

KUMARAGURU COLLEGE OF TECHNOLOGY

An autonomous Institution affiliated to Anna University, Chennai

COIMBATORE – 641 049.

B.TECH. INFORMATION TECHNOLOGY

REGULATION 2024 (2025 Batch)



I to VIII Semesters

Department of Information Technology


Signature of BOS Chairman, IT

VISION

The department of Information Technology aspires to become a school of excellence in providing quality education, constructive research and professional opportunities in Information Technology.

MISSION

- To provide academic programs that engage, enlighten and empower the students to learn technology through practice, service and outreach
- To educate the students about social responsibilities and entrepreneurship
- To encourage research through continuous improvement in infrastructure, curriculum and faculty development in collaboration with industry and institutions.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The Program Specific Outcomes of Information Technology Undergraduate Program are:

PSO1: IT Systems Innovation and Management

Graduates will design and manage secure, scalable IT systems that address real-world challenges with technological and social relevance.

PSO2: Emerging Tech for Business Impact

Graduates will apply cutting-edge technologies to create innovative, ethical solutions that drive business transformation and community advancement.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates will demonstrate career progression in Information and Communication Technologies by acquiring higher qualifications or industry certifications and advancing in professional roles.

PEO2: Graduates will be leaders in their chosen field

PEO3: Graduates will utilize the acquired technical skills and knowledge for the benefit of society

PROGRAM OUTCOMES (POs)

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

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



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

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.

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.

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.

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.

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

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

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make 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.

PO11: Life-Long Learning: Recognize the need for and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change.



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KUMARAGURU COLLEGE OF TECHNOLOGY**INFORMATION TECHNOLOGY****REGULATION 2024****B. Tech. Information Technology – Curriculum****2025 Batch Structure****Semester I**

S. No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24HST103 / 24HST104 /	Effective Communication / Professional Communication /	Theory	HS	2	0	0	0	2
	24HSJ102	Fluency Through Practice	Project		0	0	0	4	
2	24MAI114	Applied Linear Algebra and Calculus	Embedded	BS	3	0	2	0	4
3	24PHI101	Applied Physics for Computing	Embedded	BS	3	0	2	0	4
4	24CSI006	Programming in C	Embedded	ES	1	0	6	0	4
5	24CSI102	Digital Logic Circuits	Embedded	ES	2	0	2	0	3
6	24HST101	Heritage of Tamils	Theory	HS	1	0	0	0	1
7	24INP102	Innovation Practicum - 1	Practical	ES	0	0	2	0	1
8	24HSP111	Holistic Wellness - 1	Practical	HS	0	0	2	0	1
9	24INO101	FCLF- General Stack-1	Practical	OE	0	0	2	0	1
10	24CSV001	Emerging Domains	Embedded	VA	2	0	0	0	0
Total Credits									21
Total Contact Hours/week									32

Semester II

S.No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24HSP005	Mastering Conversations	Practical	HS	0	0	2	0	1
2	24MAI124	Multivariate Calculus and Forecasting	Embedded	BS	3	0	2	0	4
3	24CSI007	Python For Computational Problem Solving	Embedded	ES	1	0	4	0	3
4	24ITI001	Embedded Systems for IoT	Embedded	ES	2	0	2	0	3
5	24ADT015	Finance, Economics and Marketing	Theory	HS	3	0	0	0	3
6	24HST102	Tamils and Technology	Theory	HS	1	0	0	0	1
7	24INP103	Innovation Practicum- 2	Practical	ES	0	0	2	0	1
8	24HSP112	Holistic Wellness-2	Practical	HS	0	0	2	0	1
9	24INO102	FCLF- General Stack-2	Practical	OE	0	0	2	0	1
10	24INP101	Design Thinking	Practical	HS	0	0	2	0	1
Total Credits									19



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Total Contact Hours/week									28
Semester III									
S.No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24MAI234	Computational Probability and Statistics	Embedded	BS	3	0	2	0	4
2	24CSI024	Data Structures and Algorithms	Embedded	PC	2	0	4	0	4
3	24CSI025	Object Oriented Programming	Embedded	PC	1	0	4	0	3
4	24ITT203	Computer Organization and Architecture	Theory	PC	3	0	0	0	3
5	24ITI005	Operating Systems	Embedded	PC	3	0	2	0	4
6	24INM201	Universal Human Values-II	Theory	HS	1	0	0	0	1
7	24INP201	Innovation Practicum- 3	Practical	ES	0	0	2	0	1
8	24HSP006	Mastering Group Discussion and Presentation Skills	Practical	HS	0	0	2	0	1
9	24INOXYX	FCLF- General Stack-3	Practical	OE	0	0	2	0	1
Total Credits									22
Total Contact Hours/week									33
Semester IV									
S.No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24MAT243	Discrete Mathematics and Optimization	Theory	BS	3	0	0	0	3
2	24CSI009	Database Management Systems	Embedded	PC	3	0	2	0	4
3	24CSI014	Design and Analysis of Algorithms	Embedded	PC	3	0	2	0	4
4	24CSI015	Software Engineering and Agile Practices	Embedded	PC	3	0	0	2	4
5	24_____	Artificial Intelligence and Machine Learning	Embedded	PC	3	0	2	0	4
6	24CSI011	Computer Networks and Security	Embedded	PC	3	0	2	0	4
7	24HSP007	Building Professional Readiness	Practical	HS	0	0	2	0	1
8	24INP202	Innovation Practicum – 4	Practical	ES	0	0	2	0	1
Total Credits									25
Total Contact Hours/week									33
Semester V									
S.No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24CSI013	Full Stack Development	Embedded	PC	3	0	2	0	4
2	24ITI006	Big Data Technology	Embedded	PC	3	0	2	0	4


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3	24ITI007	Mobile Application Development	Embedded	PC	2	0	2	0	3
4	24HSPXY	Indian / Foreign Language	Practical	HS	0	0	4	0	2
5	24INM202	Environmental Science and Sustainability	Embedded	HS	1	0	2	0	2
6	24-----	Professional Elective I	Embedded/ Theory	PE	2	0	2	0	3
7	24-----	Professional Elective II	Embedded/ Theory	PE	2	0	2	0	3
8	24ITOXY	Open Elective 2	Theory	OE	3	0	0	0	3
Total Credits									24
Total Contact Hours/week									32*
Semester VI									
S.No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24____	Cloud and DevOps	Embedded	PC	3	0	0	2	4
2	24____	Generative AI and Agentic AI Systems	Embedded	PC	3	0	2	0	4
3	24-----	Professional Elective III	Embedded/ Theory	PE	2	0	2	0	3
4	24-----	Professional Elective IV	Embedded/ Theory	PE	2	0	2	0	3
5	24-----	Professional Elective V	Embedded/ Theory	PE	2	0	2	0	3
6	24-----	Professional Elective VI	Embedded/ Theory	PE	2	0	2	0	3
7	24ITOXY	Open Elective 3	Theory	OE	3	0	0	0	3
8	24INM302	Constitution of India	Theory	HS	1	0	0	0	0
Total Credits									23
Total Contact Hours/week									30*
Semester VII									
S.No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24-----	Professional Elective VII	Embedded/ Theory	PE	2	0	2	0	3
2	24-----	Professional Elective VIII	Embedded/ Theory	PE	2	0	2	0	3
3	24ITOXY	Open Elective 4	Theory	OE	3	0	0	0	3
4	24INM102	Indian Knowledge System in Science and Engineering	Theory	HS	1	0	0	0	1
5	24ITJ409	Project Phase-I	Project	PRJ	0	0	0	6	3
6	24ITJ415	Professional Internship/ Certification	Project	PRJ	0	0	0	6	3
Total Credits									16


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Total Contact Hours/week									24*
Semester VIII									
S.No	Course code	Course Title	Course Mode	Course Type	L	T	P	J	C
1	24ITJ411	Project Phase-II	Project	PRJ	0	0	0	24	12
Total Credits									12
Total Contact Hours/week									24
Grand Total Credits									162


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SEMESTER I

A handwritten signature in black ink, appearing to read "Shaulgim", enclosed within a rectangular box.

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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)	-
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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
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 where 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)	
SA I, SA II, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE)	


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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)	-
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Course Objectives:	
The purpose of taking this course is to	
1	develop students' abilities to craft clear, concise, and well-structured technical content and professional communications
2	enhance students' communication skills in team settings
3	equip students with cross-cultural communication skills and effective listening techniques

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

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

Course Content	
Mastering Professional Communication	


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Industry-specific terminology (Business / Technical Register) - Crafting professional emails - Essential elements of an effective email (subject line, salutation, body, closing) - reading and responding to email communication – Networking Emails - Analyzing and interpreting technical texts (Loud Reading).	6 Hours
Navigating Digital Media Introduction to Digital media and online communication tools (instant messaging, video conferencing, social media, blogs, forums) - Listening and analysing 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)

SA I, SA II, Activity and Learning Task(s), Mini project, MCQ, End Semester Examination (ESE)

Course Curated by

Expert from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Mr.Vijayan Ramanathan , Project manager,	Dr. Aninditha Sahoo, IIT, Madras Dr.P.R.Sujatha Priyadharshini, Anna	Dr. Arokia Lawrence Vijay



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Toppan Merrill. Technologies, Coimbatore	University, Chennai Dr. E. Justin Ruben,CIT, Coimbatore	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	L	T	P	J	C
		0	0	0	4	2
HS		SDG		4, 9, 12		

Pre-requisite courses	Nil	Data Book / Codes / Standards (If any)	
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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	Bloom's Taxonomy Level (BTL)
CO 1	Analyze and apply effective communication techniques in professional contexts.	An
CO 2	Collaborate in teams to design and execute language-based projects with real-world applications.	Ap
CO 3	Develop critical thinking and problem-solving skills through research, analysis, and presentation of technical content.	An
CO 4	Produce publishable-quality written and spoken outputs, such as book chapters, journal articles, and copyrighted content.	C

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

Course Content


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

Assessment (Theory course)
Assignments, Quiz, Library Record, Draft submission, Oral Presentation, Project Review

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


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24MAI114	APPLIED LINEAR ALGEBRA AND CALCULUS (Common to CS, IT, AD)		L	T	P	J	C
			3	0	2	0	4
BS			SDG	4, 9			
Pre-requisite courses	-	Data Book / Code book (If any)	-				

Course Objectives:

The purpose of taking this course is to:

1	understand and apply the concepts of eigenvalues, eigenvectors, and matrix transformations to solve real-world linear algebra problems relevant to computing and data sciences.
2	develop proficiency in vector spaces, subspaces, and matrix decomposition techniques (LU and SVD) for effective analysis and solution of linear systems in engineering and data analytics.
3	apply differentiation and integration techniques, including optimization and calculation of areas and volumes, to solve practical problems in engineering and computational contexts.
4	master multivariate calculus concepts such as partial derivatives, Taylor series, and constrained optimization methods for applications in machine learning and data science algorithms.
5	provide MATLAB techniques for solving first-order and higher-order ordinary differential equations to model and analyse dynamic systems in computing and engineering.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	apply the concepts of eigenvalues and eigenvectors to diagonalize matrices and solve systems of linear equations in real-world applications.	Ap
CO2	apply the concepts of vector spaces, subspaces and matrix decomposition techniques such as LU decomposition and Singular Value Decomposition to solve linear systems and reduce matrix complexity in data science and engineering problems.	Ap
CO3	apply differentiation techniques to solve optimization problems including finding maxima and minima and use integration methods to compute arc lengths, areas between curves and volumes of solids for practical engineering and computational applications.	Ap
CO4	apply multivariate calculus concepts such as partial derivatives and Taylor's series expansion to analyse and approximate multivariable functions for solving engineering and computational problems.	Ap
CO5	analyse and solve constrained and unconstrained optimization problems using the Lagrange multiplier method and determine the maxima and minima of functions with two or more variables relevant to machine learning and data science applications.	An
CO6	analyse methods for solving first-order and higher-order ordinary differential equations to model and analyse dynamic systems in engineering and computing, using appropriate solution techniques to address real-world problems.	An



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

Course Content	
MATRICES Eigenvalues and eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors (Statement only) – Cayley Hamilton theorem (excluding proof) - Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation. Practical Component Matrix operations like addition, subtraction, multiplication, inverse, rank and transpose, eigenvalues and eigenvectors of a given matrix and verify the diagonalization of the matrix. Cayley-Hamilton theorem to find the characteristic equation of a matrix and verify that the matrix satisfies its own characteristic equation.	9 Hours 6 Hours
VECTOR SPACES Vector spaces and subspaces over real space – Euclidean spaces - Linear independence and dependence - Basis and Dimension - Null spaces, column spaces and Linear transformations - LU decomposition method - Singular Value Decomposition method. (No proofs of any theorems, only problems based on these topics) Practical Component Linearly independent and dependent vectors and Singular Value Decomposition. Curve Tracing, 3D and Surface plotting.	9 Hours 6 Hours



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APPLICATIONS OF CALCULUS Differentiation: Mean Value Theorem-Maxima and Minima – Integration: Arc Length, Area between two curves, Area of a Surface of Revolution, Volume of solids							9 Hours		
Practical Component First and second derivatives of a given function, area between two curves and the volume of a solid of revolution Optimization problems in single variables.							6 Hours		
FUNCTIONS OF SEVERAL VARIABLES Partial derivatives – Homogeneous functions and Euler’s theorem –Total derivative – Taylor’s series expansion - Maxima and minima of functions of two variables – Constrained maxima and minima: Lagrange’s multiplier method with single constraints – Jacobians							9 Hours		
Practical Component Computing partial derivatives of multivariable functions Optimization problems in multiple variables							6 Hours		
ORDINARY DIFFERENTIAL EQUATIONS Solutions of first order linear ODE: Leibnitz equation and Bernoulli’s equation – Linear, homogeneous differential equations of second and higher order with constant coefficients.							9 Hours		
Practical Component Solution of first order ordinary differential equations. Solution of second and higher order ordinary differential equations							6 Hours		
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, 2021 2. Howard Anton and Chris Rorres, “Elementary Linear Algebra”, Applications Version, 12th Edition, 2019.									
Reference books									
1. Kreyszig E., “Advanced Engineering Mathematics”, 10 th Edition, John Wiley and Sons, 2011. 2. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2018 3. David C. Lay, “Linear Algebra and its Applications”, Pearson Education Asia, New Delhi, 6th Edition, 2021 4. Weir, MD, Hass J, Giordano FR: “Thomas’ Calculus”, Pearson Education, 15th Edition, 2023.									
Online Resources (Web Links)									

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1. Integral Calculus - Khan Academy <https://www.khanacademy.org/math/integral-calculus>
2. Linear Algebra by MIT Open Courseware (Free) <https://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/>
3. Multivariable Calculus by MIT Open Courseware (Free) <https://ocw.mit.edu/courses/mathematics/18-02sc-multivariable-calculus-fall-2010/>
4. Khan Academy: Multivariable Calculus (Free) <https://www.khanacademy.org/math/multivariable-calculus>
5. Coursera: Introduction to MATLAB Programming by Vanderbilt University <https://www.coursera.org/learn/matlab>

Assessment (Embedded course)

SA I, SA II, 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. D. Arivuoli Dr. J. Dhivya Dr. Vijeta Iyer, Department of Mathematics
Recommended by BoS on	16.08.2024	
Academic Council Approval	No: 27	Date 24.08.2024



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24PHI101	APPLIED PHYSICS FOR COMPUTING (Common to AD, CS, IT)	L	T	P	J	C
		3	0	2	0	4
		SDG		7, 9, 12		
BS						

Pre-requisite courses	High School Education	Data Book / Code book (If any)	-
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Course Objectives:	
The purpose of taking this course is to:	
1	understand and apply fundamental principles of wave behaviour, optics, and acoustics, and their practical applications in engineering.
2	develop a solid understanding of quantum mechanics and quantum computing, and their relevance to modern technology.
3	integrate physics principles across mechanics, and thermal physics to solve real-world problems.
4	foster analytical and problem-solving skills by applying key concepts to real-world engineering and technological challenges.

Course Outcomes		
After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	apply wave behaviour in optics and demonstrate its applications in real-world technologies.	Ap
CO 2	understand quantum mechanics principles and state their application in quantum information systems.	Ap
CO 3	implement qubits and quantum gates to demonstrate the advantages of quantum computing.	Ap
CO 4	examine the principles of heat transfer mechanisms for effective thermal management in engineering applications.	Ap
CO 5	apply vectors and moments to equilibrium problems in distributed-force systems with free body diagrams	Ap
CO 6	analyse and interpret acoustic principles to assess sound quality and design strategies for effective noise control in real-time applications.	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	


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

Course Content	
Applied optics Wave Behaviour in Optics: Reflection, Refraction, Interference, Diffraction and Polarization (qualitative) - Interaction of light and matter - Absorption - Spontaneous emission - Stimulated emission - Population inversion - CO2 laser - Semiconductor lasers - Applications –Laser Imaging and Holography- Laser gyroscopes- LiDAR- Introduction and importance of Fiber Optics Technology- Propagation mechanism of rays in an optical fibre, Meridional rays, Skew rays- Types of optical fibres -Application of Optical Fibers, Optical fibre Communication system with block diagram.	9 Hours
Practical Component - 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	6 Hours
Quantum physics Introduction to Quantum Mechanics- Wave Particle duality- Heisenberg uncertainty principle- Wave function- Postulates of Quantum Mechanics- Schrodinger's Equations - Particle in a box- Eigen values and Eigen function- Quantum confinement – quantum wells, wires and dots – Quantum system for information processing - quantum states – classical bits – quantum bits or qubits –CNOT gate - multiple qubits – quantum gates – advantage of quantum computing over classical computing.	9 Hours
Practical Component - Determination of band gap of a semiconductor - Determination of efficiency of solar cell - Determination of Planck's constant – Electroluminescence method	6 Hours
Thermal Physics	


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Transfer of heat energy – conduction, convection, and radiation – 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 - Thermal Insulation – classification and properties – heat exchangers - applications – Thermal Physics in Virtual Reality and Haptics.	9 Hours
Practical Component Lee's Disc method: Determination of thermal conductivity of a bad conductor	6 Hours
Mechanics Introduction to position vector, force vector and moment vector- 3-D representation of force and couple- their moments about a point or line- Distributed-force systems- Free Body diagram- Equilibrium of a body under 2D/3D force systems- Moment of inertia of plane areas; Perpendicular-axis and parallel axis theorems- Rectilinear and curvilinear motion of a particles- Work and energy- Impulse and momentum.	9 Hours
Practical Component - Compound pendulum – Determination of acceleration due to gravity - Non-uniform bending – Determination of Young's modulus	6 Hours
Acoustics Sound basic definitions - Human response to sound and vibration- Range of audible sound pressure levels and frequencies, infra sound, ultrasound-Pitch-Loudness: equal loudness contours and loudness level. Loudness calculations. Principle of superposition of waves, interference, beats, standing waves- Principle of active noise control- Doppler effect. Reverberation - Reverberation time - Absorption coefficient and its determination - Factors affecting the acoustics of the buildings and their remedies.	9 Hours
Practical Component Melde's string – Determination of frequency of a tuning fork	6 Hours

Theory Hours:	45	Tutorial Hours:	0	Practical Hours:	30	Project Hours:	0	Total Hours:	75
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Learning Resources
Textbooks
- Optics, Light, and Lasers: The Practical Approach to Modern Aspects of Photonics and Laser Physics, Dieter Meschede, 3rd Edition, Wiley, 2017. - Quantum Mechanics, David H. McIntyre, Cambridge University Press, 2022. - Introduction to Quantum Control and Dynamics, Domenico D'Alessandro, 2nd Edition, Chapman and Hall/CRC, 2021. - Shames, Irving H. Engineering mechanics statics and dynamics. 2022. - Engineering Mechanics: Dynamics, James L. Meriam, L. G. Kraige, J. N. Bolton, John Wiley & Sons, 2020.
Reference books
- Engineering Acoustics: Noise and Vibration Control, Malcolm J. Crocker, Jorge P. Arenas, John Wiley & Sons, 2021. - Engineering Mechanics, Hibbeler, R. C., Pearson Education India, 2010. - Pain, Herbert John. The physics of vibrations and waves. 2022.


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4. Introductory Quantum Optics, Christopher C. Gerry and Peter L. Knight, Cambridge university press, 2023.
5. Optics for Engineers, Charles A. DiMarzio, Crc Press, 2024.

Online Resources (Web Links)

1. <https://ocw.mit.edu/courses/2-71-optics-spring-2009/>
2. <https://ocw.mit.edu/courses/8-04-quantum-physics-i-spring-2016/>
3. <https://ocw.mit.edu/courses/2-051-introduction-to-heat-transfer-fall-2015/>
4. <https://ocw.mit.edu/courses/2-001-mechanics-materials-i-fall-2006/>
5. <https://phet.colorado.edu/en/simulations/waves-intro>
6. <https://www.nasa.gov/directorates/esdmd/hhp/acoustics-and-noise-control/>

Assessment (Embedded course)

SA I, SA II, 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)
		Capt A.R.Arul Dr. S.Nithya Department of Physics
Recommended by BoS on	16.08.2024	
Academic Council Approval	No: 27	Date 24.08.2024



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24CSI006	PROGRAMMING IN C (Common to CS, IT, & AD)	L	T	P	J	C
		1	0	6	0	4
ES		SDG		9		

Pre-requisite courses	Nil	Data Book / Codes / Standards (If any)	Nil
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Course Objectives:	The purpose of taking this course is to:
1	Gain proficiency in logical reasoning and problem-solving using algorithms and flowcharts.
2	Acquire knowledge of fundamental programming constructs in C, including data types, variables, control structures, and input/output operations.
3	Attain the capability to address real-world problems by utilizing arrays, strings, and modular programming with functions.
4	Introduce concepts of pointers, storage classes, and structures as tools for effective data representation and management.
5	Provide exposure to the development of C-based applications that integrate file operations and fundamental debugging methodologies.

Course Outcomes:	After successful completion of this course, the students shall be able to	Bloom's Taxonomy Level (BTL)
CO 1	Explain basic C programming constructs and problem-solving strategies using flowcharts and algorithms	U
CO 2	Demonstrate the implementation of conditional and iterative control structures in developing computational programs	Ap
CO 3	Apply arrays, strings, and functions to solve computational problems using modular programming.	Ap
CO 4	Apply pointers, storage classes, and structures to efficiently manage data in C programs	Ap
CO 5	Develop simple applications using file operations and debugging tools in C.	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	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


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

Course Content

INTRODUCTION TO PROBLEM SOLVING AND C BASICS

Introduction to computer problem-solving – The problem-solving aspect- Top-down design -Building blocks, pseudocode notation, flowcharts – Implementation of algorithms –Simple algorithmic problem-solving scenarios – C programming: data types, variables, operators and expressions, input and output operations, control flow using if and switch statements.

Practical Component

Drawing flowcharts, Writing pseudocode for algorithmic problem scenarios, Programs using arithmetic, logical, and relational operators, Simple logic-based programs: prime number, palindrome, factorial, Fibonacci series

3 Hours

18 Hours

FUNCTIONS AND STORAGE CLASSES

Looping and Control Statements: for, while, break, continue, Patterns -Defining a function - Accessing a function - Function prototypes - Passing arguments to a function - Passing arrays to functions - Function with string - Recursion - Storage classes

Practical Component

Pattern printing using loops -Programs using functions with arguments and return values, Recursive functions (e.g., factorial, Fibonacci), Passing arrays and strings to functions, Programs demonstrating storage classes: auto, static, extern, register

3 Hours

18 Hours

ARRAYS AND STRING

Defining an array - Processing an array - Multidimensional Arrays-Character Arithmetic - Defining a string - NULL character - Initialization of Strings - Reading and Writing Strings - Processing Strings -Searching and Sorting of Strings.

Practical Component

Programs for defining and processing 1D and 2D arrays, Searching (linear and binary search), Sorting (bubble sort, selection sort), Matrix operations (addition, subtraction, transpose), String handling using standard functions (strlen, strcpy, etc.)

3 Hours

18 Hours

POINTERS, STRUCTURES AND UNIONS

Pointer Fundamentals - Pointer Declaration - Passing Pointers to a Function - Pointers and one-dimensional arrays - operations on pointers - Dynamic memory

3 Hours



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allocation- Structures and Unions: Defining a Structure - Processing a Structure - User defined data types (Typedef) -Unions Practical Component Pointer operations and arithmetic, swapping values using pointers, Pointer and array manipulation, Dynamic memory allocation using malloc, calloc, and free, Programs using structures and unions, Accessing structure members using pointers	18 Hours
FILES AND DEBUGGING Files- Opening and Closing a Data File - Reading and writing a data file - Processing a data file -Unformatted data files - Concept of binary files - Accessing a file randomly using fseek- Types of errors: Syntax, Logical, Runtime – Debugging techniques: Tracing with printf(), setting breakpoints, step-by-step execution – Introduction to debugging tools: gcc -g, GDB- Integrated Development Environment- – Best practices in debugging C programs. Practical Component Student record system using structures and files, File read/write operations using text and binary files, Processing structured data from files, Accessing file data using fseek, Debugging C programs using printf() tracing and GDB, Identifying and fixing syntax, logical, and runtime errors	3 Hours 18 Hours

Theory	30	Tutorial	60	Project	90
Hours:		Hours:		Hours:	Hours:

Learning Resources
Textbooks
- Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, Third Edition, New Delhi, 2011. E. Balagurusamy, Programming in ANSI C, 8th Edition, McGraw-Hill Education, 2019.
Reference books/ Web Links
- Yashavant Kanetkar, Let Us C, 17th Edition, BPB Publications, 2023. R. G. Dromey, <i>How to Solve It by Computer</i>, Pearson Education, First Edition, New Delhi, 2008. - Pradip Dey and Manas Ghosh, Programming in C, 2nd Edition, Oxford University Press, 2011. - Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition, Pearson Education, 2006. - Ashok N. Kamthane, Computer Programming, Pearson Education, 2007. - Reema Thareja, Programming in C, 2nd Edition, Oxford University Press, 2011.
Online Resources
https://www.geeksforgeeks.org/c-programming-language/ https://www.w3schools.com/c/ https://www.programiz.com/c-programming https://www.coursera.org/learn/c-for-everyone https://www.codingninjas.com/studio/library/c-programming


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Assessment (Embedded course)			
MCQ, Experimental Cycle tests and End Semester Examination (Lab)			
Course Curated by			
Expert(s) from Industry	Expert(s) from Higher Education Institution		Internal Expert
-	-		Ms. R. Nivetha Department of Computer Science and Engineering
Recommended by BoS on	09.05.2025		
Academic Council Approval	No: 28	Date	26.06.2025


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24CSI102	DIGITAL LOGIC CIRCUITS (Common to AD, CS, IT)	L	T	P	J	C
		2	0	2	0	3
ES		SDG		9		

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

The purpose of taking this course is to:

1	understand digital systems, number systems, and Boolean algebra for logic simplification and circuit design.
2	learn to analyse and design Combinational and Sequential Logic Circuits
3	explore digital logic families and implement logic circuits using programmable devices.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	comprehend the fundamental concepts of digital number systems, Boolean algebra, and the basic principles of digital circuit design.	U
CO2	develop and implement logic functions using Boolean algebra, optimizing them through simplification and employing combinational circuit components.	Ap
CO3	construct and validate sequential circuits, such as flip-flops, counters, and shift registers, and integrate these into larger digital systems.	Ap
CO4	develop combinational logic circuits using programmable logic devices.	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	PSO-1	PSO-2
	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		
1	3												
2			3									3	
3			3									3	
4	3	2											

Course Content

OVERVIEW OF DIGITAL SYSTEMS AND BOOLEAN ALGEBRA Introduction to Digital Systems - Analog vs. Digital Signals – Digital System Design Process- Number base conversions, complements, signed binary numbers – Binary codes-	7 Hours
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4. Clive Woods, Brian Holdsworth, "Digital Logic Design", 4th Edition, O'Reilly Media, 2002.
5. Donald D.Givone, "Digital Principles and Design", 7th Edition, McGraw Hill, 2010.

Online Resources (Weblinks)

1. Digital Systems: From Logic Gates to Processors | Coursera
2. Digital Logic Circuits and Design | Udemey
3. Digital Electronic Circuits - Course (nptel.ac.in)

Assessment (Embedded course)

SA I, SA II, 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)
		Ms. C. Bharathipriya, AP-II Ms. P. Anitha, AP-I Department of Computer Science and Engineering
Recommended by BoS on	16.08.2024	
Academic Council Approval	No: 27	Date 24.08.2024



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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
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.

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.

நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

3 Hours

3 Hours

3 Hours



Signature of BOS Chairman, IT

FOLK AND MARTIAL ARTS Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Ciabatta, Valari, Tiger dance - Sports and Games of Tamil	
தமிழர்களின் திணைக்கோட்பாடுகள் தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள் – 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 அச்ச 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
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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). 8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) 9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)				


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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/1pf0jbyuDTNdvlcKMnOf0Pjbqha7JqdOc/edit#slide=id.p1>
4. https://www.youtube.com/watch?v=IKPwEmsmuZc&list=PLMMrJE4pHZmc0iJZIE6lBpFoPK_9Y325e&index=1

Assessment (Theory course)

SA I, SA II, 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



Signature of BOS Chairman, IT

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

Pre-requisite courses	-	Data Book / Code book (If any)	-
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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	PSO 1	PSO 2
	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		
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?srsId=AfmBOorwzDG9RhJoL3L5tIz_Dr4sVcey-vPC-pkKTj2E0mWJWtFYlikY
2.	https://www.symmetryelectronics.com/technology-teardowns/

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

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


 Signature of BOS Chairman, IT

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)	-
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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	2	3	4	5	6	7	8	9	10	11	PSO 1	PSO 2
	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		
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. - The importance of balance in overall well-being. - Hands-on activity: Self-assessment of current wellness status.	4 Hour


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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:	
- Jayanna, Krishnamurthy., Science & Practice of Integrative Health & Wellbeing Lifestyle., White Falcon Publishing (2020). - Rosenberg, Marshall Bertram., Nonviolent Communication: A Language of Life., Puddle Dancer Press, Encinitas, CA (2015).	
References:	
- B.K.S Iyengar., Yoga: The Path to Holistic Health., Dorling Kindersley Limited, City of Publication (2001) - Goleman Daniel., Emotional Intelligence., Bloomsbury India, India, (2021). - James Allen., As a Man Thinketh., Maple Press, Noida, (2010) - Swami Budhanandha., Will power and its development., Advaita Ashrama Mayavati, Pithoragarh, Himalayas from its Publication Department, Calcutta. (2001) - Kalderdon Adizes Ichak., What Matters in Life: Lessons I Learned from Opening My Heart ., WS Press, Newtown, PA (2023)	
Online Resources (Weblinks)	
- Learning Suryanamskar - Yoga for well-being - Nutritional Educational contents - Introduction to Psychology	


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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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24CSV001	EMERGING DOMAINS (Common to AD, CS, IT)		L	T	P	J	C
			2	0	0	0	0
VA			SDG	3, 9, 12, 15			
Pre-requisite courses		-	Data Book / Code book (If any)			-	

Course Objectives:

The purpose of taking this course is to:

- | | |
|---|--|
| 1 | provide students with a comprehensive understanding of how emerging technologies like AI, IoT, blockchain, big data, and automation are revolutionizing various industries. Focusing on sectors such as agriculture, education, healthcare, gaming, music, law, and textiles, the course explores the application of these technologies to develop innovative solutions that enhance productivity, sustainability, and user engagement. Students will analyze the impact of digital tools on transforming key sectors and evaluate strategies to improve operational efficiency, creativity, and adaptability. Additionally, the course examines the disruption of traditional business models by these technologies, equipping students with the skills to leverage these changes for innovation and competitiveness in a rapidly evolving landscape. |
|---|--|

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	understand the role of digital tools in education and healthcare for enhancing user engagement and fostering innovation.	U
CO2	outline the role of technologies in enhancing agricultural practices to demonstrate how these technologies can improve productivity and sustainability in farming.	U
CO3	relate the key technological applications of emerging domains that enhance operational efficiency and creativity.	R

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

Course Content

EDUCATION



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LMS – LCMS – MOOC - Coursera equivalent for Indian languages - LLMs for educational content & answering queries of learners - Multiple Intelligence skills - Information Communication Technologies (ICT) - smart class rooms, Attendance management - Library Systems - use of LLMs to scan through books and respond to learner queries - Educational Software - Assessment software student learning progression - Social media for learning language learning apps - Making learning accessible to all - apps for social teaching - Direction for learning to attain learning outcomes - Connecting learning with opportunities					3 Hours
AGRICULTURE (CROPS, DAIRY, POULTRY) Role of Agriculture in Indian Economy - Soil health and fertility management - Investment and Innovation in Agriculture - Government policies and subsidies for agriculture - Role of startups and agritech companies - Innovations in crop production, dairy, and poultry farming - Challenges in traditional farming methods - Integrating technology for sustainable agriculture - Mobile Apps for Agriculture - Digital marketplaces for agricultural products - Precision Farming - IoT in Agriculture - Drones in Agriculture - Aerial spraying of pesticides and fertilizers - Livestock monitoring and management with drone technology - Cloud Computing in Agriculture - Applications of Blockchain in Agriculture - Ensuring transparency and traceability in the supply chain - Blockchain for smart contracts and payments in agriculture.					6 Hours
HEALTHCARE - CLINICAL, PHARMACEUTICAL, MENTAL HEALTH AND REHABILITATION eHealth-Types of records in healthcare: EHR, EMR, PHR - Generative AI in healthcare - Telemedicine - Wearable IoT in Healthcare - Upgrading the legacy software and data security - Future trends and their Examples - Diabetics and pharmaceutical drugs - Digital twins in healthcare - Phases of clinical trial and their frameworks					6 Hours
ROLE OF AI AI in Music: Composition and Production - Sound Design and Mixing - Music Recommendation - Personalized Learning - Rights Management and Copyright AI in Law: Legal Research - Contract Analysis and Drafting - Predictive Analytics - Document Automation - Compliance Monitoring AI in Textiles: Design and Trend Prediction - Quality Control - Supply Chain Optimization - Personalization and Customization - Sustainability					6 Hours
GAMING Introduction to Gaming and Game design - Game Development Tools and Engines - Graphics and Animation in Games - Artificial Intelligence in Games - Game Programming Usecases - Virtual and Augmented Reality - The Future of Gaming and Emerging Technologies - Job Market and gamification.					3 Hours
TAMIL COMPUTING Introduction to types of AI - Data and Domain - Types of Models - Foundation Models (LLM) - Solving Usecases - Natural Language Processing - NLP Applications - NLP Pipeline - NLP Preprocessing - Why Tamil AI? - Building Tamil AI – Necessities - Data Curation Challenges - Data Curation Framework - Core Components - Models for Tamil - Generative AI: Research Directions - Limitations of Generative AI - Role of the community.					6 Hours
Theory Hours:	Tutorial Hours:	Practical Hours:	Project Hours:	Total Hours:	30

Learning Resources

Online Resources (Weblinks)



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1. Get Interactive: Practical Teaching with Technology | Coursera
2. What future for education? | Coursera
3. Sustainable Agricultural Land Management | Coursera
4. IoT Enabled Farming | Coursera
5. Introduction to Healthcare | Coursera
6. Game Design and Development 4: 3D Platformer | Coursera

Assessment

MCQ (10 questions) on every domain in Coursera / Poster Presentation.

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
-	-	Dr. K. Saranya, Mr. V. Senthilkumar, Dr. N. Jeba, Department of Computer Science and Engineering Ms. G. Shobana, Department of IT, Ms. P. R. Rupashini, Ms. G. Preethi, Department of AI&DS
Recommended by BoS on	16.08.2024	
Academic Council Approval	No: 27	Date 24.08.2024



Signature of BOS Chairman, IT

Semester – II

A handwritten signature in black ink, appearing to read "Shenugm.", enclosed within a rectangular box.

Signature of BOS Chairman, IT

24HSP005	MASTERING CONVERSATIONS (Common to AD, CS, IT)	L	T	P	J	C
		0	0	2	0	1
		SDG		4, 8		
HS						

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

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

	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	Communication	Project Management and Finance	Life-Long Learning	PSO 1	PSO 2
1						3			3	2	3		
2									1	2			
3									3	2			


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Course Content				
Practical Component / Roleplays Dynamics Introduction to Role play - Benefits of role plays - Importance of gesture, tone and modulation-Skill development through role play activities - Types of role plays - Conversation Building through communicative functions-Initiating a dialogue- Framing questions- Receiving feedback				6 Hours
Practical Component /Roleplays on Social Skill Social Interactions: - (Ordering food at a restaurant- Making a reservation at a hotel-- Shopping at a store-- Attending a party or social gathering) Travel and Tourism:(Asking for directions- Booking a flight or hotel-- Exploring a new city- Interacting with local people) Community and Volunteering:(Participating in a charity event- Volunteering at a local organization- Discussing community issues- Organizing a community project)				6 Hours
Practical Component / Roleplays on Education and Technology Education and Personal Growth:(Setting goals- (Short term & Long term)- Creating a study plan- Participating in a workshop- Reflecting on personal growth) Technology and Online Interactions:(Participating in an online meeting- Creating a social media post- Writing an email or text message- Making an online purchase) Technology and Science:(Explaining a scientific concept- Discussing emerging technologies- participating in Hackathons- Presenting a research paper)				6 Hours
Practical Component / Roleplays on Strategic Insights Critical Thinking :(Evaluating a news article-solving a moral dilemma-Decision with incomplete information-Assessing a historical event) Problem-Solving:(Resolving a conflict- Negotiating a deal - Making a complaint- Apologizing for a mistake) Business and Entrepreneurship:(Pitching an idea- Negotiating a contract- Conducting a market Research- Presenting a product launch)				6 Hours
Practical Component / Roleplays on Cultural Exchange Cultural Exchange:(Sharing customs and traditions- Discussing cultural differences- Exploring historical events- Participating in a cultural festival) Media and Entertainment:(Event planning- Creating an advertisement-Digital Marketing-Conducting interviews- Creating news broadcast- Writing and Performing a script- Enacting one act plays) Arts and Culture:(Visiting an art gallery - Attending/ organizing a concert or play - Discussing literature- Creating a piece of art)				6 Hours
Theory Hours:	0	Tutorial Hours:	0	Practical Hours: 30
				Project Hours: 0
				Total Hours: 30

Learning Resources	
Reference books	
1. Bonwell, C. C., & Eison, J. A. (1991). Active learning: Creating excitement in the classroom. Washington, DC: The George Washington University.	


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2. Harbour, E., & Connick, J. (2005). Role playing games and activities rules and tips. Retrieved from <https://www.businessballs.com/roleplayinggames.htm>
3. Lebaron, J., & Miller, D. (2005). The potential of jigsaw role playing to promote the social construction of knowledge in an online graduate education course. Retrieved from http://paws.wcu.edu/jlebaron/Jigsaw-FnlTCRpdf_050812.pdf
4. Davies, A. (2018). Teaching and learning through role-play: A practical guide. Maidenhead, UK: McGraw-Hill Education.
5. Young, K. C. (2016). The art of role play: Developing realistic scenarios for skill development. Boston, MA: Pearson.
6. Yardley-Matwieczuk, K. M. (1997). Role play: Theory and practice. London, UK: SAGE Publications Ltd.

Online Resources (Weblinks)

1. <https://www.niu.edu/citl/resources/guides/instructional-guide>
2. <https://positivepsychology.com/role-playing-scripts/>

Assessment (Practical course)

Assignments / Mini project, Quiz, Lab, Quizzes and written assignments, Participation in group activities

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education 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. Tissa Tony Department of English
Recommended by BoS on	16.08.2024	
Academic Council Approval	No:27	Date 24.08.2024



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24MAI124	MULTIVARIATE CALCULUS AND FORECASTING	L	T	P	J	C
		3	0	2	0	4
BS	(Common to AD, CS, IT)	SDG		7, 9		
Pre-requisite courses		24MAI114/ Applied Linear Algebra and Calculus		Data Book / Codes books (If any)		-

Course Objectives:

The purpose of taking this course is to:

1	understand the techniques of evaluating double and triple integrals and applying them to calculate areas and volumes.
2	familiarize students with vector field concepts such as gradient, divergence, and curl, and apply the theorems of Green, Gauss, and Stokes.
3	develop an understanding of the least squares method for fitting various types of curves and its application in forecasting.
4	equip students with knowledge of time series analysis, including construction, trend measurement, and seasonal variation determination.
5	introduce students to numerical methods such as interpolation, numerical differentiation, and numerical integration.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	apply double and triple integrals with constant and variable limit concepts to compute areas and volumes in cartesian coordinates.	Ap
CO 2	calculate gradient, divergence, and curl, and verify Green's theorem, Gauss's divergence theorem, and Stokes' theorem in a given vector field.	Ap
CO 3	assess the reliability of predictions using goodness-of-fit measures like R^2 , RMSE, MAE, and MAPE for the method of least squares to fit linear, parabolic, cubic, and non-linear curves.	An
CO 4	analyze time series data, and measure trends using methods like moving averages and assess seasonal variations through appropriate techniques.	An
CO 5	apply Newton's interpolation techniques for both forward and backward interpolation, perform numerical differentiation.	Ap
CO 6	apply the concepts of Trapezoidal and Simpson's rules for numerical integration.	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	PSO1	PSO 2
1	2	2			2								
2	2		2		2		2						
3	2			2	2								
4		2		2	2					2			
5	2			2	2								
6	2			2	2								

Course Content	
MULTIPLE INTEGRALS Double integration – Cartesian coordinates – Change of order of integration – Triple integration in Cartesian coordinates –Area as double integral and Volume as triple integral. Practical Component - Double and triple integration with constant and variable limits. - Area as double integral and volume as triple integral.	9 Hours 6 Hours
VECTOR CALCULUS Gradient, divergence and curl – Directional derivative – Irrotational and Solenoidal vector fields - Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (Only statements excluding proofs) Practical Component - Evaluation of gradient, divergence, and curl - Verification of Green's theorem in the plane	9 Hours 6 Hours
CURVE FITTING AND FORECASTING Method of least squares – Fitting a linear curve, second-degree parabolic curve, cubic curves and non-linear curves of the form $y = ae^{bx}$, $y = ab^x$, $y = ax^b$ by the method of least squares – Forecasting Using Fitted Curves – Assessing the reliability of predictions using goodness-of-fit measures such as R^2 , Adjusted R^2 , RMSE (Root Mean Square Error), MAE (Mean Absolute Error), and MAPE (Mean Absolute Percentage Error). Practical Component - Fitting polynomials curve by Least Square method. - Fitting non-linear curves by Least Square method.	9 Hours 6 Hours
TIME SERIES Time series – Components of Time series – Construction of Time series – Measurement of Trend: Determination of trend by moving averages – Measurement of Seasonal	9 Hours



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Variations: Method of Simple Average, Ratio to Trend Method and Ratio to moving average method. Practical Component - Time series construction and Measurement of Trend by Moving Averages. - Simple Average, Ratio to Trend Method and Ratio to Moving Average Method to determine seasonal variations in a time series dataset					6 Hours
NUMERICAL DIFFERENTIATION AND INTEGRATION Interpolation – Newton’s forward and backward interpolation – Newton’s divided difference interpolation – Numerical differentiation by using Newton’s forward, backward and divided differences – Numerical integration by using Trapezoidal and Simpson’s 1/3rd and 3/8th rules Practical Component - Numerical Differentiation - Newton’s divided differences. - Numerical Integration using Trapezoidal and Simpson’s rule.					9 Hours 6 Hours
Theory	Tutorial	Practical	Project	Total	
Hours: 45	Hours: 0	Hours: 30	Hours: 0	Hours: 75	
Learning Resources					
Textbooks					
1. Kreyzig E., “Advanced Engineering Mathematics”, 10th Edition, John Wiley and sons, 2023 2. A. Montgomery D.C., Johnson. L.A., Gardiner J.S., “Forecasting and Time series Analysis”, McGraw Hill, 1990 3. Gerald, C. F. and Wheatley, P. O., “Applied Numerical Analysis”, 7th Edition, Pearson Education Asia, New Delhi 4. Numerical Methods for Scientific and Engineering Computation by M.K. Jain, S.R.K.Iyengar and R.K. Jain, New Age International Publishers 2007. 5. Gupta S.C and Kapoor V.K, “Fundamentals of Mathematical Statistics”, 11th extensively revised edition, Sultan Chand & Sons, 2007.					
Reference books					
1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44th Edition, 2014. 2. Weir, MD, Hass J, Giordano FR: “Thomas’ Calculus”, Pearson Education, 15th Edition, 2023 3. Kandasamy P., Thilagavathy K. and Gunavathy K., “Numerical Methods”, S. Chand Co. Ltd., New Delhi, 2007. 4. David C. Lay, “Linear Algebra and its Applications”, Pearson Education Asia, New Delhi, 6th Edition, 2021 5. Anderson, T. W, “An Introduction to Multivariate Statistical Analysis”, John Wiley and Sons, 2003.					
Online Resources (Web Links)					
1. Double and Triple Integrals (Khan Academy): https://www.khanacademy.org/math/multivariable-calculus/integrating-multivariable-functions 2. Gradient, Divergence, and Curl (Paul’s Online Math Notes): http://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx 3. Method of Least Squares and Curve Fitting (Wolfram MathWorld): https://mathworld.wolfram.com/LeastSquaresFitting.html 4. Introduction to Time Series Analysis (Coursera - University of London): https://www.coursera.org/learn/time-series-analysis					


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5. **Numerical Integration (Trapezoidal and Simpson's Rule)** (Khan Academy):
<https://www.khanacademy.org/math/ap-calculus-bc/bc-integration-new/bc-6-14/a/numerical-integration>

Assessment

SA I, SA II, 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. Vijeta Iyer Dr.K.P. Thilagavathy Ms. Princy Flora Department of Mathematics
Recommended by BoS on	16.08.2024	
Academic Council Approval	No: 27	Date 24.08.2024



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24CSI007	PYTHON FOR COMPUTATIONAL PROBLEM SOLVING (Common to AD, CS, IT)	L	T	P	J	C
		1	0	4	0	3
		SDG		9		
PC						

Pre-requisite courses	NIL	Data Book / Code book (If any)	NIL
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Course Objectives:	
The purpose of taking this course is to:	
1	Introduce the basics of Python, including data types, operators, and control structures, with a focus on practical implementation.
2	Develop proficiency in iterative statements, string handling, and fundamental data structures like lists, tuples, and dictionaries through extensive lab work.
3	Provide foundational knowledge on modules, functions, object-oriented programming (OOP) concepts, and file handling.
4	Familiarize students with exception handling and Python's standard libraries like NumPy and Pandas for data manipulation.
5	Enable students to apply Python concepts to solve real-world problems through practical, hands-on experiments.

Course Outcomes		
After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	Understand Python syntax, data types, operators, and basic control structures.	U
CO2	Apply conditional and iterative constructs for solving logical problems.	Ap
CO3	Implement modular programming concepts, handle strings, and utilize data structures efficiently	Ap
CO4	Demonstrate object-oriented programming, file handling, and exception handling in Python.	Ap
CO5	Utilize libraries like NumPy and Pandas for data analysis and manipulation.	Ap

Course Outcomes	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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OOP concepts - Creating classes and objects - Self parameter - <code>__init__</code> method. Inheritance & Polymorphism: Types of inheritance, Method Overriding - Concept of Method Overloading in Python. Practical Component: Develop a robust OOP-based application to practically demonstrate the core concepts: creating multiple classes and objects, implementing all major types of inheritance, and showcasing polymorphism through method overriding. Implement a solution to simulate method overloading using variable arguments or default parameters.	12 Hours
File Handling and Exception Handling File Handling: Reading and writing files, File modes - Working with text and CSV files. Exception Handling: Understanding exceptions - Handling exceptions using try-except-finally - Raising custom exceptions. Practical Component: Read and write large amounts of data to text and CSV files using different Python file handling modes. Create a practical utility that processes data from a file, writes results to another file, and is fully protected using robust exception handling. Implement and raise meaningful custom exceptions for validation or specific error conditions.	3 Hours
Python Libraries -Numpy and Pandas NumPy Library: Introduction to NumPy, Arrays, Array creation and manipulation, Array operations. Analysing different pipeline structures involving storage - processing, ML components based on requirements. Pandas Library: Series: Creating Series – Indexing - Operations on Series. DataFrames: Creating DataFrames, Data Manipulation. Handling Missing Data: <code>dropna()</code>, <code>fillna()</code>, <code>isnull()</code> functions. Practical Component: Perform an extensive array creation, manipulation, and mathematical operations on NumPy arrays. Manipulate real-world or mock datasets using Pandas Series and DataFrames, including data cleaning, filtering, sorting, and handling missing values using appropriate functions.	3 Hours
	12 Hours

Theory Hrs: 15	Tutorial Hrs:	Practical Hrs: 60	Project Hrs:	Total Hrs: 75
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Learning Resources
Textbooks:
1. Mark Lutz, "Learning Python," O'Reilly Media, 6th Edition, 2025. 2. Y. Daniel Liang, "Introduction to Programming Using Python," Pearson, 1st Edition, 2017.


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References:	
1.	Allen B. Downey, “Think Python: How to Think Like a Computer Scientist,” Green Tea Press, 2nd Edition, 2015.
2.	Zed A. Shaw, “Learn Python the Hard Way,” Addison-Wesley, 5th Edition, 2024.
Online Educational Resources:	
1.	https://docs.python.org/3/tutorial/index.html
2.	https://learn.microsoft.com/en-us/shows/intro-to-python-development/
3.	https://www.udacity.com/course/introduction-to-python--ud1110
4.	https://www.geeksforgeeks.org/courses/python-course-certification-free
5.	https://onlinecourses.nptel.ac.in/noc24_cs57/preview
6.	https://www.coursera.org/projects/python-for-data-analysis-numpy

Assessment (Embedded course)
MCQ, Experimental Cycle tests and End Semester Examination (Lab)

Course Curated by			
Expert(s) from Industry	Expert(s) from Higher Education Institution		Internal Expert
-	-		Ms. Ruphashini Department of Artificial Intelligence and Data Science
Recommended by BoS on	29.11.2025		
Academic Council Approval	No: 29	Date	24.12.2025


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24ITI001	Embedded Systems for IoT (Common to CS, IT & AD)	L	T	P	J	C
		2	0	2	0	3
ES		SDG		4,9		

Pre-requisite courses	24CSI102 Digital Logic Circuits	Data Book / Codes / Standards (If any)	Nil
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Course Objectives:	The purpose of taking this course is to:
1	Introduce the architecture and operational characteristics of embedded system, microprocessors and microcontroller
2	Learn IoT architecture, ecosystem components, and communication technologies used in connected systems.
3	Develop practical skills in Arduino and Raspberry Pi programming for sensor, actuator, and device interfacing
4	Apply IoT concepts to design smart solutions for real-world applications such as smart cities, healthcare, agriculture, manufacturing, and home automation.

Course Outcomes:	After successful completion of this course, the students shall be able to	Bloom's Taxonomy Level (BTL)
CO 1	Demonstrate knowledge of embedded system architecture, the functions of microprocessors and microcontrollers.	U
CO 2	Apply IoT concepts, characteristics, and architecture to explain real-world IoT systems.	Ap
CO 3	Apply Knowledge of sensors, actuators, and selection criteria to choose suitable devices for IoT applications.	Ap
CO 4	Analyze IoT applications, communication technologies, and recent trends to design smart solutions	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	3	2			1							2	


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

Course Content	
INTRODUCTION Overview of Embedded System - Design Challenges - Introduction to Microprocessors- 8086 Architecture- Pin Configuration- Instruction Set- 8086 Assembly Language Programming-Interrupts -Introduction to Microcontroller- Microprocessors Vs Microcontroller- Role of microcontroller in IoT	7 Hours
Lab Components: Basic Assembly Program: ALP to perform 16-bit arithmetic operations	4 Hours
IOT Fundamentals Introduction to Internet of Things (IoT), Functional Characteristics and evolution of IoT – different layers of Architecture and their working - Elements of an IoT ecosystem- Different IoT boards, architecture - IDEs for IoT Prototyping- Programming -Structure-functions- Input and output operations- Serial communication - Libraries and code management	8 Hours
Lab Components: 1. LED Blink 2. Buzzer ON /OFF 3. Serial Communication 4. Random LED Game 5. LED pattern generator using function	8 Hours
IoT Hardware and Communication Sensors and actuators – Types and functions – Sensor characteristics – Sensor selection criteria – Actuator types and applications-Comparison of Arduino, Raspberry Pi and AI-enabled boards. Gateways in IoT- Network connectivity – Short-range Communication - Long-range communication - RaspberryPi: Introduction to RaspberryPi - Hardware Layout - Configuring RaspberryPi - Programming RaspberryPi	8 Hours
Lab Components Board (Arduino/ RaspberryPi) 1. Temperature and Humidity Monitoring 2. Measure the Distance of object 3. Detect Human motion and Turn ON LED 4. Monitor the Soil Moisture Level 5. Control LED Brightness based on Light Intensity	8 Hours


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Case Studies on IOT Applications Recent Trends in the Adoption of IoT, Role of cloud in IoT. Case Studies: Smart Cities - Smart Waste Management, Smart Street Lights, Smart Street Parking. Healthcare - Baby Monitoring, Elderly Monitoring, Agriculture - Precision Agriculture, Connected Livestock, Food Safety. Manufacturing and Logistics - Smart Manufacturing- Smart Packaging, Smart Label-Home Automation.	7 Hours
Lab component	10 Hours
1. Smart Street Light Automation 2. Smart Waste Bin Monitoring system 3. Health Monitoring system 4. Smart Home Automation	

Theory Hours: 30	Tutorial Hours: 0	Practical Hours: 30	Project Hours: 0	Total Hours: 60
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Learning Resources		
Reference books/ Web Links		
1. "Internet of Things: A Hands-On Approach", Arshdeep Bahga, Vijay Madisetti, Publisher Universities Press, 2016 2. Douglas V. Hall, "Microprocessors and Interfacing: Programming and hardware", McGraw Hill Education, Third Edition, 2021 3. "Building the Internet of Things: Implement New Business Models, Disrupt Competitors, Transform Your Industry" by Maciej Kranz, ISBN: 978-1-119-28568-7, 2016. 4. "The Internet of Things: Key Applications and Protocols", Olivier Hersent, David Boswarthick, Omar Elloumi, Wiley Publication, 2012. 5. "IOT Deployment Handbook: A practical Guide to Implementing Successful IOT Projects" By Richard G. Brown, 2022		
Online Resources		
1. https://onlinecourses.nptel.ac.in/noc26_cs37/preview 2. https://www.coursera.org/specializations/iot 3. https://www.udemy.com/course/introduction-to-internet-of-things-iot-using-arduino/?kw=internet+of+things+usi&src=sac		
Assessment (Embedded course)		
SA I, SA II, 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)
-	-	Ms.G.Shobana , Assistant Professor


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		Department of Information Technology Mr.M.Sathish Assistant Professor, Department of CSE	
Recommended by BoS on	09.05.2025		
Academic Council Approval	No: 28	Date	26.06.2025


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24ADT015	FINANCE, ECONOMICS AND MARKETING (Common to AD, CS, IT)		L	T	P	J	C
			3	0	0	0	3
HS			SDG	8			
Pre-requisite courses	Nil		Data Book / Codes / Standards (If any)	Nil			

Course Objectives:	
The purpose of taking this course is to:	
1	Understand core concepts of managerial economics and apply demand estimation techniques in business decision-making.
2	Gain foundational knowledge of cost and financial accounting for analyzing and preparing basic financial statements.
3	Develop skills in financial statement analysis and cash-flow management for strategic financial planning.
4	Apply marketing principles and research analytics to formulate integrated, data-driven growth strategies.

Course Outcomes		
After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO1	Apply core economic concepts (demand, supply, elasticity, utility) to managerial decision-making.	Ap
CO2	Record, summarise and interpret fundamental financial transactions in accordance with generally accepted accounting principles (GAAP/Ind-AS).	Ap
CO3	Analyse and evaluate corporate performance using the three key financial statements and cash-flow-based metrics (EBITDA, FCF, EVA).	An
CO4	Design customer-centred marketing strategies that integrate traditional and digital channels to create, communicate and capture value.	Ap
CO5	Employ data-driven market research and analytics to segment, target and position offerings and to forecast demand under uncertainty.	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	PSO-1	PSO-2
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		


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

Course Content	
MANAGERIAL ECONOMICS & DEMAND ESTIMATION Managerial goals vs. shareholder value; Law of demand & supply; elasticity (price, income, cross); marginal utility & consumer surplus; exceptions to the law of demand; quantitative & qualitative demand-forecasting techniques (time-series, causal models, Delphi, big-data tools); introduction to behavioural economics for managers.	9 Hours
COST & FINANCIAL ACCOUNTING FUNDAMENTALS Cost concepts—fixed, variable, stepped, sunk, opportunity, relevant; economies & diseconomies of scale; cost-volume-profit analysis; accounting principles & conventions, double-entry system, journal-ledger-trial balance; the accounting equation; preparation of basic Income Statement and Balance Sheet.	9 Hours
FINANCIAL STATEMENT ANALYSIS & CASH-FLOW MANAGEMENT Operating vs. financing & investing cash flows; preparation of the Statement of Cash Flows (IND-AS 7); working-capital management; ratio analysis—liquidity, leverage, profitability, efficiency; advanced cash-flow metrics (EBITDA, FCF, EVA); brief introduction to valuation multiples.	9 Hours
MARKETING PRINCIPLES IN THE DIGITAL ERA Evolution of marketing & the holistic marketing concept; Marketing vs. Selling; customer value & satisfaction; 7 Ps and extended service mix; product-life-cycle strategies; overview of digital marketing (SEO, SEM, social, content, influencer); omnichannel customer journeys.	9 Hours
MARKET RESEARCH, ANALYTICS & STRATEGIC INTEGRATION Marketing-information systems (MIS); environmental & competitor scanning (PESTLE & Porter 5-forces); STP—segmentation techniques, targeting criteria, positioning maps; basics of marketing analytics (A/B testing, RFM, CLV); integrating finance & marketing for growth strategy—profit-impact of marketing decisions, budgeting, ROI dashboards; capstone case discussion.	9 Hours

Theory Hours:45	Tutorial Hours: 0	Practical Hours: 0	Project Hours: 0	Total Hours:45
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Learning Resources	
Textbooks	
1. P. Geetika, P. Roy Chowdhury & P. Ghosh. Managerial Economics (3e), McGraw-Hill (2017). 2. V. G. Narayanan. An Easy Introduction to Financial Accounting: A Self-Study Guide (2020). 3. Philip Kotler, Kevin Lane Keller. Marketing Management (16e), Pearson (2022).	
Reference	


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1. D. N. Gujarati & D. C. Porter. Essentials of Econometrics (4e), McGraw-Hill (2009).
2. C. Dougherty. Introduction to Econometrics (4e), OUP (2020).
3. Tapan K. Panda. Marketing Management: Text & Cases (3e), Excel Books (2023).
4. Mike Grigsby. Marketing Analytics: Strategic Models & Metrics, Kogan Page (2022).
5. Peter Atrill & Eddie McLaney. Financial Accounting for Decision Makers (9e), Pearson (2021).

Online Resources (Weblinks)

1. <https://fulfillment.shiprocket.in/blog/demand-estimation/>
2. <https://www.coursera.org/learn/uva-darden-financial-accounting>
3. <https://www.investopedia.com/articles/stocks/07/easycashflow.asp>
4. <https://handbook.flinders.edu.au/topics/2025/busn1022>
5. <https://insight7.io/marketing-research-and-insights-8-integration-techniques/>

Assessment (Theory course)

SA I, SA II, Activity and Learning Task(s), MCQ, End Semester Examination (ESE)

Course Curated By

Expert(s) from Industry	Expert(s) from Higher Education Institutions	Internal Expert(s)
-	-	Aman Kumar Dubey Assistant Professor & Program Head/MBA IEV
Recommended by BoS on	09.05.2025	
Academic Council Approval	No: 28	Date 26.06.2025



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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

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


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

Course Content	
நெசவு மற்றும் பாணைத் தொழில்நுட்பம்: சங்க காலத்தில் நெசவுத் தொழில் - பாணைத் 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 ஓர் சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரம் 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. 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 beads - Archeological evidence - Gem stone types described in Silappathikaram.	3 Hours


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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 Thoomp 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
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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. பொருறை - 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)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation> Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by: RMRL) - Reference Book.

Online Resources

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


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Assessment (Theory course)
SA I, SA II, 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


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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	2	3	4	5	6	7	8	9	10	11	PSO 1	PSO 2
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													
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	3 Hours
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Explore the concept of open-source, its underlying principles and its contrast with proprietary software, Discuss the advantages of using open-source tools, such as lower costs, increased innovation, educational value, and community support, walk through to the commonly used open-source tools for electronics design (KiCad, FreeCAD), software development (Python, Eclipse), and fabrication (Cura, LinuxCNC).	
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:
1. Damir Godec, Joamin Gonzalez-Gutierrez, Axel Nordin, Eujin Pei, Julia Ureña Alcázar, A guide to additive manufacturing, Springer – 2022. https://doi.org/10.1007/978-3-031-05863-9 2. Introducing SolidWorks, Dassault Systems.
References:
1. Insight into Electronics 2. Microcontroller Programming with Arduino and Python 3. Fundamentals of 3D modelling
Online Resources (Weblinks)
1. Google Play store apps: a. https://play.google.com/store/apps/details?id=com.electronicslab b. https://play.google.com/store/apps/details?id=it.android.demi.elettronica 2. https://engservices-ece.sites.olt.ubc.ca/files/2020/01/SolidWorks-3D-Printing-Tutorial-R2.pdf
Assessment (Practical course)


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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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24HSP112	HOLISTIC WELLNESS-II (Common to all Department)		L	T	P	J	C
			0	0	2	0	1
HS			SDG	3, 4			
Pre-requisite courses	24HSP111 / 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	2	3	4	5	6	7	8	9	10	11		
	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigations of Complex Problems	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO 1	PSO 2
1						2		2					
2						2							
3						2					3		
4						2					3		


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Course Content									
ADVANCED MINDFULNESS AND MEDITATION: • Deepening mindfulness practices for enhanced mental clarity. • Exploring different forms of meditation (e.g., guided, transcendental, movement-based). • Hands-on activity: Daily meditation practice and journaling reflections.					6 Hours				
EMOTIONAL RESILIENCE AND MENTAL HEALTH: • 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:	
1. Hanh, Thich Nhat. The Miracle of Mindfulness: An Introduction to the Practice of Meditation. Beacon Press, Boston (1975). 2. Tolle, Eckhart. The Power of Now: A Guide to Spiritual Enlightenment. New World Library, Novato (1997). 3. Patel, Kamlesh. Heartfulness Way: Heart-Based Meditations for Spiritual Transformation, Kamlesh Patel, 2018.	
References:	
1. Goleman Daniel., Emotional Intelligence., Bloomsbury India, India, (2021).	



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


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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.	
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.	

Theory Hours:	0	Tutorial Hours:	0	Practical Hours:	30	Project Hours:	0	Total Hours:	30
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Learning Resources	
Textbooks:	
1.	Handbook of Design Thinking, Christian Muller – Roterberg, Kindly Direct Publishing
2.	The Art of Innovation, Tom Kalley
3.	E Balaguruswamy (2022), Developing Thinking Skills (The way to Success), Khanna Book Publishing Company
Online Resources (Weblinks)	
1.	Survey and focus group design guides
2.	Guidance on Designing, Administering and Analyzing Focus Groups and Interviews
3.	Empathy mapping tools
4.	How to Make a Concept Model
5.	Brainstorming Techniques: 15 Creative Activities
6.	10 Brainstorming Techniques for Developing New Ideas
7.	Brainstorming templates
8.	5 Common Low-Fidelity Prototypes and Their Best Practices
9.	UX Prototypes: Low Fidelity vs. High Fidelity
10.	Low-fidelity vs. High-fidelity Design Prototypes (and when to use which)
Case study 1: Iterative Design and Prototype Testing of the NN/g Homepage	
Case study 2: Using iterative design to optimise the user flow of a product	


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11. Reflective practice toolkit

Assessment
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 III

A handwritten signature in black ink, appearing to read "Shaulgim", enclosed within a rectangular box.

Signature of BOS Chairman, IT

24MAI234	COMPUTATIONAL PROBABILITY AND STATISTICS	L	T	P	J	C
		3	0	2	0	4
BS	(Common to CS, IT, AD)	SDG		3,8		
Pre-requisite courses		Data Book / Code book (If any)			Statistical tables	

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

Course Outcomes		
After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Categorize and illustrate different types of random variables and their corresponding probability distributions.	An
CO2	Analyse joint distributions and relationships using correlation and regression techniques.	An
CO 3	Apply the concept of multivariate analysis to compute covariance and correlation matrices which forms the basis of principle component analysis.	Ap
CO 4	Examine large sample data by appropriate hypothesis testing techniques (Z-tests and Chi-square	An
CO 5	Test small sample data using t and F distributions, interpreting the results accurately.	An
CO 6	make use of ANOVA analysis in experimental design and interpret the results.	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	Engineering Tool Usage	The Engineer and The World	Ethics	Individual and Collaborative Team work	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	3			2								
2	3	3			2								
3	3	2			2								
4	3	3		2	2				1				
5	3	3		2	2				1				
6	3	2		2	2				1				

Course Content	
PROBABILITY AND RANDOM VARIABLES Axioms of probability - Conditional probability — Total probability — Bayes' theorem - Random variable —properties —Probability mass function—Probability density function — Distribution function —Moments- Normal Distribution. Practical Component • Introduction to R programming • Normal Distribution	10 Hours 6 Hours
TWO-DIMENSIONAL RANDOM VARIABLES Joint distributions — Marginal and conditional distributions — Expected values of functions of two variables- Correlation and regression (for discrete data only) - Central limit theorem (proof excluded). Practical Component • Correlation • Regression	9 Hours 6 Hours
MULTIVARIATE ANALYSIS Random vectors and matrices — Mean vectors and covariance matrices — Principal components — Population principal components — Principal components from standardized variables. Practical Component • Mean Vectors and Covariance matrices • Principal Components	8 Hours 6 Hours
TESTING OF HYPOTHESIS Large Sample tests (single mean, difference of means), Small sample tests based on Student-t test (single mean, difference of means, paired i- test) and F (variance ratio) test— Chi-square test for independence of attributes and goodness of fit. Practical Component	9 Hours 6 Hours


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Course Curated by			
Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)	
1. Dr. R Vasu Business Excellence and Management Systems Consultant Specialisation in Process Excellence, Six Sigma Quality, Health Safety & Environment Systems Vice President (Retired) Brakes India.	1. Dr. M. Sivakumar Assistant Professor Sr. Grade Vellore Institute of Technology, Vellore 2. Dr. Ramesh Babu Assistant Professor (SG) Amrita University Coimbatore, Tamil Nadu.	1. Dr.R.Rajkumar, Assistant Professor III Department of Mathematics 2. Dr.K.P.Thilagavathy Assistant Professor III Department of Mathematics	
Recommended by BoS on	25.04.2025		
Academic Council Approval No.	28	Date	26.06.2025


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24CSI024	DATA STRUCTURES AND ALGORITHMS (Common to CS, IT, & AD)	L	T	P	J	C
		2	0	4	0	4
PC		SDG	9			
Pre-requisite courses	NIL	Data Book / Code book (If any)		NIL		

Course Objectives:

The purpose of taking this course is to:

1	Provide foundational knowledge of data structures, searching and sorting algorithms, string processing techniques, and algorithm analysis for developing efficient software solutions.
2	Develop the ability to implement and analyze linear data structures such as stacks, queues, and linked lists for real-world applications.
3	Apply non-linear data structures including trees and heaps for efficient storage, searching, and data organization.
4	Analyze graph algorithms for solving complex computational and optimization problems.
5	Understand and apply hashing techniques, hash functions, and collision resolution methods for efficient data storage, retrieval, and management in computing applications.

Course Outcomes

After successful completion of this course, the students shall be able to		Revised Bloom's Taxonomy Levels (RBT)
CO 1	Apply searching, sorting, and string processing algorithms using appropriate data structures and analyze their efficiency using asymptotic notations.	Ap
CO 2	Apply linear data structures such as arrays, stacks, queues, and linked lists for solving computational problems.	Ap
CO 3	Implement and analyze tree-based data structures including BST, AVL trees, and heaps for efficient data processing.	Ap
CO 4	Apply graph algorithms such as BFS, DFS, shortest path, and minimum spanning tree algorithms for problem solving.	Ap
CO5	Design efficient hashing techniques with suitable collision resolution methods and evaluate their performance in data storage and retrieval applications.	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


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1	3										2	2	
2	3	3	2										
3	3	3	2		2						2	2	
4	3	3		2	2						2	2	
5	2	2										2	
INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS													
Theory Component:												6 Hours	
Introduction to Data Structures and Algorithms, Importance of data structures in programming and software development, data types vs data structures, Abstract Data Types (ADTs), arrays, two-pointer technique. Searching: Linear, Binary search. Sorting Algorithms: Bubble Sort, Selection sort, insertion sort. Merge sort. String algorithms .												12 Hours	
Algorithm analysis: Big O, Big Theta, Big Omega notations													
Practical Component													
Implementation of List ADT using arrays, Linear and Binary Search, Sorting, string algorithms.													
LINEAR DATA STRUCTURES												7 Hours	
Theory Component:													
Stacks: Implementation of stack and Applications (infix to postfix, expression evaluation, parenthesis matching) Queues: Implementation of Queue, Circular Queue, Applications, Linked Lists (Single, Double, and Circular linked implementation), Linked list implementation of Stack & Queue												14 Hours	
Practical Component													
Implementation of ADT for Linear Data structures(stack, Queue and Linked list) and it's applications.													
NON-LINEAR DATA STRUCTURES TREES												7 Hours	
Theory Component:													
Trees: Binary Trees, Binary Search Trees, Tree Traversals, AVL Trees, Heap tree.												14 Hours	
Practical Component													
Implementation of BST and AVL trees and heap operations.													
NON-LINEAR DATA STRUCTURES GRAPHS												6 Hours	
Theory Component:													
Graphs: Terminologies, Representation (Adjacency Matrix, List), Graph Traversal (BFS, DFS), Spanning Trees Prim's algorithm, Kruskal's algorithm, Shortest Path Algorithms (Dijkstra, Floyd-Warshall).												12 Hours	
Practical Component.													
Implementation of graph traversals, solve shortest path problems, implement MST algorithms.													


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HASHING TECHNIQUES	4 Hours
Theory Component: Hashing: Hash Functions, Collision Resolution Techniques, Linear probing, Quadratic probing, random probing, Double hashing and rehashing.	8 Hours
Practical Component Implementation of hashing techniques and collision resolution techniques	

AI Tools to be Used	
• GitHub Copilot • Agent Smith • ChatGPT API / LLM-assisted debugging • Online Competitive Coding Platforms • Complexity Visualizers	

Theory Hrs: 30	Tutorial Hrs:0	Practical Hrs: 60	Project Hrs:0	Total Hrs: 90
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Learning Resources
Textbooks
1. Horowitz, Ellis, Sartaj Sahni, and Susan Anderson-Freed. Fundamentals of Data Structures in C. Universities Press, Hyderabad (2021). 2. Tenenbaum, Aaron M., Yedidyah Langsam, and Moshe J. Augenstein. Data Structures Using C. Pearson, New York (2021). 3. Weiss, Mark Allen. Data Structures Using C. Pearson Education Asia, Singapore (2007).
Reference books
1. Tremblay, Jean Paul, and Paul G. Sorenson. An Introduction to Data Structures with Applications. Tata McGraw-Hill, New Delhi (2014). 2. Mehlhorn, Kurt, and Peter Sanders. Algorithms and Data Structures: The Basic Toolbox. Springer, Berlin (2011). 3. Aho, Alfred V., John E. Hopcroft, and Jeffrey D. Ullman. Data Structures & Algorithms. Pearson Education, New Delhi (2009).
Online Resources (Weblinks)
1. https://open.umn.edu/opentextbooks/textbooks/an-open-guide-to-data-structures-and-algorithms 2. https://www.oreilly.com/library/view/data-structures-and/9780133437483/ 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/ https://www.geeksforgeeks.org/data-structures/


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Assessment (Embedded course)
SA-I, SA-II, 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. P. Devaki, Professor/CSE Dr. V. P. Sumathi, ASP/CSE
Recommended by BoS on	06.06.2026		
Academic Council Approval	No: 31	Date	19.6.2026


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24CSI025	OBJECT ORIENTED PROGRAMMING (Common to CS, IT, & AD)	L	T	P	J	C
PC		1	0	4	0	3
		SDG		4,9		

Pre-requisite courses	Nil	Data Book / Codes / Standards (If any)	Nil
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Course Objectives:		The purpose of taking this course is to: (3 to 5)
1.	Understand the fundamentals of Java programming including program structure, data types, methods, and control statements.	
2.	Learn object-oriented programming concepts such as classes, inheritance, polymorphism, abstraction, and interfaces.	
3.	Develop skills in handling errors and working with strings and wrapper classes for efficient program development.	
4.	Understand multithreading, synchronization, and file handling concepts using Java I/O techniques.	
5.	Enable students to work with collections, database connectivity, and application development using Java technologies.	

Course OutcomeS:		After successful completion of this course, the students shall be able to	Bloom's Taxonomy Level (BTL)
CO1	Apply fundamental programming and object-oriented principles to develop programs using basic programming constructs.		Ap
CO2	Implement object-oriented features such as inheritance, polymorphism, abstraction, interfaces, and packages to develop reusable programs.		Ap
CO3	Apply exception handling and string processing techniques to develop reliable and robust programs.		Ap
CO4	Construct multithreaded programs and utilize input/output techniques for file handling and data processing.		Ap
CO5	Develop database-integrated applications using collection frameworks, modern programming features, and database connectivity techniques.		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	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2
1	3	2	2									3	
2	2		3		2							3	
3		3	2		2							3	



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4	2		3		2							3	
5		2	3		2							3	

Course Content													
JAVA FUNDAMENTALS												3 Hours	
Theory Component: Overview of Java – History, Features, and Program Structure – Compilation and Execution – Data Types, Variables, Operators, and Type Casting – Introduction to OOP Concepts: Class, Object, Constructor, Encapsulation. (Concept-level; detailed coding covered in practicals.)													
Practical Component:												12 Hours	
- Develop programs using data types, variables, operators, and type casting to solve arithmetic and logical problems. - Construct programs using control statements to solve number-based problems and pattern generation. - Design programs using arrays, methods, parameters, and return values for searching, sorting, and matrix operations. - Create applications using classes, objects, constructors, this keyword, and encapsulation concepts.													
OBJECT-ORIENTED PROGRAMMING												3 Hours	
Theory Component : Types of Inheritance – 'super' keyword and Constructor Chaining – Method Overriding and Runtime Polymorphism – Abstract Classes and Abstract Methods – Interfaces and Multiple Inheritance – Packages and Access Modifiers. (Conceptual diagrams and rules; implementation covered in practicals.)													
Practical Component:												12 Hours	
- Develop programs using inheritance and constructor chaining to model real-world scenarios. - Create applications demonstrating method overriding and runtime polymorphism concepts. - Design programs using abstract classes and interfaces to achieve abstraction and multiple inheritance. - Organize applications using packages and access modifiers to develop reusable program components.													
EXCEPTION HANDLING, STRINGS AND WRAPPER CLASSES												3 Hours	
Theory Component: Checked vs Unchecked Exceptions – Exception Hierarchy – try, catch, finally, throw, throws – Built-in and User-defined Exceptions – String Immutability – StringBuffer vs StringBuilder – Wrapper Classes overview – Autoboxing and Unboxing. (Conceptual overview; hands-on coding in practicals.)													
Practical Component :												12 Hours	
- Develop programs using exception handling mechanisms to improve program reliability and error management. - Create applications using user-defined exceptions and exception propagation techniques. - Design programs using String operations for text processing and manipulation tasks. - Demonstrate the use of StringBuffer, StringBuilder, wrapper classes, and autoboxing techniques.													
MULTITHREADING, I/O AND FILE HANDLING												3 Hours	


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Theory Component: Process vs Thread – Thread Life Cycle and States – Thread Model – Synchronization concepts – I/O Stream Hierarchy – Byte Streams vs Character Streams – File Handling overview. (Architecture diagrams and state models; coding exercises in practicals.) Practical Component : • Develop multithreaded applications using Thread class and Runnable interface. • Create programs using synchronization and inter-thread communication mechanisms. • Demonstrate console input/output and stream handling techniques. • Design file handling applications using byte streams, character streams, and buffered streams.	12 Hours
COLLECTIONS, GUI OVERVIEW AND DATABASE CONNECTIVITY Theory Component: Collection Framework Hierarchy – List, Set, Queue, Map interfaces overview – Generic Collections – Introduction to Lambda Expressions and Stream API – GUI Programming overview (Swing and JavaFX) – JDBC Architecture and Driver types. (Architecture diagrams only; implementation in practicals.) Practical Component: • Develop applications using collection framework classes and generic collections for data management. • Create programs using Lambda expressions and Stream API for collection processing. • Develop database-integrated applications by connecting frontend interfaces with relational databases using JDBC.	3 Hours 12 Hours

Theory	15	Tutorial	0	Practical	60	Project	0	Total	75
Hours:		Hours:		Hours:		Hours:		Hours:	

Learning Resources*	
Textbooks	
1. Herbert Schildt, Java: The Complete Reference, 12th Edition, McGraw-Hill Education, 2022. 2. Kathy Sierra and Bert Bates, Head First Java, 2nd Edition, O'Reilly Media, 2005. 3. Rod Johnson, Expert One-on-One J2EE Development without EJB, Wiley Publishing, 2004.	
Reference books/ Web Links	
1. Bruce Eckel, Thinking in Java, 4th Edition, Prentice Hall, 2006. 2. Josh Long, Cloud Native Java: Designing Resilient Systems with Spring Boot, Spring Cloud, and Cloud Foundry, O'Reilly Media, 2017. 3. Craig Walls, Spring in Action, 5th Edition, Manning Publications, 2018. 4. Paul Deitel and Harvey Deitel, Java How to Program, 11th Edition, Pearson, 2017.	
Online Resources	
1. https://www.coursera.org/specializations/java-programming 2. https://www.edx.org/learn/java 3. https://www.codecademy.com/learn/learn-java 4. https://docs.oracle.com/en/java/javase/	

Assessment (Embedded Course)
SA I, SA II Activity and Learning Task(s), MCQ, End Semester Examination (ESE) Lab Workbook, Experimental Cycle tests, viva-voce


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Course Curated by			
Expert(s) from Industry	Expert(s) from Higher Education Institution		Internal Expert(s)
			Ms. P. Anitha, AP/CSE Ms. G. Shobana, AP/IT
Recommended by BoS on	06.06.2026		
Academic Council Approval	No: 31	Date	19.6.2026


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24ITT203	COMPUTER ORGANIZATION AND ARCHITECTURE (Common to CS, IT)	L	T	P	J	C
		3	0	0	0	3
		SDG		4,9		
PC						

Pre-requisite courses	Nil	Data Book / Codes / Standards (If any)	Nil
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Course Objectives:	
The purpose of taking this course is to:	
1	Introduce the basic structure and functional components of a computer system, including its evolution, Von Neumann architecture, and performance parameters.
2	Explain the internal organization of a basic computer, focusing on instruction formats, addressing modes, and the distinction between CISC and RISC architectures.
3	Explore arithmetic and logic unit (ALU) operations including integer and floating-point computations.
4	Examine memory hierarchy, cache, and I/O system designs and their impact on performance.
5	Explore modern advancements in computer architecture, including multicore processors, parallel architectures, and multiprocessor systems with interconnection structures and synchronization techniques.

Course Outcomes:		
After successful completion of this course, the students shall be able to		Bloom's Taxonomy Level (BTL)
CO 1	Apply computer organization concepts to explain the functional units, performance characteristics and processor architectures.	Ap
CO 2	Solve computational problems by applying arithmetic algorithms for addition, subtraction, multiplication, and division with accuracy and efficiency.	Ap
CO 3	Utilize the concepts of instruction execution, multiple bus organization, and control unit design to implement control logic using hardwired and microprogrammed approaches.	Ap
CO 4	Apply the principles of I/O mechanisms and memory subsystems to interpret data transfer processes and memory management in computer systems.	Ap
CO 5	Use the principles of parallel processing and multicore architectures to explain data hazards, instruction hazards, and performance issues in modern computing systems	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
1	2	2											
2	2	2											
3	3		2									2	
4	3	2										2	
5	2	2										1	

Course Content	
FUNDAMENTALS OF COMPUTER ORGANIZATION Organization and Architecture- Structure and Function- Functional Units-Basic Operations and Concepts-Bus Structure-Performance. Memory Locations and Addresses - Memory Operations - Instruction and Instruction Sequencing - Addressing Modes - Basic I/O Operations. Case Study: Evolution of Intel, ARM Architectures/Processor Families	7 Hours
COMPUTER ARITHMETIC Addition and Subtraction of Signed Numbers-Design of Fast Adders-Multiplication of Positive Numbers-Signed Operand Multiplication-Fast Multiplication-Integer Division-Floating Point Numbers and Operation.	11 Hours
BASIC PROCESSING UNIT Fundamental Concepts - Execution of a Complete Instruction - Multiple Bus Organization - Hardwired Control – Microprogrammed Control – Microinstructions-Microprogram Sequencing-Wide Branch Addressing	9 Hours
I/O AND MEMORY The I/O Subsystem, -Programmed I/O- I/O Interrupts -Direct Memory Access (DMA) - The Components of Memory System – RAM Structure: The Logic Designer’s Perspective – Memory Boards and Modules-Memory Hierarchy – The Cache- The Memory Subsystem.	9 Hours
PIPELING AND PARALLEL PROCESSING Basic Concepts - Data Hazards - Instruction Hazards – Influence on instruction sets - Data path and control considerations - Superscalar operation. Multiple Processor Organization-Types, Parallel Organization. Multicore Computers Introduction – Organization- Software and Hardware performance issues. Case Study: GPU Acceleration in Real-Time System.	9 Hours

Theory Hours:	45	Tutorial Hours:	0	Practical Hours:	0	Project Hours:	0	Total Hours:	45
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Learning Resources
Textbooks



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1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, 5th Edition, McGraw-Hill, (2014). 2. Vincent P Heuring, Harry F Jordan, TG Venkatesh., Computer Systems Design and Architecture, 2nd Edition, Pearson, (2014). 3. William Stallings, Computer Organization and Architecture - Designing for Performance, 9th Edition, Prentice Hall, (2012).
Reference books/ Web Links
1. M. Moris Mano, Computer System Architecture, Revised 3rd Edition, Pearson, (2017). 2. John P.Hayes, Computer Architecture and Organization, 3rd Edition, McGraw Hill, (2002). 3. David A.Patterson and John L.Hennessy, Computer Organization and Design: The hardware / software interface, 5th Edition, Morgan Kaufmann, (2014). 4. Andrew S. Tanenbaum, Structured Computer Organization, 6th Edition Pearson Education, (2016)
Online Resources (Weblinks)
1. https://profile.iiita.ac.in/bibhas.ghoshal/teaching_coa_2021.html 2. https://www.cse.iitd.ac.in/~srsarangi/archbooksoft.html 3. https://onlinecourses.nptel.ac.in/noc22_cs88/preview 4. https://www.coursera.org/learn/comparch 5. https://www.udemy.com/course/computer-organization-and-architecture-j/?srsltid=AfmBOoo3L-F9CWPP3HioEoAzx57cX2iGGEU3Bi0UOLTD0aLRh_BAREfE&couponCode=ST21MT30625G1

Assessment (Theory course)
SA - I, SA - II, Activity and Learning Task(s), MCQ, End Semester Examination (ESE)

Course Curated by			
Expert(s) from Industry	Expert(s) from Higher Education Institution		Internal Expert
-	-		Mr. M. Sathish, Department of Computer Science and Engineering
Recommended by BoS on	09.05.2025		
Academic Council Approval	No: 28	Date	26.06.2025


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24ITI005	OPERATING SYSTEMS (Common to CS, IT)	L	T	P	J	C
		3	0	2	0	4
PC		SDG		8,9		

Pre-requisite courses	Nil	Data Book / Codes / Standards (If any)	Nil
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Course Objectives:	The purpose of taking this course is to:
1	Understand the basic concepts, structure, and key functions of operating systems.
2	Learn how operating systems manage hardware, processes, memory, and files.
3	Analyze different process scheduling, synchronization, and memory allocation techniques.
4	Gain hands-on experience in simulating and implementing OS functionalities.
5	Explore real-world applications of operating systems, including virtualization.

Course Outcomes:	After successful completion of this course, the students shall be able to	Bloom's Taxonomy Level (BTL)
CO 1	Interpret the evolution, architecture and functionalities of Operating Systems.	Ap
CO 2	Design and analyze process scheduling strategies and synchronization techniques.	An
CO 3	Apply inter-process communication and concurrency control in modern systems.	Ap
CO 4	Implement memory management schemes and virtualization strategies.	Ap
CO 5	Analyze the design and functionality of file systems and real-time operating systems.	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	3												
2		3										3	
3					3								
4			3										
5				3									3


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<u>Course Content</u>	
Operating System Fundamentals and Process Management	9 Hours
Introduction: OS Services - OS Structures: Monolithic, Layered, Modular, Micro-kernel - Process Concept, Lifecycle, Process Control Block, Process Scheduling Queues - System Calls, User Mode and Kernel Mode, Interrupts - Threads: User-level, Kernel-level, Thread Models Practical Component 1. Linux File System & Shell Scripting. 2. Process Management in Linux (Creating process using fork(), observing orphan & Zombie states)	6 Hours
CPU Scheduling and Deadlocks	9 Hours
Scheduling Basics: Preemptive & Non-Preemptive - CPU Scheduling Algorithms: FCFS, SJF, Priority, Round Robin - Multiprocessor Scheduling - Deadlock: Conditions, Resource Allocation Graph - Deadlock Handling: Prevention, Avoidance, Detection & Recovery Practical Component 1. Simulation of CPU scheduling algorithms (FCFS, SJF, Priority, RR) 2. Banker's Algorithm to detect safe/unsafe states	6 Hours
Concurrency and Synchronization	9 Hours
Inter-process Communication - Synchronization: Peterson's Solution, Bakery Algorithm, Hardware Support - Semaphores, Monitors, Classical Problems (Dining Philosophers, Readers-Writers) - IPC in Unix Systems - Locking in Multiprocessors: Scalable Locks, Lock-free Coordination Practical Component 1. Implement process synchronization using semaphores/monitors 2. Solve Dining Philosophers problem using threads and semaphores	6 Hours
Memory Management and Virtualization	9 Hours
Main Memory Management – Main Memory Allocation Strategies – Paging and Segmentation – Hardware Support: Address Translation, Translation Lookaside Buffer (TLB), Caching – Virtual Memory and Demand Paging – Page Replacement Algorithms: FIFO, LRU, Optimal – Thrashing and Working Set Model – Virtualization Concepts: Hardware and Software Virtualization, Server and Network Virtualization – Hypervisors: Type-1 and Type-2 – Containers – Cost of Virtualization. Practical Component 1. Implement dynamic memory allocation algorithms (First-fit, Best-fit, Worst-fit) 2. Simulation of Page Replacement Algorithms (FIFO, LRU, Optimal) Virtualization setup: Type-1 & Type-2 Hypervisor	6 Hours
File Systems, Storage, and RTOS	9 Hours
File System Interface: Access Methods, Directory Structures - Implementation: File Allocation, Directory Management - File Recovery: Journaling, Soft Updates, Log-structured FS - Distributed File Systems - Disk Structure, Disk Scheduling (Seek Time, Rotational Latency) – RTOS Introduction – RTOS Scheduling – RTOS Examples and Use cases - OS Performance, Scalability, Trends in Mobile OS Practical Component	6 Hours

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1. Implement file locking mechanisms in Linux	
2. Real-Time Task Scheduling and Synchronization using FreeRTOS (or any RTOS simulator)	

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

Learning Resources
Textbooks
6. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts", 10 th Edition, Wiley, United States 2018.
7. Fox, Richard, "Linux with Operating System Concepts", 2 nd Edition, Chapman and Hall/CRC, UK 2022.
Reference books/ Web Links
1. William Stallings, "Operating Systems: Internals and Design Principles", 9 th Edition, Pearson, United Kingdom 2018.
2. Andrew S. Tanenbaum, "Modern Operating Systems", 4 th Edition, Pearson, United Kingdom 2016.
3. Love, Robert, "Linux System Programming: talking directly to the kernel and C library", 2 nd Edition, O'Reilly Media, Inc, United States 2013.
Online Resources
7. https://www.scaler.com/topics/course/free-operating-system-course/
8. https://www.coursera.org/specializations/codio-introduction-operating-systems

Assessment (Embedded Course)
SA I, SA II, Activity and Learning Task(s), MCQ, End Semester Examination (ESE)
Lab Workbook, Experimental Cycle tests, viva-voice

Course Curated By			
Expert(s) from Industry	Expert(s) from Higher Education Institutions		Internal Expert(s)
-	-		Mr. K. Manoj Department of Computer Science and Engineering
Recommended by BoS on	6.6.2026		
Academic Council Approval	No:31	Date:	19.6.2026


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24INM201	Universal Human Values - II (Common to All Branches)	L	T	P	J	C
		1	0	0	0	1
HS		SDG	3,4,5,10,12,13,14, 15,16,17			
Pre-requisite courses		-		Data Book / Code book (If any)		-

Course Objectives:

The purpose of taking this course is to:

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

Course Outcomes

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

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



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Course Content						
Introduction to Value Education					3 Hours	
Value Education- Self-exploration as the Process for Value Education- Basic Human Aspirations and their Fulfilment- Right Understanding, Relationship and Physical Facility- Happiness and Prosperity – Current Scenario- Method to Fulfil the Basic Human Aspirations.						
Harmony in the Human Being					3 Hours	
Human Being as Co-existence of the Self and the Body- Distinguishing between the Needs of the Self and the Body- The Body as an Instrument of the Self- Understanding Harmony in the Self- Harmony of the Self with the Body- Programs to Ensure Self-regulation and Health.						
Harmony in the Family and Society					3 Hours	
Harmony in the Family –The Basic Unit of Human Interaction-‘Trust’ – The Foundational Value in Relationship-Respect – As the Right Evaluation- Other Values in Human-to-Human Relationship- Understanding Harmony in the Society Lecture Vision for the Universal Human Order.						
Harmony in the Nature (Existence)					3 Hours	
Understanding Harmony in Nature- Interconnectedness, Self-regulation and Mutual Fulfilment among the Four Orders of Nature- Realizing Existence as Co-existence at All Levels- The Holistic Perception of Harmony in Existence.						
Implications of the Holistic Understanding- A Look at Professional Ethics					3 Hours	
Basis for Universal Human Values-Definitiveness of (Ethical) Human Conduct - professional Ethics in the Light of Right Understanding-A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order-Holistic Technologies, Production Systems-and Management Models-Typical Case Studies Strategies for Transition towards Value-based Life and Profession						
Theory Hours:	15	Tutorial Hours:	0	Practical Hours:	Project Hours:	Total Hours:
				0	0	15
Learning Resources						



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Textbooks:
- Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010. - Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
References:
Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, Jeevan Vidya:Publishers, 1999.
Online Resources (Weblinks)
https://www.uhv.org.in/uhv-ii
Assessment (Theory course)
Presentation, MCQ, Assignment, Case Study and E Chart.

Course Curated by			
Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)	
	Sh. Umesh Jadhav, NCCIP (National Co-ordination Committee)-AICTE	Dr.S.Sivakumar, Associate Professor, SFS Dr.R.Prakasam, Assistant Professor, Department of Physics Mr.J.Sivaguru, Assistant Professor, Department of Mechatronics	
Recommended by BoS on	03-05-2025		
Academic Council Approval	28	Date	26-06-2025


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24INP201	Innovation Practicum - III			L	T	P	J	C
				0	0	2	0	1
ES				SDG		4, 9, 11, 12		
Pre-requisite courses		-	Data Book / Code book (If any)			-		

Course Objectives:	
The purpose of taking this course is to:	
1	Develop a deep understanding of the innovation process and apply customer-centric thinking to innovation
2	Evaluate the feasibility and viability of innovation ideas.
3	Optimise innovation projects for efficiency and effectiveness and communicate the ideas effectively.

Course Outcomes	
After successful completion of this course, the students shall be able to	
CO 1	Analyse the various stages of innovation and their interdependencies
CO 2	Create innovative solutions that address specific customer needs
CO 3	Evaluate the potential impact and risks of different innovation concepts and present them clearly and persuasively.

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

Course Content	
Idea Worth Prototyping Discuss potential risks and challenges associated with innovative ideas - Learn to refine and validate the initial concept - Develop a plan outlining key milestones and timelines for advancing from idea to prototype.	3 Hours


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Framing the Challenge Define the specific problem or opportunity that the innovation aims to address, understand customer needs and preferences - Identify the gaps in the market and potential obstacles to adoption, assess the potential market size, competition, and feasibility.	6 Hours
Crafting High-Value Solutions Generate Minimum Usable Prototype (MUP) concepts that address the identified challenge that provide high value, evaluate the potential of each solution concept based on criteria like feasibility, viability, and desirability.	6 Hours
Optimization and Planning Create Bill of Quantities (BOQ) and Bill of Materials (BOM) to estimate costs and resources - Develop a comprehensive innovation proposal outlining the innovation concept, goals, and benefits - Implement Lean principles to improve efficiency and reduce waste in the innovation process - Reflect on the activities to identify areas for improvement and learning.	7 Hours
Project Presentation Develop and deliver a compelling presentation of your minimum usable prototype (MUP) and innovation solution to effectively communicate its value and impact to a broader audience - Create a visually engaging presentation that clearly outlines the problem, the proposed solution, and the value of your minimum usable prototype - Utilise tools such as slides, infographics, and videos to enhance the visual appeal - Craft a compelling story around your innovation - Highlight the journey from problem identification to solution development, emphasising key insights and milestones.	8 Hours

Theory Hours:	Tutorial Hours:	Practical Hours:	30	Project Hours:	Total Hours:	30
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Learning Resources
Textbooks:
1.
References:


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1. Everything you need about value proposition:
<https://blog.forgeforward.in/everything-you-need-to-know-about-value-proposition-7247493c940c>
2. Test your Value Proposition: <http://businessmodelalchemy.com/2012/09/test-your-value-proposition-supercharge-lean-startup-and-customer-dev-principles.html>
3. Valuation Risk versus Validation Risk in Product Innovations:
<https://blog.forgeforward.in/valuation-risk-versus-validation-risk-in-product-innovations-49f253ca8624>
4. User Guide for Product Innovation Rubric: <https://blog.forgeforward.in/user-guide-for-product-innovation-rubric-857181b253dd>
5. Innovation Risk Diagnostic — Product Innovation Rubric:
<https://blog.forgeforward.in/product-innovation-rubric-adf5ebdfd356>
6. Evaluating Product Innovations — proof, potential, & progress:
<https://blog.forgeforward.in/evaluating-product-innovations-e8178e58b86e>

Online Educational Resources:

1. <https://formlabs.com/blog/ultimate-guide-to-prototyping-tools-for-hardware-and-product-design/>
2. <https://docs.kicad-pcb.org/>
3. <https://www.tinkercad.com/learn/circuits>
4. <https://docs.github.com/en/free-pro-team@latest/actions/guides>

Assessment (Practical course)

Lab Workbook, Experimental Cycle tests, viva-voce, etc...

Course Curated by

Expert(s) from Industry	Expert(s) from Higher Education Institution	Internal Expert(s)
Dr. Mahesh Veezhinathan Director - Innovation Practicum	-	Dr. Samuel Ratna Kumar P S Assistant Professor – III

		Department Mechanical Engineering	
Recommended by BoS on	07.05.2025		
Academic Council Approval	28	Date	26/06/2025



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

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

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

	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	Communication	Project Management and Finance	Life-Long Learning	PSO-1	PSO-2	PSO-3
1		2			1	2		3	3		3			
2		2			1	2		3	3		3			


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3		2			1	2		3	3		3			
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<u>Course Content</u>	
MODULE 1 Introduction to Group Discussions - Key skills for effective participation - Phases in a GD - Conversational Phrases in GD. Group Dynamics - Understanding group roles and dynamics - Conflict resolution and management in groups - Techniques for fostering collaboration. Presentations - Introduction to Visual Aids and Technology in Presentations.	6 Hours
Delivery Techniques - Voice modulation and speech clarity - Body language and gestures – audience analysis. Handling Q&A Sessions - Preparing for audience questions - Techniques for handling difficult questions - Mock Presentation with Q&A sessions.	
MODULE 2 Factual Group Discussions: Focus on sharing and verifying accurate information on a given topic. Participants base their contributions on verifiable data and concrete evidence. Opinion-based / Argumentative Group Discussion: Encourages participants to express and defend their point of view on a topic. Evaluate different perspectives and build critical thinking skills.	6 Hours
MODULE 3 Case Study Group Discussion: Involves analyzing the complexities, identifying key issues, and developing insights or solutions based on the group's collective knowledge. Abstract Discussion: Deals with intangible concepts, ideas, or themes without concrete reference points. Encourages creative thinking and theoretical exploration.	6 Hours
MODULE 4 Impromptu Presentations: Participants speak on a given topic with little to no preparation. Helps develop quick thinking and effective communication skills. Informative Presentation: Aims to educate the audience on a specific topic by providing clear, factual information. The focus is on clarity, accuracy, and comprehensiveness. Demonstrative Presentation: Interactive sessions where participants engage in hands-on activities to learn practical skills. Often includes exercises, demonstrations, and collaborative tasks.	6 Hours


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MODULE 5 Training and Technical Presentation: Designed to teach specific technical skills or procedures. Includes detailed instructions, demonstrations, and may involve technical jargon. Academic Presentation: Involves presenting research findings or theoretical concepts in an academic setting. Emphasizes clarity, evidence-based arguments, and adherence to scholarly standards. Pitch Presentation: A concise, persuasive presentation aimed at securing support, investment, or approval. Focuses on the value proposition, potential benefits, and unique selling points. Persuasive Presentation: Seeks to convince the audience to adopt a particular viewpoint or take a specific action. Utilizes logical arguments, emotional appeals, and credible evidence. Multimedia Presentations: Uses visual and auditory media to convey information and present arguments. Enhances engagement and aids in illustrating complex concepts.	6 Hours
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Theory Hours:	-	Tutorial Hours:	-	Practical Hours:	2	Project Hours:	-	Total Hours:	30
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Learning Resources*	
Reference books/ Web Links	
1. Powell, M. (2010). Dynamic presentations student's book with audio CDs (2). Cambridge University Press. 2. Reynolds, G. (2011). Presentation Zen: Simple ideas on presentation design and delivery. New Riders. 3. Galanes, G. J., Adams, K., & Brilhart, J. K. (2020). Effective group discussion: Theory and practice (15th ed.). McGraw-Hill Education. 4. Adams, K., & Galanes, G. (2018). Communicating in groups: Applications and skills, a practical guide (18th ed.). McGraw-Hill Education. 5. Ivy, D. K., & Backlund, P. (2018). Speak with confidence: A practical guide. Pearson. 6. Reynolds, G. (2019). Presentation Zen: Simple ideas on presentation design and delivery. New Riders.	
Online Resources	
1. https://www.coursera.org/learn/verbal-communications-and-presentation-skills 2. https://www.coursera.org/learn/present-with-purpose 3. https://www.coursera.org/learn/teamwork-skills-effective-communication	

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


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

Approved by: BoS Chairman	With Signature and date
BoS Approval date:	 25.04.2025


 Signature of BOS Chairman, IT