KUMARAGURU COLLEGE OF TECHNOLOGY,

An autonomous Institution affiliated to Anna University, Chennai

COIMBATORE – 641 049.

B. Tech TEXTILE TECHNOLOGY

REGULATION 2024

I and II 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:

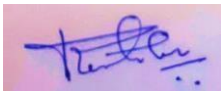
- PEO: 1 Hold leadership responsibilities in Textile and related segments such as product development, production, technical services, quality assurance and marketing.
- PEO: 2 Become successful entrepreneur in Textile and related field and contributing to societal, technological and industry development.
- 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.



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PROGRAM OUTCOMES (POs) (as per New NBA document)

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

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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)


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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

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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**

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SEMESTER I


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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 மொழி மற்றும் இலக்கியத்தின் அடிப்படை அம்சங்களை அறிமுகப்படுத்துதல், அதன் தொன்மைக்காலம் முதல் நவீனகாலம் வரையிலான வளர்ச்சியை விளக்கம் செய்யுதல். Introduce students to the foundational aspects of Tamil language and literature, tracing its evolution from ancient to modern times.
2	தமிழகத்தின் செழுமையான கலாச்சார பாரம்பரியத்தை அறிமுகப்படுத்துதல், பாறை ஓவியக் கலையிலிருந்து நவீன சிற்ப கலையின்படி அதன் கலை வெளிப்பாடுகளை ஆராய்தல். Familiarize students with the rich cultural heritage of Tamil Nadu, exploring its artistic expressions from rock art paintings to contemporary sculptures.
3	தமிழகத்தின் நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகளை அறிதல்- தினணக்கோட்பாடுகளை ஆராய்தல்- இந்திய தேசிய இயக்கத்தில் தமிழர்களின் பங்கினை அறிதல். To know the folk arts and heroic ames of Tamilnadu-explore the concept of thinai -to know the role of Tamils in Indian National movement.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	தமிழ் மொழி மற்றும் இலக்கியத்தின் அடிப்படை அறிவை மேம்படுத்துதல். மொழி பண்பாட்டில் எவ்வாறு இணைந்துள்ளது என்பதை உணர்தல். Enhance the fundamental knowledge of Tamil language and literature	U
CO2	பழங்கால பாறை ஓவியங்கள், சிற்பம் என கலைகள் நவீன காலம்வரை எவ்வாறு பயணிக்கிறது என்பதை புரிந்துகொள்ளுதல். Understand the heritage, rock art paintings to modern art sculpture	U
CO3	நாட்டுப்புறக் கலைகள் தற்காப்புக் கலைகளாகவும், உடல் ஆரோக்கியத்தை மேம்படுத்தும் விதமாகவும் அமைவதை அறிந்து கலைகள் மீதான ஆர்வத்தை அதிகரிக்கச் செய்தல்- தமிழர்களின் அகத்திணை, புறத்திணை கோட்பாட்டினை புரிந்து கொள்ளுதல். இந்திய பண்பாட்டில் தமிழர்களின் பங்களிப்பை அறிதல். Acquire essential knowledge in the folk and martial arts-understanding the Agam and puram concept- to know the contribution of Tamils in Indian culture.	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	

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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	PSO-3
1							3	2	2		2			
2							3	3	2		2			
3							3	2	2		2			

Course Content

மொழி மற்றும் இலக்கியம் இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமய சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தொடக்கம் -பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு. **LANGUAGE AND LITERATURE** Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.	**3 Hours**
மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக்கலை நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புற தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு. **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, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.	**3 Hours**
நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்	**3 Hours**

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தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள். **FOLK AND MARTIAL ARTS** Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Ciabatta, Valari, Tiger dance - Sports and Games of Tami	
தமிழர்களின் திணைக்கோட்பாடுகள் தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பொடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் தமிழர்களின் வெற்றி. **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 - Overseas Conquest of Cholas.	**3 Hours**
இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு. **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 வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித்தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

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8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization 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

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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

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ELECTRIC POWER SYSTEM 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.	**9 Hours**
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)

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

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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	

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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	PSO-3
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**	**9 Hours**

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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.	**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

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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


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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	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	PSO-3

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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	


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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 • Estimation of DO by Winkler's method • Estimation of Alkalinity by Indicator method • Estimation of Chloride by Argentometric method	**9 Hours** **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/

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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

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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	PSO-3
1	2	2			2									
2		2		2						2				
3		2	2				2							
4	2		2		2									

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

Learning Resources

Textbooks:

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

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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):
11. https://www.khanacademy.org/math/differential-calculus 12. https://nptel.ac.in/courses/106105171 13. 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


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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	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	PSO-3
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	**6 Hours**

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Transdisciplinary systems to accelerate innovation - Manu'Futuring: Technology in hardware manufacturing and manufacturing of hardware technologies - Future scopes with product case studies.	
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

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Signature of BOS chairman, TXT

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

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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	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	PSO-3
1	2						2							
2	2		2											
3					2					2				

Course Content

Introduction to Artificial Intelligence (AI)
Practical Component

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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) - 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.	**8 Hours**
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

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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

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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 work	9 Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2	PSO-3
1						2		1						
2						2								
3						1					3			
4						2					3			

Course Content

INTRODUCTION TO HOLISTIC WELLNESS: • Overview of holistic wellness: physical, mental, emotional, and internal health.	**4 Hour**

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• The importance of balance in overall well-being. • 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:

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

References:

7. B.K.S Iyengar., Yoga: The Path to Holistic Health., Dorling Kindersley Limited, City of Publication (2001)
8. Goleman Daniel., Emotional Intelligence., Bloomsbury India, India, (2021).
9. James Allen., As a Man Thinketh., Maple Press, Noida, (2010)
10. Swami Budhanandha., Will power and its development., Advaita Ashrama Mayavati, Pithoragarh, Himalayas from its Publication Department, Calcutta. (2001)

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11. 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

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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	PSO-3
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**

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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

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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

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SEMESTER II


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24HST102	தமிழரும் தொழில்நுட்பமும்/ 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	தமிழர்களின் நெசவு மற்றும் பானைத் தொழில்நுட்பத்தை அறிமுகப்படுத்துதல், சங்க கால கட்டிட தொழில்நுட்பத்தை விளக்குதல், கோயில்கள் மற்றும் சிற்பக்கலைகளை ஆராய்தல். introducing weaving and pottery technology of Tamils -Explaining the building technology of the Sangam Period-Explore temples and sculptures.
2	கப்பல், இரும்பு, நாணயங்கள், மணி உருவாக்கும் தொழிற்சாலைகள், ஆகியவற்றை விளக்கம் செய்தல், தமிழகத்தின் தொல்லியல் சான்றுகளின் பழமையை உணர்த்துதல். explain Ship, Iron, Coins, Beads Making Factories. Realizing the Antiquity of Archaeological Evidence of Tamil Nadu
3	வேளாண்மை மற்றும் அறிவியல் தமிழைப் பற்றி அறிதல், இணையத்தில் தமிழின் தேவையை உணர்த்துதல்,தமிழ் மென்பொருள்களை அறிமுகம் செய்தல். knowledge of Agricultural and Scientific Tamil, Realizing the need for Tamil on the Internet, Introducing Tamil software.

Course Outcomes:

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	தமிழர்களின் நெசவு மற்றும் பானைத் தொழில்நுட்பத்தின் முக்கியத்துவத்தினை அறிந்து கொள்ளுதல். சங்ககால தமிழர் வளர்த்த அழகுக் கலைகளைத் தெரிந்து கொள்ளுதல். know the importance of weaving and pottery technology of Tamils-To know the Aesthetics arts developed by Sangam Tamils	U
CO 2	கப்பல் கட்டும் கலை, இரும்புத் தொழிற்சாலை, நாணயங்கள் அச்சடித்தல்,மணி உருவாக்கும் தொழிற்சாலைகள், சிலப்பதிகாரத்தில் உள்ள மணிகளின் வகையை அறிதல். knowledge of ship building, ironworks, coinage, minting, and beads making factories,Knowing the types of beads in Silapathikaram.	U
CO 3	வேளாண்மை மற்றும் நீர்ப்பாசன தொழில்நுட்பத்தை அறிந்து கொள்ளல். அறிவியல் தமிழ் மற்றும் கணினித் தமிழைப் புரிந்து கொள்ளுதல். know agriculture and irrigation technology. Understanding Scientific Tamil and Computer Tamil.	Ap

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	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	PSO-3
1	2		2				3	2	2		2			
2	2		2				3	2	2		2			
3	2		2				3	2	2		2			

Course Content

நெசவு மற்றும் பானைத் தொழில்நுட்பம்: சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள். Weaving Industry during Sangam Age - Ceramic technology - Black and Red Ware Potteries (BRW)-Graffiti on Potteries.	**3 Hours**
வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் ரூ சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் -சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை. 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 British Period.	**3 Hours**
உற்பத்தித் தொழில் நுட்பம்: கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள்- நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் -தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.	

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Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel-Copper and gold- Coins as source of history - Minting of Coins - Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidence - Gem stone types described in Silappathikaram.	**3 Hours**
வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம்- கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள்- வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம். 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 மற்றும் கணித்தமிழ்: அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள்- சொற்குவைத் திட்டம். 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 வரலாறு மக்களும் பண்பாடும் கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு).
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL- (in print)
6. Social Life of the Tamils the Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the 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)

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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
14. https://www.youtube.com/watch?v=Gp1ratX2sOE&list=PLtyn2o7hocf40PtPibRqJTf_dQL3eOtLl 15. https://www.youtube.com/watch?v=jteRvnNiD6w

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

V.Ramesh Babu
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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	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	PSO-3
1							2	2	3		3			
2							2	2	3		3			
3							2	2	3		3			

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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)

V.Ramesh Babu
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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

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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	PSO-3
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)	**6 Hours**

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- reading and responding to email communication – Networking Emails - Analyzing and interpreting technical texts (Loud Reading).	
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)

V.Ramesh Babu
Signature of BOS chairman, TXT

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. Hema Department of English
Recommended by BoS on	16.08.2024		
Academic Council Approval	No: 27	**Date**	24.08.2024

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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	PSO-3
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			

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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	

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Academic Council Approval	No:27	Date	24.08.2024

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24MET106	BASICS OF MECHANICAL ENGINEERING (Common to TT and FT)	L	T	P	J	C
		3	0	0	0	3
BS		SDG	8, 9			

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 & 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

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

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	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	PSO-3
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	**9 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.	**9 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	**9 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	**9 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.	**9 Hours**

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

Learning Resources

Textbooks:

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7. Venugopal. K. and Prabu Raja, “Basic Mechanical Engineering”, Anuradha Publications, Chennai, 2011.
8. A Textbook of Engineering Thermodynamics. PK Nag. Tata McGraw-Hill Education, 2017.

References:

12. 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.
13. Rattan S.S, “Theory of machines”, Tata MC Graw-Hill publishing company Ltd., New Delhi, 2019.
14. Shigley J.E and Uicker J.J. “Theory of machines and mechanisms”, McGraw- Hill, Inc. 2017.
15. Shanmugam G, Palanichamy M S, “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Company, New Delhi, 2nd Edition, 2018.
16. Pravin Kumar - Basic Mechanical Engineering -Pearson Education 2017.

Online Resources (Weblinks)

16. https://archive.nptel.ac.in/courses/112/107/112107144/
17. https://onlinecourses.nptel.ac.in/noc22_me28/preview
18. 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

V.Ramesh Babu
Signature of BOS chairman, TXT

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 work	9 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

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Signature of BOS chairman, TXT

UNDERSTANDING EVERYDAY TEXTILES • 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).	**3 Hours**
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**


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

Learning Resources

Textbooks:

9. Murthy, H.S., 2016. Introduction to textile fibres. CRC Press.
10. Kozłowski, R.M. and Mackiewicz-Talarczyk, M., 2020. Introduction to natural textile fibres. In Handbook of natural fibres (pp. 1-13). Woodhead Publishing.
11. 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.
12. Mahadevan, M.G., 2005. Textile Spinning, Weaving & Designing. Abhishek Publications.
13. Hamdani, S.T.A., 2017. Introduction to weaving. In Structural Textile Design (pp. 31-46). CRC Press.
14. Wardman, R.H., 2017. An introduction to textile coloration: principles and practice. John Wiley & Sons.
15. 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)

19. https://www.textileschool.com/119/textile-an-introduction/#google_vignette
20. https://www.britannica.com/topic/textile
21. https://gphisar.ac.in/wp-content/uploads/2022/09/TEXTILE-FUNDAMENTALS.pdf
22. 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	

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Signature of BOS chairman, TXT

Academic Council Approval	No.27	Date	24.09.2024


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Signature of BOS chairman, TXT

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	PSO-3

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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 **Practical Component** • Taylor's series expansion of function of two variables. • Maxima and Minima of a function of two variables.	**9 Hours** **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 **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.	**9 Hours** **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. **Practical Component** • Area and volume using multiple integrals. • Numerical double integration by Trapezoidal and Simpson's rule	**9 Hours** **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. **Practical Component** • Solution of transcendental functions using Laplace transforms. • Heaviside functions	**9 Hours** **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. **Practical Component** • Inverse Laplace Transforms. • Solution of differential equations using inverse Laplace transform.	**9 Hours** **6 Hours**


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

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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

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

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	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	PSO-3
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

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devices. Futuristic Energy: Hydrogen – Methane Hydrates – Carbon capture and storage (CCS). **Practical Component** Determination of efficiency of solar cell	**6 Hours**
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:

16. Avadhanulu, M. N., Kshirsagar, P. G., and Murthy, T. V. S. Arun., A Textbook of Engineering Physics., S. Chand Publications, New Delhi (2018).
17. Gaur, R. K., and Gupta, S. L., Engineering Physics., Dhanpat Rai Publishing Co Pvt Ltd, New Delhi.
18. Beiser, Arthur., Mahajan, Shobhit., and Choudhury, S. Rai., Concepts of Modern Physics., McGraw Hill Education, New Delhi (2017).
19. 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).

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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

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24INP103	INNOVATION PRACTICUM – II	L	T	P	J	C
		0	0	2	0	1
ES	(Common to All branches)	SDG	9, 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 work	9 Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2	PSO-3
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	**3 Hours**

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(KiCad, FreeCAD), software development (Python, Eclipse), and fabrication (Cura, LinuxCNC).	
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 & 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:	**0**	**Tutorial Hours:**	**0**	**Practical Hours:**	**30**	**Project Hours:**	**0**	**Total Hours:**	**30**

Learning Resources

Textbooks:

20. 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
21. Introducing SolidWorks, Dassault Systems.

References:

17. Insight into Electronics
18. Microcontroller Programming with Arduino and Python
19. Fundamentals of 3D modelling

Online Resources (Weblinks)

23. 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


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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

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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	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	3	2	1									3		
3		1										2		

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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.	**10 Hours**

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Functions: Definition - declaration - types of functions (user-defined, library functions) - parameter passing (by value, by reference) pointers and functions, recursion. **Practical Component** 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

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Signature of BOS chairman, TXT

24HSP112	HOLISTIC WELLNESS-II	L	T	P	J	C
		0	0	2	0	1
HS	(Common to all Department)	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 work	9 Communication	10 Project Management and Finance	11 Life-Long Learning	PSO-1	PSO-2	PSO-3
1						2		2						
2						2								
3						2					3			
4						2					3			

Course Content

ADVANCED MINDFULLNESS AND MEDITATION:	6 Hours

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• 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.	
EMOTIONAL RESILIENCE AND MENTAL HEALTH: • Building emotional resilience through positive psychology practices. • Cognitive-behavioural strategies for managing stress and anxiety. • Hands-on activity: Developing and practicing a resilience toolkit.	**6 Hours**
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:

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

References:

20. Goleman Daniel., Emotional Intelligence., Bloomsbury India, India, (2021).
21. James Allen., As a Man Thinketh., Maple Press, Noida, (2010)
22. Swami Budhanandha., Will power and its development., Advaita Ashrama Mayavati, Pithoragarh, Himalayas from its Publication Department, Calcutta. (2001)
23. Rosenberg, Marshall Bertram., Nonviolent Communication: A Language of Life., Puddle Dancer Press, Encinitas, CA (2015).

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24. Jayanna, Krishnamurthy., Science & Practice of Integrative Health & Wellbeing Lifestyle., White Falcon Publishing (2020).
25. Lipton, Bruce., The Biology of Belief 10th Anniversary Edition: Unleashing the Power of Consciousness, Matter & Miracles, Hay House, Carlsbad (2015).
26. Kalderdon Adizes Ichak., What Matters in Life: Lessons I Learned from Opening My Heart
27. ., WS Press, Newtown, PA(2023).
28. Murphy, Joseph., The Power of Your Subconscious Mind [Original Edition (Complete)], Prentice-Hall, Englewood Cliffs (1963).
29. Kamlesh D. Patel., Designing Destiny: The Heartfulness Way, Heartfulness Institute, Chennai (2021)

Online Resources (Weblinks)

- Introduction to Psychology
- Guided Meditation
- Life skills and value education
- 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			
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