning Task: Quiz, Case study, MCQ, End Semester Examination (ESE)

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Mr. Gopalakrishnan P Chief General Manager-Quality Control Sri Shanmugavel Group of Mills, Thadicombu-624 709 Dindigul	Dr. J. C. Sakthivel Associate Professor Department of Textile Technology PSG College of Technology Peelamedu Coimbatore - 641004	Prof. A. Pavendhan, Associate Dean-Textile Cluster & Dr. Sivakumar.P, Module Coordinator-Spinning Department of Textile Technology, Kumaraguru College of Technology.

Recommended by BoS on	07.05.2025		
Academic Council Approval	No 28	**Date**	26.06.2025

24TTI203	WEAVING TECHNOLOGY - I	L	T	P	J	C
		3	0	2	0	4
PC		SDG	4, 9, 12, 13			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	Understand the basic process involved in woven fabric production.
2	Impart knowledge of various processes involved in weaving preparatory.
3	Know the basics of weaving motions in woven fabric formation.
4	Acquire practical skills in pattern preparation for small to large motifs.
5	Familiarize students with various mechanisms in fabric formation.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Explain winding and warping mechanisms and perform related calculations.	U
CO 2	Analyze sizing systems and optimize size pick-up and production parameters.	U
CO 3	Distinguish between different shedding systems and their working principles.	Ap
CO 4	Evaluate picking, beat-up, and take-up motions and suggest system improvements.	E
CO 5	Justify use of auxiliary motions and automation for sustainable weaving.	E
CO 6	Perform hands-on analysis of weave mechanisms using CAD and lab equipment.	An

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	3			3						3	3	3
2	3	3	3		3						3	3	3
3	3	3			3						3	3	3
4	3	3	3		2						3	3	3
5			3			2	2			3	3	3	
6				3	3			3		3	3	3	

Course Content

WINDING TECHNOLOGY Objectives of winding, types of packages, yarn withdrawal, definition of wind, wind per double traverse and angle of wind. Package density. Types of winders, drum driven winders, precision winders. Yarn tensioner, objectives, additive and multiplicative tensioners. Yarn clearer, principles of mechanical and electronic clearers, classimat faults, splicing and knotting. Pirn winding, bunch building. Calculation related to production cone winding and pirn winding.	**9 Hours**
PracticalComponent: 1. Analysis of geometry of the packages given. 2. Analysis of yarn fault, winding cuts and SLT channels.	**6 Hours**
WARPING AND SIZING Passage of warp, Types of creels. Beam warping machines, Sectional warping. Calculations related to beam and sectional warping. Sizing-Objective, weaving curve, size ingredients, preparation of the size paste. Sizing machine -Multi cylinder sizing machine and single end sizing machine. Calculations related to production, size add on, size pick up and water evaporation.	**9 Hours**
PracticalComponent: 1. Prepare the warp design pattern and perform the drawing-in process. 2. Size the given yarn and analyze the size pick-up and tensile properties.	**6 Hours**

SHEDDING MECHANISMS Introduction of shedding mechanisms, types of shed, tappet shedding, shedding with negative cams, positive shedding using grooved cams, limitations of tappet shedding. Dobby shedding- cam and rotary dobby, jacquard shedding- single lift single cylinder jacquard, double lift single cylinder jacquard, double lift double cylinder jacquard, Verdol jacquard, Reversing mechanisms.	**9 Hours**
PracticalComponent: 1. Analyze the geometry of the shed, depth of the shed and calculate the strain in the warp from shed height. 2. Prepare the pattern card for custom design and simulate the fabric using CAD for dobby shedding. 3. Prepare the pattern card for custom design and simulate the fabric using CAD for Jacquard shedding.	**9 Hours**
PICKING AND BEAT-UP Picking methods, shuttle picking, shuttle timing. Loom timing diagram, relation between shuttle velocity and loom speed, loom width and rate of weft insertion, conventional picking mechanisms, classification, cone over pick, cone under pick, advantages and limitations. Shuttle checking devices. Beat up mechanism, sley eccentricity.	**9 Hours**
PracticalComponent: 1. Analyze the Motion of shuttle during acceleration, catapult effect, nominal and actual, displacement. 2. Analyze the Movement of sley, beat up, sley eccentricity and the factors influencing it.	**6 Hours**
SECONDARY & AUXILIARY MOTIONS Let off motions, negative and positive let off motions. Take up motions, objectives, five-wheel, seven wheel take up motions, Auxiliary motions- weft stop motions, side fork and center fork motions, warp protector motions, loose reed and fast reed, warp stop motions. Automatic looms, weft feelers, bobbin change systems, weft mixing, drop box motions.	**9 Hours**
PracticalComponent: 1. Prepare the pattern card with custom design for weft in drop box mechanism.	**3 Hours**

Theory Hours: 45	Tutorial Hours: 0	Practical Hours: 30	Project Hours: 0	Total Hours: 75

Learning Resources

Textbooks:

1. Lord, P.R., and Mohamed, M.H. Weaving: Conversion of Yarn to Fabric. Merrow Publishing, UK, 2021.
2. Talukdar, M.K., Sriramulu, P., and Ajgaonkar, D.B. Winding and Warping. Textile Trade Press, India, 2020.
3. Marks, R, and Robinson, A.T.C. Principles of Weaving. Textile Institute, 1976.

4. Majumdar, A. Principles of Woven Fabric Manufacturing. CRC Press, 2016.

References:

1. Ajgaonkar, D.B. Textile Manufacturing Processes. Woven Fabric Tech Publications, India, 2022.
2. Banerjee, P.K. Principles of Fabric Formation. CRC Press, 2015.
3. Goswami,B.C., Anandjiwala, R., and Hall. Textile Sizing. Woodhead Publishing. 2004
4. Booth, J.E. Textile Mathematics (Volume III). Textile Institute 1977.

Assessment (Embedded course)

SA, Activity and Learning Task(s)*, Mini project, MCQ, End Semester Examination (ESE)
Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Mr. V. Sembian, Vignesh Super Fabrics, 6/320, Peedampalli Road, Pattanam, Coimbatore-641016.	Dr. N. K. Palaniswamy, Associate Professor, Textile Technology, National Institute of Technology (NIT), Jalandhar, Punjab 144008.	Dr. S. Ariharasudhan Assistant Professor III, Department of Textile Technology, Kumaraguru College of Technology, Coimbatore – 641049.

Recommended by BoS on	07.05.2025		
Academic Council Approval	No 28	**Date**	26.06.2025

24MAI232	APPLIED STATISTICS FOR ENGINEERS (Common to BT, FT, TT)	L	T	P	J	C
		3	0	2	0	4
BS		SDG	3, 8			

Pre-requisite courses	Frequency distribution, Sample and Population	Data Book / Codes / Standards (If any)	Statistical Tables

Course Objectives:	The purpose of taking this course is to:
1	Introduce the concept of random variables and their probability distributions.
2	Explore two-dimensional random variables, correlation, and regression analysis
3	Provide knowledge of hypothesis testing using small and large sample tests.
4	Explain the principles of experimental design and analysis of variance
5	Familiarize students with statistical quality control techniques

Course Outcomes:	After successful completion of this course, the students shall be able to	Bloom's Taxonomy Level (BTL)
CO 1	Describe different types of random variables and their probability distributions.	Ap
CO 2	Analyse joint distributions and measure relationships using correlation and regression techniques	An
CO 3	Conduct hypothesis tests using Z-tests and Chi-square for large samples	Ap
CO 4	Perform small sample hypothesis tests using t-tests and F-tests.	Ap
CO 5	Apply ANOVA and experimental design methods for data analysis.	An
CO 6	Construct and interpret control charts for process monitoring.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	2			2								
2	3	3			2								
3	3	3		2	1				2				
4	3	3		2	1				2				
5	3	3		1	3				2				
6	3	3		1	3				2				

Course Content

RANDOM VARIABLES **Axioms of probability - Conditional probability – Total probability – Baye's theorem - Random variable – Properties – Probability mass function – Probability density function – Distribution function - Binomial, Poisson and Normal distributions.** **Practical Component** • **Generate a Binomial distribution, plot its PMF and CDF, find the probability of a given range, and compute its mean and variance.** • **Simulate Poisson and Normal distributions, visualize them using PMF and histograms, and calculate probabilities for given ranges.**	**9 Hours** **6 Hours**
TWO DIMENSIONAL RANDOM VARIABLES AND CORRELATION AND REGRESSION **Two dimensional random variables – Joint Density and Distribution Functions – Marginal distributions- Correlation – Karl Pearson's Correlation coefficient ((Discrete Data) – Regression lines. (Discrete Data). central limit theorem-Simple problems.** **Practical Component**	**9 Hours** **6 Hours**

• **Generate a two-dimensional discrete random variable, compute its joint probability distribution, and plot the joint probability mass function (PMF).** • **Compute Karl Pearson's and Spearman's Rank Correlation coefficients for a given discrete dataset, fit regression lines, and interpret the results.**	
TESTING OF HYPOTHESIS **Testing of hypothesis for large samples: single mean, 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.** **Practical Component** • **Perform hypothesis testing for large samples by conducting Z-tests for a single mean and difference of means and interpret the results.** • **Conduct t-tests (single mean, difference of means, and paired t-test), F-test for variance ratio, and Chi-square tests for independence of attributes and goodness of fit using given datasets.**	**9 Hours** **6 Hours**
DESIGN OF EXPERIMENTS **Analysis of Variance (ANOVA) – Completely Randomized Design (CRD) – Randomized Block Design (RBD) -Latin Square Design** **Practical Component** • **Conduct an ANOVA using a Completely Randomized Design (CRD) and a Randomized Block Design (RBD) on a given dataset and compare the treatment effects.** • **Perform a Latin Square Design ANOVA on provided data, analyze the treatment differences, and interpret the outcomes.**	**9 Hours** **6 Hours**
STATISTICAL QUALITY CONTROL **Concept of process control - Control charts for variables: Mean and Range charts – Control charts for attributes: p, np, c – charts.** **Practical Component** • **Construct and analyze Mean and Range ($\bar{X}$ and R) control charts for a given dataset to monitor process stability.** • **Develop p, np, and c control charts for attribute data, interpret the control limits, and determine if the process is in control.**	**9 Hours** **6 Hours**

Theory Hours:	**45**	**Tutorial Hours:**		**Practical Hours:**	**30**	**Project Hours:**	**Total Hours:**	**75**

Learning Resources
Textbooks
1. Walpole R. E., Myers S.L. & Keying Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education Inc, 10th edition, 2020. 2. Charles Henry Brase and Corrinne Pellillo Brase "Understandable Statistics", Cengage Learning Company, Toronto, 12th edition, 2016. 3. Andy Field, Jeremy Miles, and Zoë Field, "Discovering Statistics Using R", Sage Publications, 1st edition, 2012.
Reference books
1. Johnson R. A., Miller & Freund's "Probability and Statistics for Engineers", 9th Edition, Pearson Education, Delhi, 2017. 2. Gupta S.C, and KapurV.K "Fundamentals of Applied Statistics", Sultan Chand, New Delhi, 4th Edition, 2014. 3. Michael J. Crawley, "The R Book", Wiley, 3rd Edition,2020.
Online Resources/Web Links
Introduction to Probability and Statistics Using R: **https://www.atmos.albany.edu/facstaff/timm/ATM315spring14/R/IPSUR.pdf**

Assessment	
Formative	**Summative**
Assignments / PBA, SBA, Worksheet, Quiz, Lab	**SA- I, SA – II and End Semester Examination (ESE)**

Course Curated By			
Expert(s) from Industry	**Expert(s) from Higher Education Institutions**		**Internal Expert(s)**
1. **Dr. R VASU** **Business Excellence and Management Systems Consultant Specialisation in Process Excellence, Six Sigma Quality, Health Safety & Environment Systems** **Vice President (Retired) Brakes India.**	1. **Dr. M. Sivakumar** **Assistant Professor Sr. Grade** **Vellore Institute of Technology, Vellore** 2. **Dr. Ramesh Babu** **Assistant Professor (SG)** **Amrita University Coimbatore, Tamil Nadu.**		1. **Dr. R. Marudhachalam** **Associate Professor, Department of Mathematics, KCT**
Recommended by BoS on	**25.4.2025**		
Academic Council Approval	**No 28**	**Date**	**26.06.2025**

24HSP005	MASTERING CONVERSATIONS	L	T	P	J	C
		0	0	2	0	1
Course Category: HS		SDG	4 & 8			

Pre-requisite courses - Nil	NIL	Data Book / Codes / Standards (If any)	Nil

Course Objectives:	The purpose of taking this course is to:
1	Demonstrate understanding of different perspectives by analyzing complex personal and professional situations.
2	Engage in thoughtful dialogue and discussions about complex, real-world issues, utilizing critical thinking to assess different viewpoints.
3	Apply role-playing as a tool to enhance understanding of workplace dynamics, conflict resolution, and team collaboration.

Course Outcomes:	After successful completion of this course, the students shall be able to	Bloom's Taxonomy Level (BTL)
CO 1	Empathize with and understand people in both professional and personal contexts, reflecting on situations from multiple perspectives and participating in activities that mirror career-related scenarios	Ap
CO 2	Analyze and converse critically on complex subjects, demonstrating the ability to approach and deal with various social contexts effectively	An
CO 3	Exhibit skills in role-playing and enacting given situations to navigate diverse social interactions and career-related contexts.	C

Course Outcomes should be clear, measurable, aligned with broader educational objectives, and focused on developing essential engineering skills while preparing students for future challenges in the field

COs: Embedded (3 to 4 credits): –6,, Theory only- 5, Micro-credentials - 3, lab only – 3, project – 4

BTL: R, U, Ap, An, E, C (Remember, Understand, Apply, Analysis, Evaluate, Create)

	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
Course Outcomes (CO)	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1						3			3	2	3		
2									1	2			
3									3	2			

Course Content	
Practical Component / Roleplays Dynamics Introduction to Role play - Benefits of role plays - Importance of gesture, tone and modulation-Skill development through role play activities - Types of role plays -Conversation Building through communicative functions-Initiating a dialogue- Framing questions- Receiving feedback	**6 Hours**
Practical Component /Roleplays on Social Skill Social Interactions: - (Ordering food at a restaurant- Making a reservation at a hotel-- Shopping at a store-- Attending a party or social gathering) Travel and Tourism:(Asking for directions- Booking a flight or hotel--Exploring a new city- Interacting with local people) Community and Volunteering:(Participating in a charity event- Volunteering at a local organization- Discussing community issues- Organizing a community project)	**6 Hours**
Practical Component / Roleplays on Education and Technology Education and Personal Growth:(Setting goals-(Short term & Long term)-Creating a study plan- Participating in a workshop- Reflecting on personal growth) Technology and Online Interactions:(Participating in an online meeting-Creating a social media post- Writing an email or text message- Making an online purchase) Technology and Science:(Explaining a scientific concept- Discussing emerging technologies- participating in Hackathons- Presenting a research paper)	**6 Hours**
Practical Component / Roleplays on Strategic Insights Critical Thinking :(Evaluating a news article-solving a moral dilemma-Decision with incomplete information-Assessing a historical event)	**6 Hours**

Problem-Solving:(Resolving a conflict- Negotiating a deal - Making a complaint- Apologizing for a mistake) Business and Entrepreneurship:(Pitching an idea- Negotiating a contract- Conducting a market Research- Presenting a product launch)	
Practical Component / Roleplays on Cultural Exchange Cultural Exchange:(Sharing customs and traditions- Discussing cultural differences- Exploring historical events- Participating in a cultural festival) Media and Entertainment:(Event planning- Creating an advertisement-Digital Marketing-Conducting interviews- Creating news broadcast- Writing and Performing a script- Enacting one act plays) Arts and Culture:(Visiting an art gallery - Attending/ organizing a concert or play - Discussing literature- Creating a piece of art)	**6 Hours**

Theory Hours:	Tutorial Hours:	Practical Hours:	30	Project Hours:	Total Hours:
					30

Learning Resources*
Textbooks
Reference books/ Web Links
1.Bonwell, C. C., & Eison, J. A. (1991). Active learning: Creating excitement in the classroom. Washington, DC: The George Washington University. 2. Harbour, E., & Connick, J. (2005). Role playing games and activities rules and tips. Retrieved from https://www.businessballs.com/roleplayinggames.htm 3. Lebaron, J., & Miller, D. (2005). The potential of jigsaw role playing to promote the social construction of knowledge in an online graduate education course. Retrieved from http://paws.wcu.edu/jlebaron/Jigsaw-FnlTCRpdf_050812.pdf 4. Davies, A. (2018). Teaching and learning through role-play: A practical guide. Maidenhead, UK: McGraw-Hill Education. 5. Young, K. C. (2016). The art of role play: Developing realistic scenarios for skill development. Boston, MA: Pearson. 6. Yardley-Matwiejczuk, K. M. (1997). Role play: Theory and practice. London, UK: SAGE Publications Ltd.
Online Resources
https://www.niu.edu/citl/resources/guides/instructional-guide **https://positivepsychology.com/role-playing-scripts/**

Assessment	
Formative	Summative
Assignments / Mini project), Quiz, Lab	Quizzes and written assignments, Participation in group activities

Course Curated By		
Expert(s) from Industry	**Expert(s) from Higher Education Institutions**	**Internal Expert(s)**
Mr.Vijayan Ramanathan , Project manager, Toppan Merrill. Technologies, Coimbatore	Dr. Aninditha Sahoo, IIT, Madras Dr.P.R.Sujatha Priyadharshini, Anna University Chennai Dr. E. Justin Ruben, CIT, Coimbatore	Dr. Arokia Lawrence Vijay Dr. Tissaa Tony

Reccomended by BoS on	**16.08.2024**		
Academic Council Approval	**No 28**	**Date**	**26.06.2025**

24INM201	UNIVERSAL HUMAN VALUES II: Understanding Harmony (Common to All Branches)	L	T	P	J	C
		1	0	0	0	1
HS		SDG	5,10,16			
Pre-requisite courses		Data Book / Code book (If any)				

Course Objectives:	
The purpose of taking this course is to:	
1	Introduce the concept and significance of value education in shaping a meaningful and fulfilling life.
2	Enable students to understand the human being as a co-existence of self and body and the harmony within.
3	Develop an understanding of harmony in relationships, family, and society.
4	Help students appreciate the interconnectedness and harmony in nature and existence.
5	Instill the importance of ethical behavior in personal, professional, and social contexts.

Course Outcomes		
After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels(RBT)
CO1	Understand the foundational concepts of value education and human aspirations.	U
CO2	Analyse the human being as a holistic entity comprising self and body.	An
CO3	Evaluate and cultivate harmonious relationships within the family and society.	E
CO4	Interpret the interconnectedness in nature and recognize harmony in existence.	U
CO5	Apply holistic understanding to professional ethics and sustainable living.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1						3	3	3	3		3		
2						3	3	3	3		3		
3						3	3	3	3		3		
4						3	3	3	3		3		
5						3	3	3	3		3		

Course Content

Introduction to Value Education Value Education- Self-exploration as the Process for Value Education- Basic Human Aspirations and their Fulfilment- Right Understanding, Relationship and Physical Facility- Happiness and Prosperity – Current Scenario- Method to Fulfil the Basic Human Aspirations.	**3 Hours**
Harmony in the Human Being Human Being as Co-existence of the Self and the Body- Distinguishing between the Needs of the Self and the Body- The Body as an Instrument of the Self- Understanding Harmony in the Self- Harmony of the Self with the Body- Programs to Ensure Self-regulation and Health.	**3 Hours**
Harmony in the Family and Society Harmony in the Family –The Basic Unit of Human Interaction-'Trust' – The Foundational Value in Relationship-Respect – As the Right Evaluation- Other Values in Human-to-Human Relationship- Understanding Harmony in the SocietyLecture Vision for the Universal Human Order.	**3 Hours**
Harmony in the Nature (Existence) Understanding Harmony in Nature- Interconnectedness, Self-regulation and Mutual Fulfilment among the Four Orders of Nature- Realizing Existence as Co-existence at All Levels- The Holistic Perception of Harmony in Existence.	**3 Hours**

Implications of the Holistic Understanding- A Look at Professional Ethics Basis for Universal Human Values-Definitiveness of (Ethical) Human Conduct - professional Ethics in the Light of Right Understanding-A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order-Holistic Technologies, Production Systems-and Management Models-Typical Case Studies Strategies for Transition towards Value-based Life and Profession	**3 Hours**

Theory Hours:	Tutorial Hours:	Practical Hours:	Project Hours:	Total Hours:
15				15

Learning Resources

Textbooks:

Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010.

Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.

References:

Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, Jeevan Vidya:Publishers, 1999.

Online Resources (Weblinks)

https://www.uhv.org.in/uhv-ii

Assessment (Theory course)

Presentation, MCQ, Assignment, Case Study and E Chart.

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
	Sh. Umesh Jadhav, NCCIP (National Co-oridnation Committee)-AICTE	Dr. S. Sivakumar, Associate Professor, SFS Dr.R.Prakasam, Assistant Professor, Department of Physics Mr.J.Sivaguru, Assistant Professor, Department of Mechatronics

Recommended by BoS on	03-05-2025		
Academic Council Approval	No 28	**Date**	26-06-2025

24EII225	MEASUREMENT AND INSTRUMENTATION FOR TEXTILE INDUSTRIES	L	T	P	J	C
		3	0	2	0	4
Professional Core		SDG	8, 9, 12			

Pre-requisite courses		Data Book / Code book (If any)	Nil

Course Objectives:	
The purpose of taking this course is to:	
1	Learn the fundamentals of measurement systems, calibration, sensors, and textile-specific parameter measurement.
2	Calibrate instruments, apply appropriate sensors, operate textile instrumentation, and program basic PLC systems for data acquisition and automation.
3	Build the ability to apply measurement and instrumentation knowledge for data-driven quality control, process monitoring, and automation in textile production.

Course Outcomes		
After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Understand the principles of measurement systems, calibration standards, and sources of error in engineering measurements.	U
CO 2	Apply appropriate transducers and sensors for measuring physical and process parameters in textile applications.	Ap
CO 3	Analyze performance characteristics of sensors and instrumentation systems for accurate data acquisition and control.	An
CO 4	Perform calibration and validation of measurement instruments using standard procedures and interpret results.	Ap
CO 5	Operate and troubleshoot textile-specific instrumentation systems for monitoring yarn, fabric, and dyeing parameters.	Ap
CO 6	Develop basic PLC-based automation programs for process monitoring and control in textile production environments.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	2									2	1	
2	3	3	2	2	3						2	3	
3	3	3	2	3	2						2	3	
4	3	2		3	3						2	3	
5	3	2	2	2	3			2	2		2	1	
6	3	2	3	2	3			2	2		2		2

Course Content

Fundamentals of Measurement Introduction to measurement systems, Types of measurements: Direct & Indirect, Standards and calibration, Accuracy, precision, sensitivity, repeatability, linearity, Types and sources of errors in measurement **Practical Component:** ○ Calibration of Measurement Instruments- pressure gauge / thermometer using standard methods.	**4 Hours** **4 Hours**
Transducers and Sensors Classification of transducers, Electrical, mechanical, thermal, optical transducers, Working principles: RTD, thermocouples, LVDT, strain gauges, capacitive, piezoelectric, Fiber-optic sensors, Signal conditioning basics **Practical Component:** ○ Measurement of Displacement using LVDT ○ Strain Gauge Based Load/Pressure Measurement ○ Study of Capacitive and Inductive Proximity Sensor.	**6 Hours** **6 Hours**
Measurement of Physical Parameters Displacement, velocity, acceleration (textile machinery vibration), Temperature measurement (dyeing, heat setting), Pressure and vacuum measurement (printing, vacuum drying), Flow measurement: orifice, venturi,	**8 Hours**

rotameter, electromagnetic, ultrasonic, Level measurement techniques (chemical tanks, dye baths) **PracticalComponent:** • Temperature Measurement using RTD and Thermocouple • Measurement of Flow Rate using venturimeter- Flow control in dyeing and chemical dosing systems	**8 Hours**
Textile-Specific Instrumentation Measurement in spinning: yarn count, twist, tension, evenness, hairiness, Weaving instrumentation: warp tension control, fabric width, Knitting : loop length, yarn input monitoring, Dyeing and finishing: pH, conductivity, temperature, Colour monitoring, Non-contact sensors (infrared, laser-based) in textile inspection **PracticalComponent:** • pH Monitoring • Speed Measurement and Control of a DC Motor	**9 Hours** **4 Hours**
Data Acquisition and Instrumentation Systems Basics of data acquisition systems (DAQ),Analog-to-digital and digital-to-analog conversion, Interfaces: RS232, USB, GPIB, Ethernet, PLCs and SCADA systems in textiles, Introduction to smart sensors and IoT in textile monitoring **PracticalComponent:** • Ladder logic programming. -PLC	**9 Hours** **4 Hours**
Quality Control and Automation Online vs offline measurements,Feedback and feedforward control,Statistical process control using instrumentation data,Case studies of automation in modern textile mills,Safety and maintenance of instruments **PracticalComponent:** • PLC-based Control Simulation (e.g., Tank Level Control)	**9 Hours** **4 Hours**

Theory Hours:	**45**	**Tutorial Hours:**		**Practical Hours:**	**30**	**Project Hours:**		**Total Hours:**	75

Learning Resources

Textbooks:

1. Bunsell, Anthony R., ed. *Handbook of properties of textile and technical fibres*. Woodhead Publishing, 2018.
2. Mather, R. R., Wardman, R. H., & Rana, S. Chemistry of textile fibres. Royal Society of Chemistry, Royal society of Chemistry,2023

References:

1. Eichhorn, Stephen, John WS Hearle, Michael Jaffe, and Takeshi Kikutani, eds. "Handbook of textile fibre structure: volume 2: natural, regenerated, inorganic and specialist fibres." (2009).
2. Gupta V. B. and Kothari V. K. (Editors), “Manufactured Fibre Technology”, Kluwer Academic Publishers, 1997.
3. Kozłowski, Ryszard M., and Maria Mackiewicz-Talarczyk. "Introduction to natural textile fibres." In *Handbook of natural fibres*, pp. 1-13. Woodhead Publishing, 2020.

.Online Educational Resources:

1. **NPTEL Courses**: Measurement and Instrumentation, Textile Testing
2. **MIT OpenCourseWare**: Instrumentation tutorials

Assessment (Embedded course)
SA, Activity and Learning Task(s)* , Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce,

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
Dr Prem Kumar R & D Head LMW Coimbatore	Dr J C Sakthivel Associate Professor Textile Technology PSG College of Technology, Coimbatore	E. Muthuramalingam Department of Electronics and Instrumentation Engineering	
Recommended by BoS on	07.05.2025		
Academic Council Approval	No. 28	**Date**	26.06.2025

SEMESTER IV

24TTT205	CHARACTERISTICS OF TEXTILE FIBRES	L	T	P	J	C
		3	0	0	0	3
PC		SDG	7, 8, 10			

Pre-requisite courses	24TTI201	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	Study the fine structure of polymeric system and phenomenon of absorption nature of fibres
2	Analyze the mechanical behaviour and optical properties of fibres.
3	Explore the frictional, electrical and thermal properties of fibres.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Analyze the influence of molecular structure on and differentiate between natural and man-made fibres.	An
CO 2	Evaluate the effect of fibre structure on moisture absorption and recommend conditioning techniques for fibres.	E
CO 3	Analyze stress-strain curves of various textile fibres and prioritize mechanical properties based on typical values.	An
CO 4	Evaluate the factors influencing optical properties of fibres and justify techniques for measuring fibre friction.	E
CO 5	Analyze problems encountered during processing due to static electricity and design elimination techniques.	An

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	2	2											
2	2	2										2	
3	2	2						2	2				
4	2		3										
5	2	2											

Course Content	
STRUCTURE OF FIBRES Basic requirements for fiber formation, Intra- and inter-molecular forces, degree of order, degree of orientation of molecular chains, crystalline and amorphous regions –Models of fibre structure. Similarities and differences amongst the structural features of natural and man-made fibres. Analysis of charts from X-ray diffraction methods.	**9 Hours**
MOISTURE ABSORPTION PROPERTIES OF FIBRES Absolute humidity and relative humidity- moisture content and regain of different fibres- Moisture regains curves, Hygroscopic nature of fibres. Hysteresis in moisture absorption. Equilibrium absorption - Effect of fibre structure – hydrophilic groups and non-crystalline regions on Moisture absorption. Conditioning of fibers –Conditioning process, factors influencing rate of conditioning, effect of conditioning on fibre properties	**9 Hours**
MECHANICAL PROPERTIES OF FIBRES Definitions –Load elongation, breaking strength, breaking extension, tensile Stress, tensile strain, mass specific stress, yield point, initial modulus, work of rupture and work factor. Stress-strain curves for various textile fibres and their significance. Elastic properties – elasticity, elastic recovery and its relation to stress and strain, work recovery, typical values of elastic recovery and work recovery for various textile fibres. Mechanical conditioning of fibres – advantages. Time effects – stress relaxation and creep phenomena. Torsional rigidity – its relation to other fibre properties. Flexural rigidity – its relation to other fibre properties.	**9 Hours**
OPTICAL AND FRICTIONAL PROPERTIES Refractive index and Birefringence of fibres –effect of factors like fibre orientation, density and regain. Optical orientation factor, its relation with refractive index and birefringence. Reflection of light – specular and diffused reflection, lustre, lustre index, factors influencing lustre. Absorption of light – dichroism, dichroic ratio. Theories of fibre friction- Amonton's law; Lindberg's inter fibre friction Yarn to yarn abrasion and friction; friction of wool.	**9 Hours**
ELECTRICAL AND THERMAL PROPERTIES Static electricity – generation of static charge, problems encountered during Processing, elimination techniques. Electrical resistance of fibres, factors influencing electrical resistance. Dielectric properties, factors influencing di-electricity. Thermal properties – specific heat, thermal conductivity, thermal expansion and contraction, structural changes in fibres on heating, heat setting of various synthetic fibres.	**9 Hours**

Theory Hours: 45	Tutorial Hours: 0	Practical Hours: 0	Project Hours: 0	Total Hours: 45

Learning Resources
Textbooks:
1. Morton W.E and Hearle, J.W.S., "Physical Properties of Textile Fibres", The Textile Institute, Manchester, U.K., 4th Edition,2008. 2. Gohl E.P.G. and Vilensky L.D., "Textile Science", second edition, CBS Publisher and Distributor, 1983.
References:
1. Meredith. R and Hearle, J.W.S., "Physical Methods of Investigation of Textiles", Wiley Publication, New York, 1989. 2. Gupta V.B., "Textile Fibres: Developments and Innovations", Vol. 2, "Progress in Textiles: Science & Technology". Edited by V.K. Kothari, IAFL Publications, 2000. 3. Meredith R.., "Mechanical Properties of Textile Fibres", North Holland, Amsterdam 1986. 4. Mishra, S.P., Fibre Science & Technology, New Age International Publishers, 2000. 5. Gupta V.B. and Kothari V.K., "Manufactured Fibre Technology", Chapman and Hall, 1997.

Assessment (Theory course)
CAT, Activity and Learning Task: Socratic seminar, Case study, MCQ, End Semester Examination (ESE)

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**		**Internal Expert(s)**
Mr. Senthilkumar R Regional Product Head-PSF-South India, Reliance Industries Limited,	Dr. N. Gobi Professor Department of Technology AC Tech Campus, Guindy, Anna University, Chennai - 600025		Dr. Sivakumar.P Mrs. R.Sukanyadevi Department of Textile
Recommended by BoS on	07.05.2025		
Academic Council Approval	No 28	**Date**	26.06.2025

24TTI206	YARN MANUFACTURING TECHNOLOGY-II	L	T	P	J	C
		3	0	2	0-	4
PC		SDG	7, 8, 10			

Pre-requisite courses	24TTI202	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	Study the principles of ring spinning and compact spinning of cotton fibres.
2	Analyze the operation of rotor, air jet spinning, and other spinning systems of cotton fibres.
3	Explore the importance and mechanism of winding, doubling, yarn conditioning and packing process.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Analyze the basic principles of ring spinning system.	An
CO 2	Evaluate the principle and mechanism of compact spinning and comparison with other systems including ring spinning.	E
CO 3	Analyse the principle and yarn formation in rotor spinning.	An
CO 4	Discuss the concept & mechanism in other spinning systems like friction, air jet, twist, adhesive, cover processes.	E
CO 5	Justify the processes of winding, doubling including TFO, yarn conditioning and packing.	An
CO 6	Demonstrate and evaluate the various parameters in ring, rotor & other spinning systems and in winding & doubling.	E

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3							2			3		
2		3			2							2	2
3	*2*		1					*2*			2		
4		3					*2*					2	
5				1		*2*	*2*						2
6						1		3		2	2		

Course Content

RING FRAME **Theory** Yarn Classifications and yarn count. Objective of Ring Spinning. Principle and operation of a modern ring frame. Drafting- Creel and feed, Rollers, Cots, Spacers and Condensers- Types of Top roller pressure application-shore hardness- waste suction-impact on yarn quality. Ideal Yarn geometry, spinning triangle. Twisting- principles of ring twisting- types of twist- twisted yarn structure- twist and strength relationship-twist multiplier. Twisting elements- spindle, its structure and type, spindle drive, rings, travellers, separators, ballon control ring Cop building- structure of cop, formation and mechanism. Manual doffing-end breaks- temperature and humidity requirements Auto Doffing- Concept of Link coners-Modern development in ring frames-Long frames-Individual Spindle monitoring for production Drafts, Speeds, Settings and Production Calculation.	**12 Hours**
Practical 1. Evaluation of draft distribution & production calculation in ring frame 2. Demonstrate calculated twist and actual yarn twist of yarn production.	**6 Hours**

COMPACT SPINNING **Theory** Objectives of Compact Spinning. Principle and Introduction - spinning triangle. Working principles of different types of compact spinning systems- Suction, Mechanical, Magnetic-Suessen EliTe- Rieter Comfor Spin-Zinser- RoCos-LMW Spinpact. Structure and yarn properties of compact yarns. Compact spinning and Twisting: EliTwist yarn, Com4 Yarn, Core Spun Yarn, Process Improvements with Compact Yarn, Applications of compact yarn - Techno economics of compact spinning.	**6 Hours**
Practical 1. Analysis of working mechanism and principle of compact spinning system. 2.Justify the structural and few properties enhancement in compact yarn in comparison with ring spun yarn through analysis. 3. Comparison of Elitwist yarn and equivalent double yarns.	**6 Hours**
ROTOR SPINNING **Theory** Rotor Spinning - Operating principle, Advantages and limitations of Rotor Spinning. Raw material requirements. Machine design features- opening roller, rotor diameter, rotor speed, groove design, profile of doffing tube. Yarn characteristics, Comparison of characteristics of yarn from different spinning systems. Fully automatic and semi-automatic.	**12 Hours**
Practical 1. Evaluation of the calculated production capacity & yarn twist in rotor spinning machine. 2. Justify the structural and property differences of produced yarns between rotor spun and ring spun.	**6 Hours**
OTHER SPINNING SYSTEMS **Theory** Friction Spinning – Dref 2 to Dref 3000-Operating principle, Classification, Advantages and limitations of friction spinning. The Platt Saco Lowell Masterspinner. Disc Spinning. Air-jet spinning – double-nozzle airjet spinning, air vortex - operating principle, Raw material requirements-Automation in air jet spinning (Murata and Rieter)-Yarn Structure-Advantages and limitations. Twist Spinning-SIRO Spinning- Yarn properties and applications. Self-twist spinning: Yarn properties and applications- Repco Spinner. Adhesive Process:	**9 Hours**

Bob Tex spinning. Compound Yarn: Covered spun yarn & core spun. Wrap Spinning: Operating Principle and ParafiL System.	
Practical 1. Compare the properties and structural differences of yarn from the following machines air jet spinning and SIRO spinning. 2. Conduct a detailed study of Ring spun and air jet spun Yarns.	**6 Hours**
WINDING, DOUBLING AND PACKING **Theory** Winding-Purpose, manual and auto winders, packages-cone/cheese, effect of winding on yarn quality, and yarn clearers. Rewinding. Doubling: Need for doubling, twisting -S and Z twists, conventional ring doubling processes and machines-up twister and down twister. Working of Two for One Twister. Yarn Conditioning- Need and basic operating principle of operating yarn conditioning machine. Packing: Various types of packing, automatic packing process, packing material, packing cost, storage.	**6 Hours**
Practical 1. Production and twist calculation in ring doubler and calculation of resultant count. 2. Production and twist calculation of fancy doubler and calculation of resultant count of fancy yarn. 3. Production & twist calculation in TFO and its effect on yarn strength.	**6 Hours**

Theory Hours:	**45**	**Tutorial Hours:**	**0**	**Practical Hours:**	**30**	**Project Hours:**	**0**	**Total Hours:**	**75**

Learning Resources

Textbooks:

1. Oxtoby E "Spun Yarn Technology" butter worth's, London, New Edition 2002.
2. Carl A KLawrence, Fundamentals of Spun Yarn Technology, CRC Press, 2023.

References:

1. Klein. W, Manual of Textile Technology, Short Staple Spinning Series, Vol 4-5, The Textile Institute
2. Handbook of Yarn Production: Technology, Science and Economics, Woodhead Publishing, 2003.
3. Textile and Fashion-Materials, Design and Technology, , Woodhead Publishing, 2015.

4. Chattopadhyay R., Technology of Carding, NCUTE, IIT Delhi, 2003.

5. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002

6. Salhotra K. R. &Chattopadhyay R., Book of papers on "Blow room and Carding" ,IIT Delhi 1998.

7. Duraiswamy I, Chellamani P &Pavendhan A., "Cotton Ginning" Textile Progress, The Textile Institute, Manchester, U.K., 1993.

8. Lord P. R., Yarn Production: Science, Technology and Economics", The Textile Institute, Manchester, U.K., 1999.

9. Arkady Cherakassky, Two-dimensional mathematical model of the carding process, Textile research journal P. 169 – 175, March 1994.

Assessment (Theory course)
CAT, Activity and Learning Task:Quiz, Case study, MCQ, End Semester Examination (ESE)

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
Mr. Gopalakrishnan P Chief General Manager-Quality Control Sri Shanmugavel Group of Mills, Thadicombu-624 709 Dindigul	Dr. J. C. Sakthivel Associate Professor Department of Textile Technology PSG College of Technology Peelamedu Coimbatore - 641004	Prof. A. Pavendhan, Associate Dean-Textile Cluster & Dr. Sivakumar. P, Module Coordinator-Spinning Department of Textile Technology, Kumaraguru College of Technology.	
Recommended by BoS on	07.05.2025		
Academic Council Approval	No 28	**Date**	26.06.2025

24TTI207	WEAVING TECHNOLOGY - II	L	T	P	J	C
		3	0	2	0	4
PC		SDG	4, 9, 12, 13			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	To provide foundational knowledge on the classification and working principles of shuttle and shuttleless looms.
2	To enable students to understand the mechanism and salient features of projectile and rapier looms.
3	To impart knowledge on fluid jet weaving machines and analyze their suitability for various fabrics.
4	To provide insights into the operational parameters and engineering considerations for loom shed management.
5	To develop practical skills in analyzing loom components, layout planning, and productivity assessment.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Apply the knowledge of shuttle and shuttleless loom types to illustrate their classification and performance.	Ap
CO 2	Analyze the working cycle and mechanisms of projectile loom to distinguish their functional features.	An
CO 3	Evaluate the rapier loom classifications and mechanisms to recommend suitable applications for fabric types.	E
CO 4	Analyze the air and water jet weaving mechanisms to interpret their efficiency and fabric suitability.	An
CO 5	Evaluate loom shed parameters and layout strategies to assess productivity and cost-effectiveness.	E
CO 6	Demonstrate the selection and analysis of loom components to develop solutions for practical weaving issues.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3				3						3	3	
2		3		3	3						3		3
3		3	3		2						3	3	
4		3		3	3								3
5			3							3	3	3	
6		3		3	3						3		

Course Content

FUNDAMENTALS OF SHUTTLELESS LOOM Limitation of shuttle looms-parameters affecting productivity-Classification of shuttleless looms. Comparison of shuttle and shuttleless looms - warp and weft yarn requirement for shuttleless weaving. Weft accumulators – types- Unconventional selvedge formation. Multiphase weaving machine- Types, warp shed wave and weft shed wave principle. circular weaving machines.	**9 Hours**
Practical Component: 1. Analyze the warp and weft yarn selection for shuttleless loom. 2.. Study of weft accumulator and selvedge formation in shuttleless loom.	**6 Hours**
PROJECTILE LOOM Gripper projectile machines: Working elements and weft insertion cycle in projectile loom. Torsion bar picking mechanism-Weft selection device-Salient features of projectile machine, Loom timing diagram. Matched cam Shedding mechanism- Cam beat-up mechanism.	**9 Hours**
Practical Component: 1. Study of weft insertion system and sequence of operations in a projectile Loom. 2. Study of torsion bar picking mechanism.	**6 Hours**

RAPIER LOOM Rapier Machines: - Classification of rapier weaving machines: Flexible, Rigid rapiers-Principles of tip and loop transfer-Weft insertion cycle-Rapier drives-movement pattern of weft in rapier picking system -Salient features.	**9 Hours**
Practical Component: 1. Study of weft insertion system and sequence of operations in a rapier loom 2. Study of rapier drive- single and double rapier system.	**6 Hours**
FLUID JET LOOMS Jet weaving Machines-Principle of air jet weaving, air nozzles, auxiliary nozzles, profile reed. Air requirements. Suitability of air jet weaving for different fabrics. Principle of water jet weaving – Weft insertion cycle for water jet –Salient features-Water requirements - Suitability of water jet weaving for different fabrics.	**9 Hours**
Practical Component: 1. Study of weft insertion system and sequence of operations in air jet loom. 2. Analyze the quality requirements for fluid jet looms (air / water jet).	**6 Hours**
LOOM SHED MANAGEMENT Fabric engineering-calculation of heald, reed, loom, weft insertion rate and production, Fabric costing. Weaving plant layout, ventilation and humidification, lighting, Material handling, quick style change, loom productivity, fabric inspection system. Loom monitoring and control.	**9 Hours**
Practical Component: 1. Prepare the layout for 200 loom shed. 2. Calculate the fabric cost and productivity of loom shed.	**6 Hours**

Theory Hours: 45	Tutorial Hours: 0	Practical Hours: 30	Project Hours: 0	Total Hours: 75

Learning Resources

Textbooks:

1. Adanur, S. Handbook of Weaving. CRC Press, 2001.
2. Ormerod, A., and Sondhelm, W.S. Weaving Technology and Operations.CRC Press. 1988.
3. Majumdar, A. Principles of Woven Fabric Manufacturing. CRC Press, 2016.

References:

1. Ajgaonkar, D.B. Textile Manufacturing Processes. Woven Fabric Tech Publications, India, 2022.
2. Talukdar, M.K., Sriramulu, P., and Ajgaonkar, D.B. Winding and Warping. Textile Trade Press, India, 2020.
3. Banerjee, P.K. Principles of Fabric Formation. CRC Press, 2015.
4. Booth, J.E. Textile Mathematics (Volume III). Textile Institute.

Assessment (Embedded course)
CAT, Activity and Learning Task(s)*, Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**		**Internal Expert(s)**
Mr. V. Sembian, Vignesh Super Fabrics, 6/320, Peedampalli Road, Pattanam, Coimbatore-641016.	Dr. N. K. Palaniswamy, Associate Professor, Textile Technology, National Institute of Technology (NIT), Jalandhar, Punjab 144008.		Dr. S. Ariharasudhan Assistant Professor III, Department of Textile Technology, Kumaraguru College of Technology, Coimbatore – 641049.
Recommended by BoS on	07.05.2025		
Academic Council Approval	No 28	**Date**	26.06.2025

24TTI208	TEXTILE DESIGN STRUCTURES	L	T	P	J	C
		2	0	2	0	3
PC		SDG	4, 9, 12, 13			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	To introduce the fundamental concepts of woven fabric structures and design principles.
2	To develop the ability to design and analyze elementary to advanced weave patterns.
3	To explore functional, decorative, and sustainable woven fabric structures relevant to the textile industry.
4	To enhance knowledge of modern techniques in color-and-weave, pile, and double cloth fabric design.
5	To integrate practical skills in fabric analysis and weave structure interpretation using contemporary tools

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Understand the concepts of cloth geometry, elementary weaves, and basic drafting methods.	R
CO 2	Analyze towel and cord effect fabrics for structural variation and performance.	An
CO 3	Evaluate colour and weave effects for design aesthetics and structural outcomes	E
CO 4	Integrate knowledge of double for advanced textile innovations.	C
CO 5	Design pile fabrics for specific end-uses.	E
CO 6	Perform systematic fabric analysis and reconstruct design, draft, and peg plan for various structures.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3		3		3						2	2	
2	3	3	3		2						1	2	
3		3	3		3				2			1	
4		2	2	2	2						2		2
5		3	3		3		2					1	1
6		2		3	2								2

Course Content

BASIC WEAVES : Geometry – Cover Factor – Use of Point Paper –Basics details of cloth – Back /Face of the cloth, warp count, weft count, warp crimp, weft crimp, warp cover factor, weft cover factor, Relative cover factor- Calculations-Design-Draft- Peg plan- Types of draft- Straight draft-Pointed draft- Mixed draft- Divided draft- Uses of design-draft and pegplan-Elementary weaves – plain and its derivatives- Design, draft and peg plan for Regular/Irregular -Warp rib- Regular/Irregular weft rib- Regular/Irregular Matt- Ornamentation of plain weave-End uses of plain weave . Definition of Twill- Classification twill- Design, draft and peg plan for Twill derivatives: Pointed twill, Herring bone twill, Broken twill, curved twill, Cork screw Twill, Drill, Denim, transposed twill, Diamond twill- Twill angle and calculation- End uses of twill structures- Satin – Sateen, Difference, Rule forming satin/Sateen, Design, draft and peg plan for regular and irregular sateen/Satin, and Satin stripes and Checks.	**6 Hours**
Practical Component: Analysis with respect to -EPI,PPI, GSM, Warp cover factor, Weft cover factor, Warp count, weft count, warp crimp, weft crimp, Design, draft and peg plan 1. Analysis of plain weave structures. 2. Analysis of twill weave structures. 3. Analysis of satin/sateen weave structures.	**4 Hours**
TOWEL FABRIC AND CORD EFFECTS FABRICS: Basic requirement of towel cloth-Classification of towel cloth structures, Design, draft and peg plan for Ordinary Honey comb- Warp way ordinary honey comb, Weft way ordinary honey comb- Special type of ordinary honey comb- Design with even end and even picks with double diagonal base(example 10 ends and 10 picks), design with end or pick with multiple of 4 and with even pick /even end (Example 6 end and 8 picks or 8 end and 6 picks),Ordinary honey comb designed for having straight draft, and Brighten Honey Comb, Comparison of ordinary honey comb with Brighton honey comb- Huck-a-Back and modification. Mock Leno – Distorted Mock leno – Crepe weaves. Definition	**6 Hours**

of crepe, Methods forming crepe, Chemical treatment method, Design, draft and peg plan for Crepe weave by woven design: On sateen base, Floating weave with plain threads, reversing a Motif, imposing of one weave over the other, End used of crepe weave, Cloth Particulars, Bedford cords: Definition-Classification- Design ,draft, peg plan and cross sectional diagram for -Plain Faced bedford cord with pair of pick principle- Plain faced bedford cord with alternate pick principle- Twill faced bedford card with alternate pick principle- plain faced bedford cord with pair of pick /Alternate pick principle- End use applications of bedford cord- welts and piques-Definition- Classification- Design , cross sectional diagram for ordinary welts and piques- Wadded piques – Loose and fast back welts and piques- End use applications of welts and piques- comparison of bedford cord and welts & piques	
Practical Component: Analysis with respect to -EPI,PPI, GSM, Warp cover factor, Weft cover factor, Warp count, weft count, warp crimp, weft crimp, Design, draft and peg plan 1. Analysis of honey comb weave structures. 2. Analysis of Huck a back-weave structures. 3. Analysis of crepe weave structures. 4. Analysis of Bedford cord weave structures.	**4 Hours**
COLOUR AND WEAVE EFFECTS: Spot figuring – Arrangement of figures – Drop Designs Half drop bases – Sateen system of distribution. Colour theory – Light and Pigment Theory – Modification of colour – Colour Schemes-Application of colours – colour and weave effects-Design of: Hair Lines or Pin Stripe effect, Crows Foot Pattern effect, Dog's Tooth Or Hound's Tooth Pattern , Shepherd's Check Pattern, Birds Eye Effect, Stepped Twill Pattern- Designing of Extra warp and Extra weft figuring with two colours- comparison of extra warp and extra weft figured structures ,Design ,draft and peg plan for Backed fabrics: Reversible Warp and Weft backed cloth, Non-reversible Warp and Weft backed cloth.	**6 Hours**
Practical Component: Analysis with respect to -EPI,PPI, GSM, Warp cover factor, Weft cover factor, Warp count, weft count, warp crimp, weft crimp, Design, draft and peg plan 1. Analysis of extra warp figured weave structures. 2. Analysis of extra weft figured weave structures.	**2 Hours**
DOUBLE CLOTH: Double cloth: Classification – Types of stitches-Design, notation, stitch diagram for - Face to back self-stitched double cloth- Back to face self-stitched – Combined stitch (Face to back-Back to face) stitch) double cloth- centre stitched double cloth- warp centre stitched double cloth- weft centre stitched double cloth, wadded double cloth - Purpose of wadding- Design, notation, stitch diagram for warp wadded double cloth - weft wadded double cloth –Ply Fabrics- End uses of double cloth and ply fabrics.	**6 Hours**
Practical Component: Analysis with respect to -EPI,PPI, GSM, Warp cover factor, Weft cover factor, Warp count, weft count, warp crimp, weft crimp, Design, draft and peg plan 1. Analysis of double cloth structures	**2 Hours**

PILE FABRICS: Pile fabrics – Factors governing pile height and pile density-Classification of weft pile structures-Design, Uncut and cut cross section for - Plain back velveteen - Twill back velveteen- Weft plush/ Lashed pile- corduroy- Classification of corduroy- Design, Uncut and cut cross section for V shape, W shape, Combined W and V shape corduroy- calculation of tuft per unit area-End uses of corduroy- Post operations of velveteen fabric- Warp pile, Fast wire pile – Design, draft and peg plan for Terry weaves – Terry stripe and checks. Comparison of warp and weft pile- Applications of warp and weft pile fabric	**6 Hours**
Practical Component: Analysis with respect to -EPI,PPI, GSM, Warp cover factor, Weft cover factor, Warp count, weft count, warp crimp, weft crimp, Design, draft and peg plan 1. Analysis of Velvet velveteen structures 2. Analysis of velveteen structures	**3 Hours**

Theory Hours: 30	Tutorial Hours: 0	Practical Hours: 15	Project Hours: 0	Total Hours: 45

Learning Resources

Textbooks:

1. Grosicki Z.J., "Watson's Textile Design and Colour"-Volume 1 – Butterworths London, 1988.
2. Grosicki Z J, "Advanced Textile Design and Color" Volume 2– Butterworths London, 2004.

References:

1. Goerner D, "Woven Structure and Design", Part – I – WIRA, 1986
2. Jacquire Wilson, " Hand Book of Textile Design, Woodhead Publishing Ltd, 2001.
3. Robert Beameront, "Colour in Woven Design" Whittaker & Co, 1972.
4. B.K.Behra and P.K.Hari, "Woven Textile Structure (Theory and Application), Woodhead Publishing Limited, 2010.
5. J Herbert Cooke, "Velvet and Corduroy", Sir issac pitman & Sons Ltd, London

Assessment (Embedded course)

CAT, Activity and Learning Task(s)*, Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Mr. V. Sembian, Vignesh Super Fabrics, 6/320, Peedampalli Road, Pattanam, Coimbatore-641016.	Dr. P. Ganesan Assistant Professor, Textile Technology, PSG College of Technology, Peelamedu, Coimbatore-641049	Dr. S. Sundaresan Associate Professor Department of Textile Technology, Kumaraguru College of Technology, Coimbatore – 641049.

Recommended by BoS on	07.05.2025		
Academic Council Approval	No 28	**Date**	26.06.2025

24TTI209	KNITTING TECHNOLOGY	L	T	P	J	C
		3	0	2	0	4
PC		SDG	4, 9, 12, 13			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	To understand the basic concepts and comparisons of weft and warp knitting with woven fabrics.
2	To study the mechanisms and operations of various weft and warp knitting machines.
3	To analyze weft and warp knitted structures, including technical and symbolic representations.
4	To examine dimensional and production parameters of knitted fabrics.
5	To introduce sustainable and emerging knitting technologies for technical textiles and apparel.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Compare knitting with woven fabrics and differentiate between warp and weft knitting	U
CO 2	Explain and demonstrate the working of weft knitting machines and their components	An
CO 3	Identify and represent basic and derivative weft knitted structures and analyze their behavior	Ap
CO 4	Explain the fundamentals of warp knitting and compare different warp knitting machines	U
CO 5	Analyze and represent warp knitted structures using chain link notation and their applications	An
CO 6	Operate circular and socks knitting machines to produce and analyze knitted samples	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	2	2									2	2	2
2	2		1		2						2	2	2
3	2	2	2	2							2	2	2
4	2	2									2	2	2
5	2			2	2						2	2	
6					2			2			2	2	

Course Content

INTRODUCTION Concept of knitting – Weft knitting, warp knitting - Comparison between woven and knitted fabric. Comparison of warp and weft knitting -Knitting needles: spring beard, latch, compound needles, Knitting cycle of latch, spring bearded and compound needle Classification of knitting machines. General definitions and elements of knitted loop structure- Yarn quality requirements for weft knitting.	**9 Hours**
Practical Component: 1. Analyze 2 woven and 2 knitted fabric samples; record observations (stretch, structure, hand feel) 2. Collection of knitted samples, visualization, analysis and their commercial names.	**6 Hours**
WEFT KNITTING Knitting Elements: Cylinder, knitting cam, sinker, feeder, stop motions. Working of plain, rib and interlock knitting machine. Pattern wheel, punched steel tape jacquard - Electronic Jacquard knitting machines- Fundamentals of formation of knit, tuck and float stitches- Basic principles and elements of flat knitting machines- Different types of flat knitting machines; mechanical and computerized knitting machines.	**9 Hours**
Practical Component: 1. Operate Circular Knitting Machine to Produce Single Jersey Fabric. 2. Knit basic Socks Sample and Record Process Parameters	**6 Hours**

WEFT KNITTED STRUCTURES Weft knit structures-Technical terms and symbolic representation of weft knit structures Characteristics of plain, rib, Interlock, purl knit structures- Derivatives of weft knit structures: lacoste, accordion and check effect -Faults in knitted fabrics and their causes and remedies - dimensional parameters such as stitch length, WPI, CPI, stitch density, GSM- Effect of Stitch Lengths and Yarn Counts on GSM, WPI and CPI- Selection of suitable machine gauge by considering GSM, shrinkage, and spirality of knit fabric- Tightness factor-spirality-Production calculations of weft knitting.	**9 Hours**
Practical Component: 1. Analyze Physical Characteristics of the given Weft Knit Structures 2. Analyze Fabric Faults in Circular Knitted Fabric and Recommend Remedies 3. Calculate Production per Shift of Circular Knitting Machine.	**8 Hours**
WARP KNITTING Warp knitting machines: needle bar, sinker bar, guide bar –pattern wheel –chain link- Warp knitting fundamentals- Knitting cycle for warp knitting- closed lap and open lap stitches – Raschel, compound needle and Tricot knitting machines- Comparison of raschel and tricot knitting machines. Materials for warp knitting-direct warping and indirect warping for warp knitting. Rack, run-in, quality, production calculations of warp knitting.	**9 Hours**
Practical Component: 1. Analyze Physical Characteristics of the given single bar warp Knit Structures 2. Analyze Physical Characteristics of the given double bar warp Knit Structures	**6 Hours**
WARP KNITTED STRUCTURES Representation of warp knit structures – chain link notation – basic warp knitted structures single for fabrics; Chain or pillar stitch and atlas lap - Two bar structures; Full tricot-Lock knit-Reverse lock knit-Satin. Application of weft and warp knit fabric in Technical Textiles. Introduction to seamless knitting, principles and machine working, garment shaping techniques, applications, advantages and limitations, sustainability benefits	**9 Hours**
Practical Component: 1. Comparison of given Two-Bar Warp Knit Structures Based on Chain Link Notation	**4 Hours**

Theory Hours:	**45**	**Tutorial Hours:**	**0**	**Practical Hours:**	**30**	**Project Hours:**	**0**	**Total Hours:**	**75**

Learning Resources

Textbooks:

1. David J. Spencer, *"Knitting Technology"*, Woodhead Publishing, 4th Edition, 2001.
2. Sadhan Chandra Ray, *"Fundamentals and Advances in Knitting Technology"*, CRC Press, 2012.
3. Dr. S. Raz, *"Warp Knitting Production"*, Melliand Textilberichte (via Karl Mayer), 1987.
4. Dr. N. Anbumani, *"Knitting Fundamentals, Machines, Structures and Developments"*, New Age International, 2006.

References:

1. **Ajgaonkar D. B.,** *"Knitting Technology"*, Universal Publishing Corporation, 1998.
2. **K. F. Au,** *"Advances in Knitting Technology"*, CRC Press, 2011.

Assessment (Embedded course)
CAT, Activity and Learning Task(s)*, Mini project, MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
Mr. Manikandan, Shahi Exports Private Limited, Sarjapur - Marathahalli Rd, Bellandur, Bengaluru, Karnataka 560103	Dr. N. K. Palaniswamy, Associate Professor, Textile Technology, National Institute of Technology (NIT), Jalandhar, Punjab 144008.	Dr. S.Natarajan Assistant Professor III, Department of Textile Technology, Kumaraguru College of Technology, Coimbatore – 641049.	
Recommended by BoS on	07.05.2025		
Academic Council Approval	No 28	**Date**	26.06.2025

24INM202	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY (Common to All Branches)	L	T	P	J	C
		1	0	2	0	2
HS		SDG	6, 13, 15			

Pre-requisite courses	-	Data Book / Code book (If any)	-

Course Objectives:

The purpose of taking this course is to:

1	To introduce the importance, types, and conservation strategies of natural resources, with a focus on sustainable practices in water and food management.
2	To understand the structure and function of ecosystems and biodiversity, and explore the need for conservation through the study of hotspots and global environmental concerns.
3	To examine the causes and effects of environmental degradation, including pollution and waste management, and to promote mitigation strategies for sustainable development.
4	To provide knowledge of the legal and institutional frameworks for environmental protection in India and globally, including critical environmental acts and enforcement challenges.
5	To explore conventional and alternative energy resources, and to assess methods for energy conservation and carbon footprint reduction through audits and sustainability measures.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	Apply the concept of natural resource conservation to demonstrate sustainable practices	Ap
CO2	Analyse the structure, function, and adaptive capacity of ecosystems to categorize threats and conservation strategies for biodiversity.	An
CO3	Analyse various forms of environmental degradation and propose management and preventive solutions.	An
CO4	Apply national environmental laws and frameworks in the personal and professional contexts	Ap
CO5	Design strategies using renewable energy principles to develop sustainable energy utilization plans through audits and footprint analysis to transfer a healthy environment for future generations.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	2	–	–	–	–	2	3	–	1	–	–	2	–
2	2	2	–	–	–	2	3	1	–	–	–	2	2
3	2	3	–	2	–	3	3	1	–	–	–	2	3
4	–	2	–	–	–	3	3	3	1	2	2	–	2
5	2	2	3	2	2	3	3	–	1	2	2	2	2

Course Content

NATURAL RESOURCES **Introduction to Natural resources :** Types, significance, and conservation strategies **Water resources:** Utilization, management practices, and conservation strategies - rainwater harvesting methods.– Water distribution system audit **Food resources:** Challenges of food security in India - impact of modern agriculture, and environmental concerns related to fertilizers and pesticides. **Practical Component:** • Parameter Testing : Water / Effluent / Soil/Fertiliser • Simulation Experiments • Online Course	**3 Hours** **10 Hours**
ECOSYSTEM AND BIODIVERSITY **Ecosystem:** Structure and function of an ecosystem - ecosystem resilience and adaptive capacity **Biodiversity:** Values of biodiversity - Hot Spot of biodiversity (in the Himalayas, the Western Ghats, the Indo-Burma region, and the Gulf of Mannar) - Threats to biodiversity. **Conservation Strategies:** Emerging Issues in Biodiversity Conservation - Citizen science - In-situ and Ex-situ conservation of biodiversity. **Practical Component:** • Documentation of biodiversity in the campus	**3 Hours** **6 Hours**
ENVIRONMENTAL DEGRADATION AND MANAGEMENT **Pollution**: Causes, effects and control measures of Air pollution, Water pollution - Role of an individual in prevention of pollution **Waste management**: Circular Economy vs. Linear Economy - Disposal of solid wastes - Treatment of Liquid wastes **Disaster Management**: Mitigation strategies and Readiness **Practical Component:**	**3 Hours**

• Waste Management and Resource recovery in Campus • Documentation of Environmental Data Resources and Monitoring Tools.	**6 Hours**
LEGAL FRAMEWORK FOR ENVIRONMENTAL PROTECTION IN INDIA **Global and National Initiatives**: United Nations Sustainable Development Goals - Coastal Regulation Zone - Environmental impact assessment **Environmental Legislation in India**: Key Legal and Regulatory Terminology in India – Valuation of Ecosystem Services and integration of Acts in the workplace - Plastic Waste Management Rules - E-Waste Management Rules - Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act **Implementation Challenges**: Issues involved in enforcement of environmental legislation **Practical Component:** • Online Course	**3 Hours** **2 Hours**
ENERGY MANAGEMENT **Energy Resources:** Energy Demand and Urban energy Challenges - Necessity of alternate energy methods - Renewable and Non- renewable energy resources - Carbon footprint and carbon credit – Sustainable energy utilization – Case study **Energy Audits** – Purpose, methodology, and common instruments used **Practical Component**: • Documentation of Energy usage through Carbon foot print calculation - Personal aswell as Institutional	**3 Hours** **6 Hours**

Theory Hours:	**15**	**Tutorial Hours:**	**0**	**Practical Hours:**	**30**	**Project Hours:**	**0**	**Total Hours:**	**45**

Learning Resources

References:

1. Bharucha, E. (2021). Textbook of environmental studies for undergraduate courses (3rd ed.). Orient BlackSwan / Universities Press - Hyderabad, India.
2. Miller, G. T., & Spoolman, S. E. (2014). Environmental science (14th ed.). Cengage India
3. Anubha Kaushik & C.P. Kaushik (2024). Perspectives in Environmental Studies (8th ed.). New Age International Publishers, New Delhi.
4. Masters, G. M., & Ela, W. P. (2013). Introduction to environmental engineering and science (3rd ed.). Pearson Education, New Delhi.
5. Leelakrishnan, P. (2018). Environmental law in India (3rd ed.). LexisNexis Butterworths, New Delhi.
6. Botkin, D. B., & Keller, E. A. (2014). Environmental science: Earth as a living planet (9th ed.). Wiley, Hoboken, NJ.
7. Armstrong, J. (2023). The future of energy: The 2023 guide to the energy transition. Independently published.
8. Easton, T. (Ed.). (2017). Taking sides: Clashing views on environmental issues (17th ed.). McGraw-Hill Education, New York, NY.
9. Ishwaran, N. (2022). Ecosystem services and economic valuation. New Delhi: TERI Press.

Online Resources (Weblinks)
https://www.youtube.com/watch?v=j4Z6WmTnhRQ How to Conduct a Water Audit in Institutions • https://www.youtube.com/watch?v=_OKYio2Yk9U India's Food Security Challenge • https://www.youtube.com/watch?v=IjNT9Z2OLf4 India's Biodiversity Hotspots • https://www.youtube.com/watch?v=_c_sJIEJY4M What is Citizen Science? • https://www.youtube.com/watch?v=1HZR3GyzFZc What is a Circular Economy • https://www.youtube.com/watch?v=6_tLYyR_3Vo Environmental Law and Acts in India • https://www.youtube.com/watch?v=kGcrYkHwE80 Introduction to SDGs • https://www.youtube.com/watch?v=V___eNSHdChA Conducting an Energy Audit • https://www.youtube.com/watch?v=dUqTt5Qrxn8 - What is Your Carbon Footprint?

Assessment (Embedded course)
CAT, Activity and Learning Task(s), MCQ, End Semester Examination (ESE) Lab Workbook, Report Submission

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**	**Internal Expert(s)**	
Dr. Muthuraja Perumal General Manager - Research & Development Rohith Industries, APIIC Industrial Park, Andhra Pradesh	Dr. Mathivanan Packiarajan University of Michigan Ann Arbor, MI USA Dr. Venkatakrishnan Professor, School of Chemical Sciences Indian Institute of Technology (Mandi) Himachal Pradesh India	Faculty Of Chemistry Department of Chemistry	
Recommended by BoS on	07.05.2025		
Academic Council Approval	No. 28	**Date**	26.06.2025

24HSP006	MASTERING GROUP DISCUSSION AND PRESENTATION SKILLS	L	T	P	J	C
		0	0	2	0	1
Practical		SDG	4 & 8			

Pre-requisite courses	Nil	Data Book / Codes / Standards (If any)	

Course Objectives:	The purpose of taking this course is to:
1	To equip learners with techniques for organizing and presenting ideas effectively, ensuring logical flow and engaging delivery through appropriate visual and verbal strategies.
2	To enhance students' ability to evaluate diverse viewpoints and articulate reasoned arguments, fostering meaningful participation in collaborative discussions.
3	To strengthen students' ability to adapt their speaking style and content to different audiences and contexts, utilizing digital tools for enhanced presentation effectiveness.

Course Outcomes:	After successful completion of this course, the students shall be able to	Bloom's Taxonomy Level (BTL)
CO 1	Create and deliver structured presentations with a clear introduction, body, and conclusion, utilizing effective visual tools and appropriate pacing to enhance clarity and impact.	C
CO 2	Analyse issues from multiple perspectives, articulate ideas effectively within group discussions	An
CO 3	Deliver confident presentations and speeches in professional and social settings, leveraging digital tools and technologies to enhance quality and effectiveness.	Ap

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1		2			1	2		3	3		3		
2		2			1	2		3	3		3		
3		2			1	2		3	3		3		

Course Content

MODULE 1 **Introduction to Group** Discussions - Key skills for effective participation - Phases in a GD - Conversational Phrases in GD. **Group Dynamics** - Understanding group roles and dynamics - Conflict resolution and management in groups - Techniques for fostering collaboration.	**6 Hours**

Presentations - Introduction to Visual Aids and Technology in Presentations. **Delivery Techniques** - Voice modulation and speech clarity - Body language and gestures – audience analysis. **Handling Q&A Sessions** - Preparing for audience questions - Techniques for handling difficult questions - Mock Presentation with Q&A sessions.	
MODULE 2 **Factual Group Discussions**: Focus on sharing and verifying accurate information on a given topic. Participants base their contributions on verifiable data and concrete evidence. **Opinion-based / Argumentative Group Discussion**: Encourages participants to express and defend their point of view on a topic. Evaluate different perspectives and build critical thinking skills.	**6 Hours**
MODULE 3 **Case Study Group Discussion**: Involves analyzing the complexities, identifying key issues, and developing insights or solutions based on the group's collective knowledge. **Abstract Discussion**: Deals with intangible concepts, ideas, or themes without concrete reference points. Encourages creative thinking and theoretical exploration.	**6 Hours**
MODULE 4 **Impromptu Presentations**: Participants speak on a given topic with little to no preparation. Helps develop quick thinking and effective communication skills. **Informative Presentation**: Aims to educate the audience on a specific topic by providing clear, factual information. The focus is on clarity, accuracy, and comprehensiveness. **Demonstrative Presentation**: Interactive sessions where participants engage in hands-on activities to learn practical skills. Often includes exercises, demonstrations, and collaborative tasks.	**6 Hours**
MODULE 5 **Training and Technical Presentation**: Designed to teach specific technical skills or procedures. Includes detailed instructions, demonstrations, and may involve technical jargon. **Academic Presentation**: Involves presenting research findings or theoretical concepts in an academic setting. Emphasizes clarity, evidence-based arguments, and adherence to scholarly standards. **Pitch Presentation:** A concise, persuasive presentation aimed at securing support, investment, or approval. Focuses on the value proposition, potential benefits, and unique selling points. **Persuasive Presentation**: Seeks to convince the audience to adopt a particular viewpoint or take a specific action. Utilizes logical arguments, emotional appeals, and credible evidence. **Multimedia Presentations**: Uses visual and auditory media to convey information and present arguments. Enhances engagement and aids in illustrating complex concepts.	**6 Hours**

Theory Hours:	**-**	**Tutorial Hours:**	**-**	**Practical Hours:**	**2**	**Project Hours:**	**-**	**Total Hours:**	**30**

Learning Resources*
Reference books/ Web Links
1. Powell, M. (2010). Dynamic presentations student's book with audio CDs (2). Cambridge University Press. 2. Reynolds, G. (2011). Presentation Zen: Simple ideas on presentation design and delivery. New Riders. 3. Galanes, G. J., Adams, K., & Brilhart, J. K. (2020). Effective group discussion: Theory and practice (15th ed.). McGraw-Hill Education. 4. Adams, K., & Galanes, G. (2018). Communicating in groups: Applications and skills, a practical guide (18th ed.). McGraw-Hill Education. 5. Ivy, D. K., & Backlund, P. (2018). Speak with confidence: A practical guide. Pearson. 6. Reynolds, G. (2019). Presentation Zen: Simple ideas on presentation design and delivery. New Riders.
Online Resources
1. https://www.coursera.org/learn/verbal-communications-and-presentation-skills 2. https://www.coursera.org/learn/present-with-purpose 3. https://www.coursera.org/learn/teamwork-skills-effective-communication

Assessment	
Formative	Summative
-----	1. Participation in group discussions (40%) 2. Individual presentations (40%) 3. Quizzes and written assignments (20%)

Course Curated By		
Expert(s) from Industry	**Expert(s) from Higher Education Institutions**	**Internal Expert(s)**
Mr. Bhuvana Sundar Soorappaiah Program Manager Bosch, Coimbatore	Dr Kishore Selva Babu Head and Associate Professor Department of English and Cultural Studies Christ University Bangalore-560029	Dr. J Srikala- AP III Dr. C Tissaa Tony - AP III Dr. S G Mohanraj – AP III Dr. S Sreejan – AP III Dr. R Hema – AP II Dr. A S Mythili - AP II

Reccomended by BoS on	25.04.2025		
Academic Council Approved	**No 28**	**Date**	**26.06.2025**

24INP202	Innovation Practicum - 4	L	T	P	J	C
		0	0	2	0	1
ES		SDG	4, 9			

Pre-requisite courses	24INP201	Data Book / Code book (If any)	-

Course Objectives:	
The purpose of taking this course is to:	
1	Learn and apply the Forge Innovation Handbook (FIH) to problem-solving.
2	Develop a minimum usable prototype (MUP) through iterative design, development, and testing.
3	Effectively demonstrate the developed MUP.

Course Outcomes		
After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	Apply the FIH to identify and solve problems.	Ap
CO2	Create, design, build, and demonstrate a MUP.	C
CO3	Communicate and present project outcomes effectively.	E

Course Outcomes (CO)	Program Outcomes (PO) (Strong-3, Medium – 2, Weak-1)											Program Specific Outcomes (PSO)	
	1	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	2	2	2	2								
2			3	2			2		2			2	
3									2	3	2		2

Course Content	
Innovation fundamentals **Master Class #1:** Explore the core concepts of product design and development. **ster Class #2:** Introduction to the Forge Innovation Handbook (FIH) and its applications. **rkshop #1:** Utilize the FIH Canvas to identify challenges, validate problems, understand user needs, and define pain points, gains, and value propositions.	**3 Hours**
Advanced prototyping techniques **Master Class #3:** Rapid Prototyping Techniques - 1. **Master Class #4:** Rapid Prototyping Techniques - 2. **k Time #1:** Engage in hands-on experimentation to test core assumptions, refine the Proof of Concept (PoC). Incorporate rapid prototyping techniques and iterate on the design to enhance functionality.	**6 Hours**
llectual property and Proof of concept **Master Class #5:** Gain insights into intellectual property (IP) and prior art search. **k Time #2:** Develop and refine a working prototype. Build a Minimum Usable Prototype (MUP) based on feedback and iteration.	**6 Hours**
Build Minimum Usable Prototype (MUP) **k Time #3:** Enhance the prototype through iterative improvements. Utilise feedback from mentoring sessions to make targeted adjustments and refinements, optimising the prototype's functionality and design based on practical insights. **k Time #4:** Develop the Minimum Usable Prototype (MUP). Build the final version of the	**7 Hours**

MUP incorporating all iterative refinements. Ensure that it meets the defined criteria and is ready for comprehensive testing and presentation.	
Perfect pitch and Product showcase **k Time #5:** Conduct a final demonstration and technical testing of the prototype. Create a compelling pitch to articulate the value proposition and potential impact of the innovation, aimed at securing support or funding. **Pitch Presentation and MUP Demonstration:** Students showcase their completed prototype through a comprehensive demonstration, highlighting its key features and functionalities to Industry experts, incubators and investors. They deliver a compelling pitch that clearly communicates the innovation's impact, market potential, and benefits. This presentation aims to effectively convey the value of the prototype, engage potential stakeholders, and secure support or funding opportunities	**8 Hours**

Theory Hours:	**0**	**Tutorial Hours:**	**0**	**Practical Hours:**	**30**	**Project Hours:**	**0**	**Total Hours:**	**30**

Learning Resources

References:

Text Books

1. Rapid Prototyping And Engineering Applications: A Toolbox For Prototype Development - Frank W.Liou, 2007
2. Rapid Prototyping Technology: Selection And Application - COOPER K. G, 2001

References

1. Jazz Factory - All about Presentations and http://blog.jazzfactory.in/
2. Pretotyping Methodology - https://www.pretotyping.org/methodology.html
3. How to give a killer presentation - https://hbr.org/2013/06/how-to-give-a-killer-presentation
4. Evaluating Product Innovations — proof, potential, & progress:https://blog.forgeforward.in/evaluating-product-innovations-e8178e58b86e

Assessment (Practical course)

Lab Workbook, Experimental Cycle tests, viva-voce

Course Curated by			
Expert(s) from Industry	**Expert(s) from Higher Education Institution**		**Internal Expert(s)**
Dr. Mahesh Veezhinathan Director Forge. Academy	-		Dr. Samuel Ratna Kumar P S Assistant Professor – III Department Mechanical Engineering
Recommended by BoS on	07/05/2025		
Academic Council Approval	No: 28	**Date**	26/06/2025