Sri
SAI RAM
ENGINEERING COLLEGE
An Autonomous Institution
West Tambaram, Chennai - 44
www.sairam.edu.in

Approved by AICTE, New Delhi
Affiliated to Anna University

DEPARTMENT OF
COMPUTER SCIENCE AND BUSINESS SYSTEMS

REGULATIONS
2024

Academic Year 2024-25 onwards

AUTONOMOUS
CURRICULUM AND
SYLLABUS
I - II
SEMESTERS

SRI SAIRAM ENGINEERING COLLEGE

VISION

To emerge as a "Centre of excellence " offering Technical Education and Research opportunities of very high standards to students, develop the total personality of the individual and instil high levels of discipline and strive to set global standards, making our students technologically superior and ethically stronger, who in turn shall contribute to the advancement of society and humankind.

MISSION

We dedicate and commit ourselves to achieve, sustain and foster unmatched excellence in Technical Education. To this end, we will pursue continuous development of infra-structure and enhance state-of-the-art equipment to provide our students a technologically up-to date and intellectually inspiring environment of learning, research, creativity, innovation and professional activity and inculcate in them ethical and moral values.

Educational Organization Management System (EOMS) Policy

We at Sri Sai Ram Engineering College are committed to empower our students not only to excel academically but also imbibe essential values, enabling them to become exemplary global citizens. We build a better nation by fostering excellence and innovative practices in Engineering, Technology and Management Education. We are dedicated to consistently enhancing our systems, infrastructure and services to meet the needs and expectations of all our stakeholders for sustainable growth

DEPARTMENT OF COMPUTER SCIENCE AND BUSINESS SYSTEMS

VISION

To impart competent industry relevant education, skillful research and innovative computer science professionals with managerial skills, human and social values.

MISSION

Department of Computer Science & Business Systems, Sri Sairam Engineering College is committed to

M1 Produce highly proficient Computer Science Professionals with managerial knowledge of global standards and practices.

M2 Ascertain new technologies through ethical and innovative research and developments

M3 Impart knowledge through learning, creativity and inculcate in them critical thinking with moral values.

AUTONOMOUS CURRICULA AND SYLLABI
Regulations 2024

SEMESTER I

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			TOTAL CONTACT HOURS	CREDITS
			L	T	P		
THEORY							
1	24BSMA102	Introductory Topics in Calculus, Probability and Statistics	3	0	0	3	3
2	24HSEN102	Business Communication and Value Science-I	3	0	0	3	3
3	24BSPH102	Physics for Computing Science	3	0	0	3	3
4	24ESEE101	Principles of Electrical Engineering	3	0	0	3	3
5	24ESCS101	Problem Solving and Programming in C	3	0	0	3	3
6	24HSTA101	Heritage of Tamils	1	0	0	1	1
PRACTICALS							
1	24BSPL102	Physics for Computing Science Laboratory	0	0	2	2	1
2	24ESPL101	Programming in C Laboratory	0	0	2	2	1
3	24ESPL102	Electrical Engineering Laboratory	0	0	4	4	2
VALUE ADDITIONS - I							
1	24ENTP101	Functional Life Skills	0	0	2	2	1
2	24ESID101	Idea Engineering Lab -I	0	0	2	2	1
ONLINE SUPPLEMENTARY							
		As recommended by BOS					
					Total	**28**	**22**

SEMESTER II

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			TOTAL CONTACT HOURS	CREDITS
			L	T	P		
THEORY							
1	24BSMA204	Discrete Mathematics for Computer Science	3	1	0	4	4
2	24HSEN202	Business Communication and Value Science–II	3	0	0	3	3
3	24BSPH205	Principles of Electronics Engineering	3	0	0	3	3
4	24BSMA205	Statistical Methods with Laboratory	3	0	2	5	4
5	24CBPC201	Data Structures and Algorithms	3	0	0	3	3
6	24HSTA201	Tamils and Technology	1	0	0	1	1
7	24CYMC201	Environmental Studies	2	0	0	2	0
8	24HSNC201	NCC Course Level 1*	2*	0	0	2*	0
PRACTICALS							
1	24BSPL201	Principles of Electronics Engineering Laboratory	0	0	2	2	1
2	24CBPL201	Data Structures and Algorithms Laboratory	0	0	4	4	2
VALUE ADDITIONS - II							
1	24ENTP201	Digital Dynamics	0	0	2	2	0
2	24ESID201	Idea Engineering Lab - II	0	0	2	2	1
ONLINE SUPPLIMENTARY							
1	24ESMC201	MS Office (Mandatory - NC)	0	0	0	0	0
					Total	**33**	**22**

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SEMESTER III

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			TOTAL CONTACT HOURS	CREDITS
			L	T	P		
THEORY							
1	24BSMA305	Linear Algebra	3	1	0	4	4
2	24HSMC301	Universal Human Values - II	3	0	0	3	3
3	24CBPC301	Software Engineering and Design	3	0	0	3	3
4	24CBPC302	Formal Language and Automata Theory	2	1	0	3	3
5	24ITPC301	Digital Design and Computer Organization	3	0	0	3	3
6	24CBMG301	Financial Management	3	0	0	3	3
7	24HSNC301	NCC Course Level 2*	3*	0	0	3*	0
PRACTICALS							
1	24CBPL301	Software Engineering and Design Laboratory	0	0	4	4	2
VALUE ADDITIONS - III							
1	24CBTP301	Aptitude Skills	0	0	2	2	1
2	24CBID301	Innovative Design Lab -I	0	0	2	2	1
ONLINE SUPPLEMENTARY							
		As recommended by BOS					
				Total		**27**	**23**

SEMESTER IV

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			TOTAL CONTACT HOURS	CREDITS
			L	T	P		
THEORY							
1	24BSMA405	Computational Statistics	3	0	0	3	3
2	24BSMA406	Operations Research with Laboratory	3	0	2	5	4
3	24CBPC401	Database Management Systems	3	0	0	3	3
4	24CBPW401	Operating Systems with Laboratory	3	0	2	5	4
5	24CBMG401	Introduction to Innovation, IP Management and Entrepreneurship	2	0	0	2	2
6	24XXOEXXX	Open Elective - I#	3	0	0	3	3
7	24HSNC401	NCC Course Level 3*	3	0	0	3*	0
PRACTICALS							
1	24CBPL401	Database Management Systems Laboratory	0	0	4	4	2
2	24CSPT401	Object Oriented Programming Laboratory with Theory	1	0	4	5	3
VALUE ADDITIONS - IV							
1	24CBTP401	Aptitude Skills	0	0	2	2	0
2	24CBID401	Innovative Design Lab - II	0	0	2	2	1
ONLINE SUPPLEMENTARY							
		As recommended by BOS					
				Total		**34**	**25**

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SEMESTER V

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			TOTAL CONTACT HOURS	CREDITS
			L	T	P		
THEORY							
1	24CBPC501	Compiler Design	3	0	0	3	3
2	24CBPW501	Design and Analysis of Algorithms with Laboratory	3	0	2	5	4
3	24CBMG501	Fundamentals of Economics	2	0	0	2	2
4	24XXELXXX	Professional Elective-I	3	0	0	3	3
5	24XXELYYY	Professional Elective-II	3	0	0	3	3
6	24XXOEXXX	Open Elective - II#	3	0	0	3	3
7	24MGMC501	Constitution of India	2	0	0	2	0
PRACTICALS							
1	24CBPL501	Compiler Design Laboratory	0	0	4	4	2
VALUE ADDITIONS - V							
1	24CBTP501	Skill Enhancement	0	0	2	2	1
2	24CBID501	Prototype Development Lab - I	0	0	2	2	1
ONLINE SUPPLEMENTARY							
		As recommended by BoS					
					Total	**29**	**22**

SEMESTER VI

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			TOTAL CONTACT HOURS	CREDITS
			L	T	P		
THEORY							
1	24CBPC601	Computer Networks	3	0	0	3	3
2	24CBPC602	Design Thinking	3	0	0	3	3
3	24XXELXXX	Professional Elective- III	3	0	0	3	3
4	24XXELYYY	Professional Elective- IV	3	0	0	3	3
5	24XXELZZZ	Professional Elective-V	3	0	0	3	3
6	24XXOEXXX	Open Elective - III	3	0	0	3	3
PRACTICALS							
1	24CBPL601	Computer Networks Laboratory	0	0	4	4	2
VALUE ADDITIONS - VI							
1	24CBTP601	Technical Skill	0	0	2	2	0
2	24CBID601	Prototype Development Lab - II	0	0	2	2	1
ONLINE SUPPLEMENTARY							
		As recommended by BoS			**Total**	**26**	**21**

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SEMESTER VII

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			TOTAL CONTACT HOURS	CREDITS
			L	T	P		
THEORY							
1	24CBPC701	IT Workshop	3	0	0	3	3
2	24CBPW701	IT Project Management with Laboratory	2	0	2	4	3
3	24CBPW702	Usability Design of Software Applications with Laboratory	2	0	2	4	3
3	24XXELXXX	Professional Elective- VI	3	0	0	3	3
4	24XXELYYY	Professional Elective- VII	3	0	0	3	3
5	24XXOEXXX	Open Elective - IV	3	0	0	3	3
PRACTICALS							
1	24CBPL701	Sky Lab/Mat Lab	0	0	2	2	1
2	24CBPJ701	Project Work - Phase I	0	0	8	8	4
VALUE ADDITIONS - VII							
1	24CBTP701	Company Specific Skills	0	0	2	2	1
ONLINE SUPPLEMENTARY							
		As recommended by BoS			**Total**	**32**	**24**

SEMESTER VIII

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			TOTAL CONTACT HOURS	CREDITS
			L	T	P		
PRACTICALS							
1	24CBPJ801	Project Work - Phase II	0	0	12	12	6
VALUE ADDITIONS - VIII							
1	24CBIN801	Internship	0	0	9	9	3
					Total	**21**	**9**

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PROFESSIONAL ELECTIVES - I

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24CBEL501	Conversational Systems	3	Artificial Intelligence
2	24CBEL502	Machine Learning	3	Artificial Intelligence
3	24CBEL503	Deep Learning	3	Artificial Intelligence
4	24CBEL504	Deep Learning for Computer Vision	3	Data Science
5	24CBEL505	Data Analytics with Python	3	Data Science
6	24CBEL506	Data Science for Engineers	3	Data Science
7	24CBEL507	Cloud, Micro Services and Applications	3	Emerging Technologies
8	24CBEL508	Augmented Reality/Virtual Reality	3	Emerging Technologies
9	24CBEL509	Cryptocurrency and Blockchain Technologies	3	Emerging Technologies
10	24CBEL510	Marketing Management	3	Management
11	24CBEL511	Computational Finance and Modeling	3	Management
12	24CBEL512	Psychology	3	Management

PROFESSIONAL ELECTIVES - II

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24CBEL513	Reinforcement Learning	3	Artificial Intelligence
2	24CBEL514	Computer Vision	3	Artificial Intelligence
3	24CBEL515	Natural Language Processing	3	Artificial Intelligence
1	24CBEL516	Data Analytics with Python	3	Data Science
2	24CBEL517	Learning Analytics Tools	3	Data Science
3	24CBEL518	Artificial Intelligence: Knowledge Representation and Reasoning	3	Data Science
1	24CBEL519	Data Mining and Analytics	3	Emerging Technologies
2	24CBEL520	Robotics and Embedded Systems	3	Emerging Technologies
3	24CBEL521	Modern Web Applications	3	Emerging Technologies
1	24CBEL522	Enterprise Systems	3	Management
2	24CBEL523	Advance Finance	3	Management
3	24CBEL524	B2B Marketing	3	Management

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PROFESSIONAL ELECTIVES - III

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24CBEL601	Optimization Techniques	3	Artificial Intelligence
2	24CBEL602	Cognitive Science and Analytics	3	Artificial Intelligence
3	24CBEL603	Image Processing and Pattern Recognition	3	Artificial Intelligence
1	24CBEL604	Exploratory Data Analysis	3	Data Science
2	24CBEL605	Recommender Systems	3	Data Science
3	24CBEL606	Text and Speech Analysis	3	Data Science
1	24CBEL607	Quantum Computation and Quantum Information	3	Emerging Technologies
2	24CBEL608	Extended Reality Applications	3	Emerging Technologies
3	24CBEL609	Robotic Process Automation	3	Emerging Technologies
1	24CBEL610	Fundamentals of Management	3	Management
2	24CBEL611	Human Resource Management for Entrepreneurs	3	Management
3	24CBEL612	Supply Chain Management	3	Management

PROFESSIONAL ELECTIVES - IV

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24CBEL613	Generative Artificial Intelligence	3	Artificial Intelligence
2	24CBEL614	Algorithmic Business Thinking	3	Artificial Intelligence
3	24CBEL615	Visualization Techniques	3	Artificial Intelligence
1	24CBEL616	Fundamentals of Blockchain Technology with Laboratory	3	Data Science
2	24CBEL617	Web Analytics	3	Data Science
3	24CBEL618	Ethics in Data Science	3	Data Science
1	24CBEL619	Service Oriented Architecture	3	Emerging Technologies
2	24CBEL620	IoT for Smart Cities	3	Emerging Technologies
3	24CBEL621	Dynamic Paradigm in IoT	3	Emerging Technologies
1	24CBEL622	Behavioral Economics	3	Management
2	24CBEL623	Entrepreneurship Development	3	Management
3	24CBEL624	Customer Relation Management	3	Management

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PROFESSIONAL ELECTIVES - V

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24CBEL625	Fundamentals of Edge and Soft Computing	3	Artificial Intelligence
2	24CBEL626	Software Defined Networks	3	Artificial Intelligence
3	24CBEL627	Pattern Recognition and Application	3	Artificial Intelligence
1	24CBEL628	Accelerated Data Science	3	Data Science
2	24CBEL629	NoSQL Database Techniques	3	Data Science
3	24CBEL630	Data Warehousing and Data Mining	3	Data Science
1	24CBEL631	Web of Things	3	Emerging Technologies
2	24CBEL632	Software and Programming in IoT	3	Emerging Technologies
3	24CBEL634	Digital Twin Technology	3	Emerging Technologies
1	24CBEL635	Integrated Marketing Communication	3	Management
2	24CBEL636	Operations and Supply Chain Management	3	Management
3	24CBEL637	Marketing Research and Analysis-II	3	Management

PROFESSIONAL ELECTIVES - VI

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24CBEL701	Bio Inspired Optimization Techniques	3	Artificial Intelligence
2	24CBEL702	Generative Deep Learning	3	Artificial Intelligence
3	24CBEL703	Affective Computing	3	Artificial Intelligence
1	24CBEL704	Database Security and Auditing	3	Data Science
2	24CBEL705	Predictive Modeling	3	Data Science
3	24CBEL706	Data Acquisition System	3	Data Science
1	24CBEL707	Cognitive Science and Analytics	3	Emerging Technologies
2	24CBEL708	Introduction to IoT	3	Emerging Technologies
3	24CBEL709	Cryptology	3	Emerging Technologies
1	24CBEL710	Financial Analytics	3	Management
2	24CBEL711	Social Text and Media Analytics	3	Management
3	24CBEL712	Industrial Psychology	3	Management

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PROFESSIONAL ELECTIVES - VII

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24CBEL713	Decision Support Systems	3	Artificial Intelligence
2	24CBEL714	Agent Based Intelligent Systems	3	Artificial Intelligence
3	24CBEL715	Artificial Intelligence Search Methods for Problem Solving	3	Artificial Intelligence
1	24CBEL716	Learning Analytics Tools	3	Data Science
2	24CBEL717	Mining Massive Datasets	3	Data Science
3	24CBEL718	BioInformatics	3	Data Science
1	24CBEL719	Quantum Computation and Quantum Information	3	Emerging Technologies
2	24CBEL720	Advanced Social, Text and Media Analytics	3	Emerging Technologies
3	24CBEL721	Mobile Computing	3	Emerging Technologies
1	24CBEL722	Risk Analytics	3	Management
2	24CBEL723	Enterprise Security	3	Management
3	24CBEL724	Business Strategy	3	Management

INDUSTRY CONNECTED PROFESSIONAL ELECTIVES
L&T BASKET

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24ITIE501	IT Primer	3	Information Technology
2	24ITIE502	Software Engineering Tools	3	Information Technology
3	24ITIE601	Data-Driven StoryTelling and Visualization	3	Information Technology
4	24ITIE602	Fundamentals of Business Analytics	3	Information Technology
5	24ITIE603	Node.JS - The Complete Guide	3	Cross-Platform
6	24ITIE604	Security Professional	3	Security and Risk Management
7	24CSIE601	Network Professional	3	Information Technology
8	24CSIE602	Cyber Defense	3	Information Technology
9	24ITIE701	Back-End Frameworks and APIs	3	Information Security
10	24ITIE702	AI and Edge Computing	3	Artificial Intelligence and Data Science

INDUSTRY CONNECTED PROFESSIONAL ELECTIVES
HCL BASKET

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24EIIE611	Embedded System For Connected Devices	3	Embedded
2	24CSIE612	C++ For Embedded Systems	3	Embedded
3	24ITIE711	Advanced C++ For Embedded Programming	3	Embedded
4	24EIIE712	Product Development Process	3	Embedded
5	24CBIE711	Project Phase-I	4	Embedded
6	24CBIE811	Internship	3	Embedded
7	24CBIE812	Project Phase-II	6	Embedded

INDUSTRY CONNECTED PROFESSIONAL ELECTIVES
SALESFORCE BASKET

S. NO	COURSE CODE	COURSE TITLE	CREDIT	DOMAIN
1	24ITIE503	Salesforce Administrator	3	Data Science
2	24CSIE504	Salesforce Developer	3	Data Science
3	24ITIE605	MuleSoft Anypoint Platform Fundamentals	3	Data Science
4	24CSIE606	Salesforce Business Analyst	3	Data Science

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1 The Graduants will explore and excel in emerging domains such as Analytics, Machine Learning, Cloud Computing, and Internet of Things and apply the knowledge to design and develop solutions to business and societal needs.

PEO 2 Graduates will perform Research by designing & developing solutions using modern tools for complex problems in the field of IT by adapting to the rapid technological advancements.

PEO 3 The students graduating will have profound knowledge in Computer Science with equal appreciation of humanities, management sciences and human values.

PEO 4 The Graduants will be industry ready with required business skills in service orientated industries.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1 Ability to create innovative software professionals with the emerging technologies and service orientations.

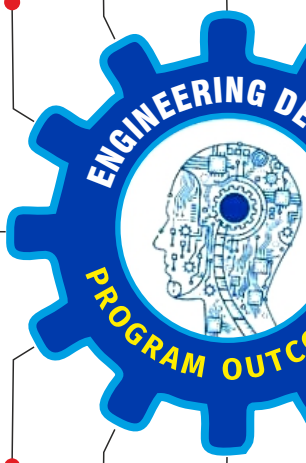
PSO 2 Ability to design and implement industry demand professionals with business principles aligned with equivalent knowledge in humanities and business systems.

COMPONENTS OF THE CURRICULUM (COC)

Course Component	Curriculum Content (% of total number of credits of the program)	Total number of contact hours	Total Number of credits
Basic Sciences (BS)	18	33	30
Engineering Sciences (ES)	5	14	09
Humanities and Social Sciences (HS)	7	11	11
Professional Electives (EL)	12	21	21
Program Core + Program Lab (PC+PL)	27	56	45
Program theory with Lab (PW) / Program Lab With Theory (PT)	10	23	17
Open Elective (OE)	7	12	12
Training & Placement (TP)	2	14	4
Innovation & Development (ID) / Project (PJ)	10	32	16
Internships (IN)	2	9	3
Mandatory Courses (MC)	NA	2	NA
Total		**227**	**168**

PROGRAMME OUTCOMES(POs)

PROGRAM OUTCOME REPRESENTS THE KNOWLEDGE, SKILLS AND ATTITUDES THAT THE STUDENTS WOULD BE EXPECTED TO HAVE AT THE END OF THE 4 YEAR ENGINEERING DEGREE PROGRAM



01 Engineering knowledge

Apply the basic principle and knowledge of mathematics, science and engineering principles to solve technical problems.

02 Problem Analysis

Identify and analyze complex engineering problems reaching logical conclusions using the basic principles of mathematics, science and engineering.

03 Development of solutions

Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs.

04 Investigate complex problems

Perform investigations, use research based knowledge and conduct experiments, analyze and interpret the results to provide valid conclusions.

05 Modern tool usage

Create, select and apply the latest techniques, resources and modern engineering / IT tools to develop appropriate solutions with an understanding of the limitations.

06 The Engineer and Society

Apply reasoning based on contextual knowledge to assess societal, legal and cultural issues with competency in professional engineering practices.

07 Environment & Sustainability

Demonstrate professional skills, knowledge and contextual reasoning to assess / environmental / societal issues for sustainable development.

08 Apply ethical principles

Apply ethical principles and commit to professional ethics and responsibilities based on the norms of professional engineering pratices.

09 Individual & Teamwork

Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary professional settings.

10 Communicate effectively

Communicate effectively amongst the engineering community, being able to comprehend & write effective reports, make presentations & give/receive clear instructions.

11 Project management

Demonstrate knowledge and apply the principles of engineering & management in their own / team projects in multidisciplinary environments.

12 Life-long learning

Recognize the need for, and have the preparation, ability to engage in independent and life-long learning in the context of technological change.

SEMESTER - I

24BSMA102 SDG NO. 4	INTRODUCTORY TOPICS IN CALCULUS, PROBABILITY AND STATISTICS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To impart basic knowledge in differential and integral calculus and apply it to solve a wide variety of engineering problems.
- To introduce the fundamental concepts in the theory of probability and statistics for studying engineering subjects.

MODULE - I DIFFERENTIAL CALCULUS 8

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

MODULE - II INTEGRAL CALCULUS 8

Definite and Indefinite Integrals - Types of Integration: Integration by substitution, Integration by parts, Bernoulli's formula - Double and Triple Integrals (Cartesian coordinates) - Applications of double and triple Integrals - Area and Volume.

MODULE - III PROBABILITY AND RANDOM VARIABLES 8

Concept of experiments, sample space, event - Definition of Combinatorial Probability - Conditional Probability - Bayes theorem - Expected values and moments: mathematical expectation and its properties - Moments (including variance) and their properties, interpretation - Moment generating function.

MODULE - IV DISCRETE PROBABILITY DISTRIBUTIONS 5

Binomial, Poisson and Geometric distributions.

MODULE - V CONTINUOUS PROBABILITY DISTRIBUTIONS 8

Uniform, Exponential, Normal, Chi-square, t and F distributions.

MODULE - VI INTRODUCTION TO STATISTICS 8

Definition of Statistics - Basic objectives. Applications in various branches of science with example - Collection of data: Internal and external data, primary and secondary data - Population and sample, representative sample - Descriptive statistics: Classification and tabulation of univariate data,

graphical representation, frequency curves - Descriptive measures - central tendency and dispersion - Bivariate data, summarization, marginal and conditional frequency distribution.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, 44th Edition, Khanna Publishers, New Delhi, 2023.
2. Introduction of Probability Models, S. M. Ross, 12th Edition, Academic Press, N.Y., 2019.
3. Fundamentals of Statistics, vol. I & II, A. Goon, M. Gupta and B. Dasgupta, 3rd Edition, World Press Private Ltd., 1968.

REFERENCES:

1. Advanced Engineering Mathematics, Peter V. O'Neil, 7th Edition, Cengage Learning, 2011.
2. Advanced Engineering Mathematics, M. D. Greenberg, 2nd Edition, Pearson Education, 1998.
3. Applied Mathematics, Vol. I & II, P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Ghriha Prakashan, 1999.
4. A first course in Probability, S. M. Ross, 8th Edition, Pearson, 2010.
5. Probability and Statistics for Engineers, I. R. Miller, J. E. Freund and R. Johnson 8th Edition, PHI, 2011.
6. Introduction to the Theory of Statistics, A. M. Mood, F. A. Graybill and D. C. Boes, 3rd Edition, McGraw Hill Education, 2017.

WEB RESOURCES:

1. https://tinyurl.com/2uyw3eys
2. https://amsi.org.au/ESA_Senior_Years/PDF/IntroDiffCall3b.pdf
3. https://mlerma54.github.io/courses/math214-2-02f/notes/c2-all.pdf
4. https://www.gpnngr.org.in/lms/1st%20Year%20Integral%20calculus.pdf
5. https://www.ebookbou.edu.bd/Books/Text/SOB/MBA/mba_2306/Unit-10.pdf
6. https://www.schoollearningresources.com/PDF/_Basics%20of%20Statistics.pdf
7. http://eflorakkl.in/staff/uploads2/Multiple%20Integrals%20and%20their%20Applications.pdf

ONLINE RESOURCES

1. https://www.khanacademy.org/math/statistics-probability
2. https://www.khanacademy.org/math/differential-calculus
3. https://www.khanacademy.org/math/integral-calculus
4. https://www.youtube.com/watch?v=mIeeVrv447s&t=55s
5. https://www.youtube.com/playlist?list=PLpklqhIbn1jq348mSrMmmWMQlixyG8Snk

OUTCOMES:

Upon completion of the course, the student should be able to

1. Evaluate the limit, examine the continuity and use derivatives to find extreme values of function. (K3)
2. Evaluate indefinite and definite integrals of algebraic, exponential, trigonometric and logarithmic functions and apply double and triple integrals for finding area of a region and volume of a surface. (K3)
3. Calculate the probability, conditional probability and statistical averages of events. (K3)
4. Apply standard discrete distributions in solving real life problems. (K3)
5. Apply standard continuous distributions in solving real life problems. (K3)
6. Analyze statistical data using measures of central tendency, dispersion and location. (K3)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	1	-	-	-	-	-	-	-	1
CO2	3	1	1	1	-	-	-	-	-	-	-	1
CO3	3	1	1	1	-	-	-	-	-	-	-	1
CO4	3	1	1	1	-	-	-	-	-	-	-	1
CO5	3	1	1	1	-	-	-	-	-	-	-	1
CO6	3	1	1	1	-	-	-	-	-	-	-	1

SEMESTER - I

24HSEN102 SDG NO. 4	BUSINESS COMMUNICATION AND VALUE SCIENCE – I	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To motivate the learners to look within and create a better version of themselves
- To develop the basic LSRW skills of the learners
- To understand and use the tools of structural written communication
- To help students to identify personality traits and to gain social awareness
- To understand and apply the values of life skills

MODULE - I SELF AWARENESS 8

Self Intro - Self Awareness - Activity: Who Am I? - SWOT - TOWS - Reading Newspaper (Skimming & Scanning) - Writing Newspaper Report - Listening to TED Talks - Activity: Speaking: About oneself

MODULE - II BASIC TENETS OF COMMUNICATION 8

Overview of Communication Skills - Barriers in Communication - Verbal/Nonverbal Communication - Critical Reading (Essays) - Listening to Conversations - Role Play: Interviewing Celebrities

MODULE - III WRITTEN COMMUNICATION 8

Email etiquettes & Email writing - Drafting Resume and applying for a job - Paragraph Writing - Summary Writing - Creative Writing

MODULE - IV PERSONALITY TRAITS 7

Big Five Personality Traits - Introduction to Social Issues - Activity: Skit on Social Issues -- Review Writing - Listening to Audiobooks - Speaking: Group Discussion on Social Issues

MODULE - V LIFE SKILLS 7

Introduction to Life Skills - Skills and Values of a Captain - Belbin's Team Roles - Reading (Stories/Novels) - Story Writing based on Life Skills - Watching videos on Empathy - 'Fish and I'(Babak Habibifar)

MODULE - VI LEADERSHIP TRAITS 7

Intro on leadership traits - role of team member - teamwork - motivating people – Group discussion: TCS Values – respect for individual and integrity - Speaking: Situational Dialogues

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Parikh J P, Anshu Surve, et.al, Business Communication: Basic Concepts and Skills, Orient BlackSwan, 2011.
2. Lawrence G. Fine, The SWOT Analysis: Using Your Strength to Overcome Weaknesses, Using Opportunities to Overcome Threats, 2010.
3. B. Hurn& B. Tomalin, Cross-Cultural Communication Theory and Practice, Palgrave Macmillian, 2013.

REFERENCES:

1. English vocabulary in use – Alan Mccarthy and O'dell
2. The Handbook of Communication in Cross-cultural Perspective, Ed. DonalCarbaugh, Routledge, September 5, 2016
3. Urban Diversity: Space, Culture, and Inclusive Pluralism in Cities Worldwide, Eds. Caroline Wanjiku, Blar A. Rubieet. al, John Hopkins University Press, 2010

WEB REFERENCES:

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

ONLINE RESOURCES:

1. https://www.coursera.org/learn/learning-how-to-learn
2. https://www.coursera.org/specializations/effective-business-communication

OUTCOMES:

Upon completion of the course, the student should be able to

1. Analyze their own self and write reports employing grammatically correct sentences (K3)

2. Apply the basic tenets of communication and engage in conversations by expressing appropriate verbal and non-verbal cues and methods (K3)
3. Summarize the given passage and to construct resume and emails in a convincing manner (K3)
4. Understand positive personality traits and recognize social issues (K2)
5. Apply life skills for different situations and developing a positive self image (K3)
6. Exhibit leadership qualities and display team spirit (K3)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO6	-	-	-	-	-	-	-	-	3	3	-	3	-	-

SEMESTER - I

24BSPH102 SDG NO. 4	PHYSICS FOR COMPUTING SCIENCE	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To learn the Fundamentals of Interference and Polarization properties of light.
- To learn the basic ideas in Thermodynamics.
- To understand the Principles of Oscillations.
- To understand the ideas in crystallography.
- To understand the Fundamentals of Lasers and Fiber optics.
- To learn the basic ideas in Electromagnetism.

MODULE - I INTERFERENCE - PRINCIPLE OF SUPERPOSITION YOUNG'S EXPERIMENT 8

Introduction- Interference – Conditions - Coherence - Superposition -Young's double slit Experiment - Theory of Interference Fringes – Newton's Rings –

Diffraction – Types - Fresnel's biprism – difference between Interference and Diffraction - Fraunhofer Diffraction at Single Slit - Plane Diffraction Grating. Polarization of light: Introduction – Concept of production of polarized beam of light from two SHM acting at right angle; Plane, Elliptical and Circularly Polarized Light- Brewster's Law - Double Refraction.

MODULE - II THERMODYNAMICS 7

Introduction – Difference between dynamics and thermodynamics – Thermodynamic system – Thermodynamic properties (Intensive and Extensive variables) – Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law -second law of thermodynamics and concept of Engine – entropy – change in entropy in reversible and irreversible processes.

MODULE - III OSCILLATION 8

Introduction– Periodic motion – simple harmonic motion – characteristics – Free vibration of simple spring mass system – Resonance – Types – Applications. Damped harmonic oscillator – heavy, critical and light damping – Energy Decay in a Damped Harmonic Oscillator – Quality Factor – Forced Mechanical and Electrical Oscillators.

MODULE - IV CRYSTALLOGRAPHY 7

Introduction – Classification – Unit cell – Crystal system – Bravais Lattices–Miller Indices – D – Spacing – Basic parameters for Cubic system (SC, BCC, FCC) and HCP crystal Structures – Crystal defects – Burger vector.

MODULE - V LASER AND FIBER OPTICS 8

Introduction– principle – Characteristics of Laser - Temporal and Spatial Coherence (Qualitative). Einstein's Theory of Matter Radiation Interaction and A and B Co-efficient – Amplification of Light by Population Inversion – Different Types of Lasers: CO2 and Neodymium Lasers– Engineering Applications of Lasers. Fiber optics – Types of optical fibers (material, refractive index and mode). Losses associated with optical fibers – applications.

MODULE - VI BASIC IDEA OF ELECTROMAGNETISMS 7

Introduction – principles – current density – Continuity Equation for Current Densities - Maxwell's Equation – Electromagnetic wave equation– Maxwell's Equation in Vacuum and Non-conducting Medium – Transverse nature of electromagnetic waves– Relation between $E\rightarrow$ and $H\rightarrow$ of plane electro–magnetic waves in free space – Poynting theorem - applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. A Beiser, "Concepts of Modern Physics", McGraw Hill International, Fifth Edition, 2017.
2. Robert Resnick and Jearl Walker, "Fundamentals of Physics", David Halliday, Wileyplus, 2004.
3. Solid state physics (10th Edition) By S. O. Pillai, 2023
4. Heat and Thermodynamics, Brijlal, Subramaniyam.N, 2018

REFERENCE BOOKS:

1. Optics, (Fifth Edition) AjoyGhatak, Tata McGraw Hill.
2. Sears & Zemansky University Physics, Addison-Wesley.
3. Fundamentals of Optics, (Third Edition) Jenkins and White, McGraw-Hill.
4. Introduction to Solid state physics Kittal, Wiley India Edition.
5. Principles of Optics: Electromagnetic Theory of Propagation, Interference and Diffraction of Light, Max Born, Emil Wolf, Cambridge University Press.

OUTCOMES:

Upon completion of the course, the student should be able to

1. Expressing the knowledge of interference, Diffraction and polarization of light. (K2)
2. Outlining the basics of thermodynamics. (K1)
3. Understand the principles lying behind oscillations. (K2)
4. Understand the various structure and defects crystallography. (K2)
5. Summarizing the concept of laser and fiber in various fields of applications. (K2)
6. Expressing the basics knowledge of electromagnetism. (K1)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	-	-	-	-	-	1
CO2	3	2	2	-	1	-	-	-	-	-	-	1
CO3	3	2	2	-	1	-	-	-	-	-	-	1
CO4	3	3	2	1	1	-	-	-	-	-	-	1
CO5	3	2	2	2	1	-	-	-	-	-	-	1
CO6	3	2	2	2	1	-	-	-	-	-	-	1

SEMESTER - I

24ESEE101 SDG NO. 4 & 9	PRINCIPLES OF ELECTRICAL ENGINEERING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To introduce basic electric circuits and its elements.
- To impart knowledge on solving DC circuit equations using network theorems.
- To educate on solving AC circuit and three phase circuits.
- To introduce the concept of Electrostatics and Electromagnetics.
- To impart the fundamentals of Measurement technique and various sensors.

MODULE - I INTRODUCTION 8

Active and passive elements – Current and voltage relationships - Voltage and current sources - Ideal and practical sources – Reduction of networks using series and parallel combinations - Concept of work, power and energy - Kirchhoff's laws.

MODULE - II BASIC CIRCUITS 8

Network reductions using mesh and nodal analysis - Reduction of DC networks using Superposition theorem - Thevenin's theorem - Norton's Theorem - Maximum Power Transfer theorem - Star/Delta transformation.

MODULE - III FUNDAMENTALS OF AC 8

AC waveform definitions, form factor, peak factor, phasor representation, concept of impedance, admittance, complex power, power factor, single phase and three phase concepts - Study of RL, RC, RLC series and parallel circuit, Series resonance.

MODULE - IV ELECTROSTATICS 7

Electrostatic field - Electric field strength - Concept of permittivity in dielectrics - Energy stored in capacitors - Charging and discharging of capacitors.

MODULE - V ELECTROMAGNETICS 7

Electromagnetism, magnetic field and Faraday's law - Magnetic materials and B-H curve - Self and mutual inductance - Ampere's law - Electromechanical energy conversion - Transformers and its types.

MODULE - VI MEASUREMENTS AND TRANSDUCERS 7

Functional block of measuring devices/sensors and transducers - Piezoelectric and thermocouple - Elementary methods for the measurement of electrical quantities - Concept of indicating, integrating and recording instruments.

TOTAL : 45 Periods

TEXT BOOKS:

1. A. E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, "Electric Machinery", Sixth Edition, Tata McGraw Hill.
2. B. L. Theraja, "A Textbook of Electrical Technology", Vol. I, Chand and Company Ltd., New Delhi.
3. V. K. Mehta, "Basic Electrical Engineering", S. Chand and Company Ltd.,New Delhi.
4. J. Nagrath and Kothari, "Theory and problems of Basic Electrical Engineering", Second Edition, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. T. K. Nagsarkar and M. S. Sukhija, "Basic of Electrical Engineering", Oxford University Press, 2011.
2. D. J. Grif_iths, "Introduction to Electrodynamics", Fourth Edition,Cambridge University Press.
3. William H. Hayt& Jack E. Kemmerly, "Engineering Circuit Analysis",McGraw-Hill Book Company Inc.
4. Smarjith Ghosh, "Fundamentals of Electrical and Electronics Engineering", Prentice Hall (India) Pvt. Ltd.

WEB REFERENCES:

1. www.electrical4u.net/useful-information/top-10-electrical-website-forelectrical-engineering-students/#2_Electrical4ucom
2. www.academia.edu/35125273/Engineering_Principles_and_Applications_of_Electrical_Engineering

ONLINE RESOURCES:

1. https://swayam.gov.in/nd1_noc19_ee35/preview
2. https://swayam.gov.in/nd1_noc19_ee35/preview
3. https://nptel.ac.in/courses/108105112

OUTCOMES:

Upon completion of the course, the student should be able to

1. Choose the concept of Basic electric circuits with series and parallel circuit. (K1)
2. Apply electrical laws to AC & DC Circuits and Solve for Single Phase and Three Phase Circuits. (K3)
3. Outline the basic concepts of AC Circuits with R, L and C. (K2)
4. Apply the concept of Electrostatics and energy storage in capacitors. (K3)
5. Apply the concept of Electromagnetics, inductors and electromechanical energy conversion (K3)
6. Summarize the various measurements techniques and transducers in electrical engineering. (K2)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	-	-	-	-	-	2	2	2
CO2	2	2	2	2	2	2	-	-	-	-	-	2	2	2
CO3	2	2	2	2	2	2	-	-	-	-	-	2	2	2
CO4	2	2	2	2	2	2	-	-	-	-	-	2	2	2
CO5	2	2	2	2	2	2	-	-	-	-	-	2	2	2
CO6	2	2	2	2	2	2	-	-	-	-	-	2	2	2

SEMESTER - I

24ESCS101 SDG NO. 4 & 9	PROBLEM SOLVING AND PROGRAMMING IN C	L	T	P	C
		3	0	0	3

OBJECTIVES:

- Interpret Mathematical problems using algorithms, flowchart and pseudocode.
- To understand about the programming language
- To develop C Programs using basic Programming Constructs, Loops, Arrays and Strings
- To develop applications in C using Functions, Pointers and Structures
- To perform I/O operations and File Handling in C

MODULE - I INTRODUCTION TO PROGRAMMING AND ALGORITHMS FOR PROBLEM SOLVING 7

Introduction to Problem Solving through programs- Algorithm-Flowchart–Pseudocode-Memory, Variables, Values, Instructions, Programs-compilation process-Syntax and Semantic Errors- The language of C : Phases of developing a running computer program in C - Character set – Constants – Keywords – Primitive data types –Declaration, Type Conversion

MODULE - II BASICS OF C PROGRAMMING 7

Sequential- Arithmetic Operators, Relational Operators, Logical Operators, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, selective – If Else-If, Switch- repetitive structures-for, while, do while, Nested loops, go to, break, continue –Finding maximum of 3 numbers, Unit converters, Interest calculators, multiplication tables, GCD and LCM, Prime number generation

MODULE - III ARRAYS AND STRINGS 8

Introduction to Arrays: Declaration, Initialization – One Dimensional Array – Example Program: Computing Mean, Median and Mode - Two Dimensional Arrays – Example Program: Matrix Operations (Addition, Scaling, Determinant and Transpose) - String Operations: Length, Compare, Concatenate - Copy – Selection Sort - Linear and Binary Search.

MODULE - IV FUNCTIONS AND POINTERS 9

Introduction to Functions: Function Prototype, Function Definition, Function Call, Built-in Functions (String Functions, Math Functions) – Recursion – Example Program: Computation of Sine Series - Scientific Calculator using Built-in Functions - Binary Search using Recursive Functions - Factorial and Fibonacci Generation - Towers of Hanoi problem - – Pointers – Pointer Operators – Pointer Arithmetic – Arrays and Pointers –Array of Pointers – Example Program: Sorting of Names – Parameter Passing: Pass by Value - Pass by Reference – Example Program: Swapping of Two Numbers using Pass by Reference.

MODULE - V STRUCTURES 7

Structure - Nested Structures – Pointer and Structures – Array of Structures – Example Program using Structures and Pointers – Self Referential Structures – Dynamic Memory Allocation - Singly Linked List – Typedef.

MODULE - VI FILE PROCESSING 7

Files – Types of File Processing: Sequential Access, Random Access – Sequential Access File - Example Program: Finding Average of Numbers stored in Sequential Access File - Random Access File - Example Program:

Transaction Processing Using Random Access Files – Command Line Arguments.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. R.G. Dromey, "How to solve it by Computers", Reprint, PHI Publishers, 2011.
2. Reema Thareja, “Programming in C”, Oxford University Press, Second Edition, 2018.
3. Kernighan, B.W and Ritchie D.M, “The C Programming language”, Second Edition, Pearson Education, 2015.

REFERENCES:

1. Yashwant Kanetkar, "Let us C", 18th Edition, BPB Publications, 2021.
2. Byron Gottfried, "Programming with C", Fourth Edition, Tata McGraw Hill Education, 2018.
3. Paul Deitel and Harvey Deitel, “C How to Program”, Seventh edition, Pearson Publication, 2015.
4. Jeri R. Hanly & Elliot B.Koffman, “Problem Solving and Program Design in C”, Pearson Education, 2013.
5. Pradip Dey, Manas Ghosh, “Fundamentals of Computing and Programming in C”, First Edition, Oxford University Press, 2009.
6. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
7. Hanly J R & Koffman E.B, “Problem Solving and Programme design in C”, Pearson Education, 2009.

WEB REFERENCES:

1. https://www.learn-c.org/
2. https://codeforwin.org/
3. https://www.cprogramming.com

ONLINE RESOURCES:

1. https://www.linuxtopia.org/online_books/programing_books/gnu_c_programming_tutorial
2. https://nptel.ac.in/courses/106105171
3. https://swayam.gov.in/nd1_noc19_cs42/preview

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Understand the concepts of algorithms for solving a problem.(K2)
2. Illustrate the various constructs in C to develop simple applications.(K3)
3. Understand the concepts of Array & Strings.(K2)
4. Demonstrate the usage of Functions and Pointers.(K3)
5. Explain the Structure and union concepts.(K2)
6. Describe the file manipulation and its organisation.(K2)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	-	-	-	2	2	2	2
CO2	3	3	3	3	2	-	-	-	-	-	2	2	2	2
CO3	3	3	3	3	2	-	-	-	-	-	2	-	2	2
CO4	2	2	-	2	2	-	-	-	-	-	1	-	3	2
CO5	2	2	-	-	1	-	-	-	-	-	1	-	3	3
CO6	2	2	-	-	2	-	-	-	-	-	1	-	3	3

SEMESTER - I

24HSTA101 SDG NO. 4	HERITAGE OF TAMILS	L	T	P	C
		1	0	0	1

OBJECTIVES:

- Develop interest for classical language and literature to promote Tamil heritage
- Understand the ancient Tamil sculptures, folk and martial arts and contribution of Tamil to the freedom of India

UNIT - I LANGUAGE AND LITERATURE **3**

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.

UNIT - II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

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

UNIT - III FOLK AND MARTIAL ARTS 3

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

UNIT - IV THINAI CONCEPT OF TAMILS 3

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

UNIT - V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

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.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

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

தமிழர் மரபு

அலகு - I மொழி மற்றும் இலக்கியம்: 3

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

அலகு - II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை: 3

நடுகல் முதல் நவீன சிற்பங்கள் வளர - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - கதர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு - III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்: 3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலொட்டம், தொல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு - IV தமிழர்களின் திறைக் கோட்பாடுகள்: 3

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

அலகு - V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்ப்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: 3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).

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

OUTCOMES:

Upon completion of the course, the learners will be able to:

1. Understand Tamil as a classical language & Literature (K2)
2. Explore about Tamil Heritage & Sculptures,Role of temples (K2)
3. Appreciate Sports and games of Tamils (K2)
4. Perceive Thinai concept of Tamils (K2)
5. Comprehend Education and literacy during Sangam Age (K2)
6. Understand the Contribution of Tamils to National Movement & Indian Culture (K2)

CO- PO, PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO3	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO6	-	-	-	-	-	3	-	-	-	-	-	3	-	-

SEMESTER - I

24BSPL102 SDG NO. 4	PHYSICS FOR COMPUTING SCIENCE LABORATORY	L	T	P	C
		0	0	2	1

OBJECTIVES:

- Study the variation of magnetic field along the axis of the current carrying coil and finding out the Hall coefficient of a given semiconductor.
- To determine experimentally the value of Planck's constant and Stefan's constant.
- To find wavelength of a given light source by diffraction method.
- To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.
- To find the wavelength of a light source by Newton's ring method.
- To determine the laser wavelength and fiber optic parameters of a cable and size of the particle.

LIST OF EXPERIMENTS:

1. Magnetic field along the axis of current carrying coil – Stewart and Gee.
2. Determination of Hall coefficient of semiconductor.
3. Determination of Planck constant.
4. Determination the angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.
5. Determination of wavelength of light by Laser diffraction method.
6. Determination of particle size of lycopodium powder using semiconductor laser.
7. Determination of wavelength of light by Newton's Ring method.
8. Determination of laser and optical fiber parameters.
9. Determination of Stefan's Constant.
10. Determination the wavelength of spectral lines using plane transmission Grating.

TOTAL : 30 PERIODS

LAB REQUIREMENTS:

1. Stewart and Gee experimental set up to determine magnetic field 15 sets
2. Hall coefficient determination-experimental set-up 15 sets
3. Planck's constant experimental set-up 15 sets
4. Diffraction method -experimental set up to find wavelength of light source 15 sets

5. Newton's ring method -experimental set-up to find out wavelength of light 15 sets
6. Minimum deviation method - experimental set-up to find out wavelength of light 15 sets
7. Diode lasers source (5to 10 mW) 15 nos
8. OFC cables- various diameters -3 types , lycopodium powder coating glass plate 15 nos
9. Accessories for electronic experiments- wires,cutters, magnets, etc. 15 sets
10. Sodium Vapor lamp 30 nos
11. Prism and Grating 15 nos
12. Stefan's constant experimental determination set-up 15 sets

OUTCOMES:

Upon completion of the course, the student should be able to

1. Demonstrate magnetic fields along a certain direction. (K2)
2. Illustrate the Hall coefficient of a semiconductor. (K2)
3. Demonstrate the value of Planck's constant. (K2)
4. Find the wavelength of light using the diffraction and minimum deviation method. (K2)
5. Determine the wavelength of a laser and find optical fiber parameters and size of the particle. (K2)
6. Find Stefan's constant and establish Stefan's law. (K2)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	-	-	-	-	-	-	2
CO2	3	2	2	2	2	-	-	-	-	-	-	2
CO3	3	2	2	2	2	-	-	-	-	-	-	2
CO4	3	2	2	2	2	-	-	-	-	-	-	1
CO5	3	3	2	2	2	-	-	-	-	-	-	1
CO6	3	3	2	2	2	-	-	-	-	-	-	1

SEMESTER - I

24ESPL101 SDG NO. 4 & 9	PROGRAMMING IN C LABORATORY	L	T	P	C
		0	0	2	1

OBJECTIVES:

- To develop programs in C using basic Programming Constructs
- To develop applications in C using Arrays and Strings
- To design and implement applications in C using Functions, Structures
- To develop applications in C using Files

LIST OF EXPERIMENTS

1. Write a program using I/O statements and expressions.
2. Write programs using decision-making constructs.
3. Write a program to find whether the given year is a leap year or not? (Hint: not every century is a leap. For example 1700, 1800 and 1900 is not a leap year)
4. Write a program to perform the Calculator operations, namely, addition, subtraction, multiplication, division and square of a number.
5. Write a program to check whether a given number is an Armstrong number or not?
6. Write a program to check whether a given number is odd or even?
7. Write a program to find the factorial of a given number.
8. Write a program to find out the average of 4 integers.
9. Write a program to print half pyramid of *.
10. Write a program to display array elements using two dimensional arrays.
11. Write a program to perform swapping using a function.
12. Write a program to display all prime numbers between two intervals using functions.
13. Write a program to solve towers of Hanoi using recursion.
14. Write a program to get the largest element of an array using the function.
15. Write a program to concatenate two strings.
16. Write a program to find the length of String.
17. Write a program to find the frequency of a character in a string.
18. Write a program to store Student Information in Structure and Display it.

19. The annual examination is conducted for 10 students for five subjects. Write a program to read the data and determine the following:

(a) Total marks obtained by each student.

(b) The highest marks in each subject and the marks of the student who secured it.

(c) The student who obtained the highest total marks.

20. Write a program to demonstrate file operations (e.g. count the number of characters, words and lines in a file, replace a specific word with the given word in the same file).

TOTAL: 30 PERIODS

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Stand alone desktops with C compiler 30 Nos. (Or)
   Server with C compiler supporting 30 terminals or more.

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Illustrate C programs for simple applications making use of basic constructs, arrays, strings, functions and recursion.(K2)
2. Demonstrate C programs involving pointers, and structures. (K3)
3. Interpret applications using sequential and random access files. (K3)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	-	-	-	-	3	1	2
CO2	3	3	3	3	2	-	-	-	-	-	-	3	2	1
Co3	3	3	3	3	2	-	-	-	-	-	-	3	3	2

SEMESTER - I

24ESPL102 SDG NO. 4&9	ELECTRICAL ENGINEERING LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- To simulate various electric circuits using Pspice/ Matlab
- To gain practical experience on electric circuits and verification of theorems
- To gain practical Knowledge on electric circuits transients and resonance

LIST OF EXPERIMENTS :

1. Study of Electrical elements, sources, measuring devices and transducers.
2. Experimental solving of electrical circuit problems using Kirchhoff's voltage and current laws.
3. Experimental solving of electrical circuit problems using Thevenin's theorem.
4. Experimental solving of electrical circuit problems using Norton's theorem.
5. Experimental solving of electrical circuit problems using Superposition theorem.
6. Measurement of variation of resistance of a thermistor with temperature.
7. Experimental verification of Maximum Power transfer Theorem.
8. Simulation of R-C electric circuit transients.
9. Simulation of frequency response of RLC electric circuit.
10. Measurement of energy using a single phase energy meter.

TOTAL: 45 PERIODS

LAB REQUIREMENT FOR A BATCH OF 30 STUDENTS / 2 STUDENTS PER BATCH:

S.No	EQUIPMENTS	
1.	Regulated Power Supply: 0 – 15 V D.C / Distributed Power Source.	10 Nos
2.	Function Generator (1 MHz)	10Nos
3.	Single Phase Energy Meter	1 No
4.	Oscilloscope (20MHz)	10 Nos
5.	Digital Storage Oscilloscope (20 MHz)	1 No
6.	Thermistor and RTD	each 1 No
7.	10 Nos of PC with Circuit Simulation Software (min 10 Users) (e-Sim / Scilab/ Pspice / Matlab / other Equivalent software Package) and Printer	(1No.)
8.	AC/DC - Voltmeters (10 Nos.), Ammeters (10 Nos.) and Multi-meters (10 Nos.) 8 Single Phase Wattmeter	3 Nos
9.	Decade Resistance Box, Decade Inductance Box, Decade Capacitance Box Each	6 Nos
10.	Circuit Connection Boards	10Nos

OUTCOMES:

Upon completion of the course, the student should be able to

1. Use laboratory equipment and techniques to measure electrical quantities using multi-meters, power supplies and oscilloscopes. (K1)
2. Understand DC and AC Network theorems and apply to them in laboratory measurements. (K2)
3. Analyze the transient response of series RL and RC electric circuits. (K4)
4. Simulate the frequency behavior of RLC electric circuits. (K6)
5. Design and simulate the resonance circuits. (K6)
6. Build applications using electrical AC & DC circuits. (K6)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO2	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO3	3	3	3	2	2	2	-	-	2	-	-	2	3	3
CO4	3	3	3	2	2	2	-	-	2	-	-	2	3	3
CO5	3	3	3	2	2	2	-	-	2	-	-	2	3	3
CO6	3	3	3	2	2	2	-	-	2	-	-	2	3	3

SEMESTER - I

24ENTP101 SDG NO. 4	FUNCTIONAL LIFE SKILLS	L	T	P	C
		0	0	2	1

OBJECTIVES:

- Resolve common communication problems
- Observe the effectiveness of nonverbal messages
- Communicate precisely through the digital media
- Understand the importance of empathetic listening
- Explore reading and speaking processes

MODULE - I LISTENING **5**

Techniques of effective listening

Listening and comprehending

Probing questions

Barriers to listening
Reflection from listening

MODULE - II SPEECH MECHANICS **5**

Pronunciation
Enunciation
Vocabulary
Fluency
Common errors

MODULE - III READING SKILLS **5**

Techniques of effective reading
Kinds of reading
Gathering ideas and information from the text
Evaluating the ideas and information
Interpreting the text from multiple angles

MODULE - IV WRITING ASPECTS **5**

Writing process
Effective writing strategies
Different modes of writing
Optimizing the use of resources
Editing

MODULE - V PRESENTATION SKILLS **5**

Types of presentations
Nonverbal communication
Understanding the purpose and the audience
Beginning and closure of presentations
Presentation tools and strategies

MODULE - VI ARTICULATION ASPECTS **5**

Perform exercises
Slow speeches
Long speeches
Monologues, Dialogues and Conversation
Feedback necessity

TOTAL : 30 PERIODS

REFERENCES:

1. Sen, Madhuchanda.2010, An Introduction to Critical Thinking, Delhi, Pearson.
2. Effective Communication Skills Strategies for Success. Edited by Nitin Bhatnager and Mamta Bhatnager. 2023, Pearson
3. Technical Communication: Principles and Practice, Meenakshi Raman and Sangeeta Sharma. Oxford University Press, 2015

WEB REFERENCES:

1. https://swayam.gov.in/nd1_noc19_hs31/preview
2. https://www.myenglishpages.com/speaking/#google_vignette

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Utilize various listening techniques effectively (K1)
2. Demonstrate the ability to speak spontaneously in different contexts (K1)
3. Comprehend and interpret written texts accurately (K2)
4. Exhibit the ability to write freely with sufficient and relevant content (K1)
5. Articulate explanations clearly and concisely (K1)
6. Understand and present convincing speeches/ arguments effectively (K2)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	2	-	2	-	-

SEMESTER - I

24ESID101 SDG NO. 1-17	IDEA ENGINEERING LAB - I	L	T	P	C
		0	0	2	1

OBJECTIVES:

- To understand the significance of Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) of the United Nations
- To familiarize with SDG targets and indicators
- To identify the Constitutional implementation pertaining to SDGs in Panchayat Raj
- To acquire knowledge of the State and the Central government welfare schemes
- To recognise the role of educational institutions' in community development
- To develop critical thinking skills to address complex societal challenges through an immersion program

MODULE - I United Nations Sustainability and the Sustainable Development Agenda **3**

- Introduction to Sustainability
- Indian Rural Environment: Necessity and Sustainability
- Millennium Development Goals (MDGs)
- United Nations Sustainable Development Goals (SDGs) & the Agenda
- Overview of the Sustainable Development Goals (SDGs)

MODULE - II Universal SDG Targets **4**

- SDG Framework
- Key Components:
- Pillars of the SDGs
- Targets of the Goals
- Indicators of the Targets

MODULE - III SDG and Indian Gram Panchayat **3**

- Gram Panchayat
- Salient Features of Constitutional Amendments
- Transition from SDGs to LSDGs (Localizing Sustainable Development Goals)

MODULE - IV Government Schemes **4**

- Introduction to State and Central Government Schemes
- Overview of Government Schemes
- Localization and Implementation at the Regional Level
- Impact on Local Communities

MODULE - V Community Engagement **4**

- Key Recommendations of the National Education Policy
- Guidelines for Fostering Social Responsibility
- Awareness
- Participation
- Collaboration

MODULE - VI Idea Generation **12**

- Immersion Program
- Focus Areas
- Channelizing Ideas
- Forming Working Teams for SDGs (Sustainable Development Goals)

TOTAL: 30 PERIODS

REFERENCES:

1. Joy Elamon and Ms. Mariamma Sanu George,"The Handbook on Sustainable Development Goals and Gram Panchayats" , State Institute for Rural Development (SIRD).
2. Dr.C.R.Rene Robin, Dr.PA.Shanthi , Dr.B.Thanuja & Dr.V.Yuvaraj ,"Sairam SDG Idea Engineering Lab I", Sri Sairam Engineering College.

WEB REFERENCES

1. UN Sustainable Development Goals
2. https://srmuniv.digimat.in/nptel/courses/video/109106200/L30.html
3. https://avcce.digimat.in/nptel/courses/video/109106200/L26.html

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Understand the United Nations Agenda of MDGs and SDGs (K1)
2. Summarize the targets and indicators of SDGs (K2)
3. Interpret the constitutional amendments of LSDG in Gram Panchayat (K2)

4. Classify various localized and regional government schemes (K2)
5. Understand social responsibility in community development (K1)
6. Implement viable projects in SDGs through the immersion program (K3)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	2	-	2	-	2	2
CO2	-	-	-	-	-	2	2	-	2	-	2	2
CO3	-	-	-	-	-	2	2	-	2	-	2	2
CO4	-	-	-	-	-	2	2	-	2	-	2	2
CO5	-	-	-	-	-	2	2	-	2	-	2	2
CO6	2	2	-	-	-	2	2	-	2	-	2	2

SEMESTER - II

24BSMA204 SDG NO. 4	DISCRETE MATHEMATICS FOR COMPUTER SCIENCE	L	T	P	C
		3	1	0	4

OBJECTIVES:

- The aim of this course is to introduce abstraction, logical thinking and reasoning for developing algorithms and mathematical proofs related to Computer Science.

MODULE - I MATHEMATICAL LOGIC 9

Logic: Propositional calculus - propositions and connectives, syntax; Semantics – truth assignments and truth tables, validity and satisfiability, tautology; Adequate set of connectives; Equivalence and normal forms; Compactness and resolution; Formal reducibility - natural deduction system and axiom system; Soundness and completeness.

MODULE - II COMBINATORICS 9

Basic counting, balls and bins problems, generating functions, recurrence relations, Solution of recurrence relations by the method of characteristic roots and method of generating function principle of mathematical induction, pigeonhole principle.

MODULE - III ABSTRACT ALGEBRA 12

Set, Relation, Group, Subgroups, Normal subgroups and Quotient groups, Homomorphism, Cosets, Lagrange's theorem, Rings and Fields (Definition and examples only).

MODULE - IV BOOLEAN ALGEBRA 9

Introduction of Boolean algebra, truth table, basic logic gate, basic postulates of Boolean algebra, principle of duality, canonical form, Karnaugh map.

MODULE - V GRAPHS & DIGRAPHS 12

Graphs and digraphs, complement, isomorphism, connectedness and reachability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs .

MODULE - VI TREES AND PLANAR GRAPHS 9

Trees, Planar graphs, Euler's formula, dual of a planar graph, independence number and clique number, chromatic number, statement of Four-color theorem.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Mathematical Logic for Computer Science, L. Zhongwan, 2nd edition, World Scientific, Singapore, 1998.
2. Elements of Discrete Mathematics, C. L. Liu, 2nd edition, McGraw Hill, New Delhi, 1985.
3. Topics in Algebra, I. N. Herstein, 2nd edition, John Wiley and Sons,1975.
4. Digital Logic & Computer Design, M. Morris Mano, Pearson,2004.
5. Graph Theory with Applications, J. A. Bondy and U. S. R. Murty, Macmillan Press, London, 1976.

REFERENCES:

1. Introduction to Mathematical Logic 2nd edition, E. Mendelsohn, Van-Nostrand, London, 1979.
2. Introductory Combinatorics, R. A. Brualdi, 5th edition, North-Holland, New York, 2010.
3. Graph Theory with Applications to Engineering and Computer Science, N. Deo, Prentice Hall, Englewood Cliffs, 1974.

WEB REFERENCES:

1. https://www.youtube.com/watch?v=rjV4AO0iIVY
2. https://www.britannica.com/science/combinatorics/The-Ferrer-diagram
3. https://www.youtube.com/watch?v=zK8hxSwRar0
4. https://www.youtube.com/watch?v=eQA-m22wjTQ
5. https://discrete.openmathbooks.org/dmoi3/sec_planar.html

ONLINE RESOURCES:

1. www.ucl.ac.uk/~ucahmto/0007/_book/4-2-examples-of-groups.html
2. https://archive.nptel.ac.in/courses/106/108/106108051/
3. https://archive.nptel.ac.in/courses/108/105/108105132/

OUTCOMES:

Upon completion of the course, the student should be able to

1. Apply mathematical logic to understand logical arguments, construct logical proofs, solve problems and validate them. (K3)
2. Solve combinatorial problems using basic principles of counting. (K3)
3. Explain the concepts of algebraic structures such as groups, rings and fields. (K3)
4. Apply the principles of Boolean Algebra to design and simplify the circuits. (K3)

5. Solve real world problems using graphs and use it to develop algorithms in Computer Science. (K3)
6. Apply the concepts of coloring and planarity in computer science. (K3)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	-	-	-	-	-	-	-	1	-	-
CO2	3	3	2	1	-	-	-	-	-	-	-	1	-	-
CO3	3	3	2	1	-	-	-	-	-	-	-	1	-	-
CO4	3	3	2	1	-	-	-	-	-	-	-	1	-	-
CO5	3	3	2	1	-	-	-	-	-	-	-	1	-	-
CO6	3	3	2	1	-	-	-	-	-	-	-	1	-	-

SEMESTER - II

24HSEN202 SDG NO. 4	BUSINESS COMMUNICATION AND VALUE SCIENCE – II	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To create awareness about Genders and CSR
- To differentiate diversified cultures of India
- To recognize the role of science in nation building and define AI and its impacts
- To understand the need for diversity and inclusion
- Identify the significance of Business Communication and the uses of communicative writing

MODULE - I SOCIAL RESPONSIBILITY 8

Maslow's theory of Needs - Activity: Make a wish list of wants & needs - Gender Sensitization- Activity: Poster making on gender issues - Intro on Corporate Social Responsibility (CSR) - Corporate Etiquettes - Business Idioms

MODULE - II CULTURAL STUDIES 8

Cultures in India - Global, Glocal & Translocational cultures - Cross-cultural communication - cultural sensitivity - Activity: Presentation on different cultures of India - Activity: FauxPas in different cultures - Listening to cross cultural exchanges - Activity: Finding your roots and traditions

MODULE - III SCIENCE AND ARTIFICIAL INTELLIGENCE 8

Role of Science in nation building - AI in everyday life - Activity: Debate - Will machines control us? - Activity: GD - AI in Future - Stress Management - Time Management - Activity: Presentation on Scientist/Mathematician who changed the world

MODULE - IV DIVERSITY AND INCLUSION 7

Introduction to Diversity - Inclusion - Need for Diversity in corporate environment - Activity: Global Brands on diversity and inclusion - Activity: watching videos on Diversity and Inclusion (Purl) - Activity: Create a short film on social issues/diversity - Activity: GD on Challenges of Diversity

MODULE - V BUSINESS COMMUNICATION 7

Principles of general/technical Writing - Business letters (Placing Order, Complaint, Responding to letters) - Writing Business Proposal for a Startup - Vision, Mission Statements for an NGO - Creating Tagline and Logo - Activity: Develop a Startup Idea - Activity: Speaking - Pitching start- up idea

MODULE - VI EMOTIONAL INTELLIGENCE 7

Introduction to EI – Awareness of multiple intelligence and learning styles in communication – Activity; scenario based quiz – Impact of conflicts – Guideline to manage conflicts - Activity: Each group will draw up a list of tips to manage conflicts at work – Need of public speaking –Activity: Each group should present the list of best practices in public speaking

TOTAL: 45 PERIODS

TEXT BOOKS:

1. There are no prescribed texts– there will be handouts and reference links shared.

REFERENCES:

1. Emotional Intelligence: Why it Can Matter More Than IQ by Daniel Goleman
2. Putting Emotional Intelligence to Work by Ryback David
3. How to Develop Self Confidence and Improve Public Speaking - Time - Tested Methods of Persuasion by Dale Carnegie -author- Y.S. Rajan

4. TED Talks: The official TED guide to public speaking: Tips and tricks for giving unforgettable speeches and presentations

WEB REFERENCES:

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

ONLINE RESOURCES:

1. https://www.coursera.org/learn/learning-how-to-learn
2. https://www.coursera.org/specializations/effective-business-communication

OUTCOMES:

Upon completion of the course, the student should be able to

1. Differentiate wants and needs and be aware of social responsibility (K2)
2. Analyze cross cultural communication (K3)
3. Recognize the role of science in nation building and the role of AI in future (K3)
4. Understand the importance of diversity and inclusion in workplace (K2)
5. Apply the principles of Business Communication in writing letters and proposals(K3)
6. Apply emotional intelligence in real life scenarios (K3)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	2	-	-	-	3	-	3	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO4	-	-	-	-	-	-	-	-	3	3	-	3	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO6	-	-	-	-	-	-	-	-	3	3	-	3	-	-

SEMESTER - II

24BSPH205 SDG NO. 4	PRINCIPLES OF ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the basics of semiconductors.
- To understand the working of Diode and diode circuits.
- To learn the principles of varies types of transistors.
- To understand the working of feedback amplifiers and Oscillators.
- To learn the linear integrated circuits.
- To understand the digital electronic principles of Logic gates.

MODULE - I INTRODUCTORY IDEA OF SEMICONDUCTORS 8

Introduction – Solid state materials – Classification – Energy band theory – Fermi Levels - Electrical properties –Semiconductors – Effect of Temperature – Hole current - Intrinsic Semiconductor – Doping - Extrinsic Semiconductors – Fermi energy level variation with Temperature - Drift & Diffusion Carriers.

MODULE - II DIODES AND DIODE CIRCUITS 7

Formation of P-N Junction - Energy Band Diagram - Built-in-Potential - Forward and Reverse Biased P-N Junction - Formation of Depletion Zone – Operating conditions - V-I Characteristics - Zener Breakdown - Avalanche Breakdown and its Reverse Characteristics- Varactor Diode - Simple Diode Circuits - Load Line - Linear Piecewise Model – Rectifier circuits –Half Wave – Full Wave - PIV, DC Voltage and Current - Ripple Factor – Efficiency – Idea of regulation.

MODULE - III TRANSISTORS AND TRANSISTOR CIRCUITS 8

Introduction - PNP and NPN Transistors - Transistors CE, CB, CC mode of configuration- Transistor Characteristics - Concept of Field Effect Transistors (Channel Width Modulation) - Gate Isolation Types - JFET Structure and Characteristics - MOSFET Structure and Characteristics - Depletion and Enhancement Type - CS, CG, CD Configurations - CMOS: Basic Principles.

MODULE - IV FEEDBACK AMPLIFIER AND OSCILLATORS 7

Concept (Block Diagram) - Properties - Positive and Negative Feedback - Loop Gain - Open Loop Gain - Feedback Factors - Topologies of Feedback Amplifier- Effect of Feedback on Gain - Output Impedance - Input Impedance - Sensitivities (qualitative) - Bandwidth Stability- Effect of Positive Feedback - Instability - Oscillation - Condition of Oscillation - Barkhausen Criteria – Hartley – Colpitt's – Crystal Oscillators.

MODULE - V OPERATIONAL AMPLIFIER BASICS 8

Introduction to integrated circuits - operational amplifier and its terminal properties - Application of operational amplifier - inverting and non-inverting mode of operation – Voltage follower – Integrator - Differentiator - Proportional, Integral, Derivative circuits.

MODULE - VI BASIC IDEAS OF DIGITAL ELECTRONICS 7

Introduction - Number systems - Boolean Algebra - Realization of Logic gates - DeMorgan's theorem - Half and Full Adder - Subtractor - Multiplexers – De-Multiplexers – Flip flops – Registers and Counters.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Millman's Integrated Electronics, Jacob Millman, Christos Halkias, Chetan Parikh, McGrawHill Education.
2. Digital Logic & Computer Design, M. Morris Mano, Pearson.
3. Digital Principles and Applications Leach, Malvino and Saha.
4. Microelectronics Circuits, Adel S. Sedra and Kenneth Carless Smith, Oxford University Press.

REFERENCES:

1. Electronic Devices and Circuit Theory, Robert L. Boylestad, Louis Nashelsky.
2. Solid State Electronic Devices, 6 th Edition, Ben Streetman, Sanjay Banerjee.
3. Electronic Principle, Albert Paul Malvino.
4. Electronics Circuits:Discrete & Integrated, D Schilling C Belove T Apelewicz R Saccardi.
5. Microelectronics, Jacob Millman, Arvin Grabel.
6. Electronics Devices & Circuits, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj.

OUTCOMES:

Upon completion of the course, the student should be able to

1. Understand the basic principle of electronic circuits and also semiconductors. (K2)
2. Acquire the acquaintance of Diode circuits and its application. (K2)
3. Building different configuration of transistors and its applications. (K2)
4. Apply the working principle in various circuits such as feedback amplifier operational amplifier and oscillator circuits. (K2)

5. Acquire the knowledge of operational amplifier concept and its application. (K2)
6. Inferring the basic knowledge about digital integrated circuits. (K2)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	-	-	-	-	-	-	3
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	-	-	-	-	-	-	-	3
CO4	3	3	2	1	-	-	-	-	-	-	-	3
CO5	3	2	2	2	-	-	-	-	-	-	-	2
CO6	3	2	2	2	-	-	-	-	-	-	-	2

SEMESTER - II

24BSMA205 SDG NO. 4	STATISTICAL METHODS WITH LABORATORY	L	T	P	C
		3	0	2	4

OBJECTIVES:

- The objective of the course is to introduce the necessary statistical background for analyzing engineering problems.
- To introduce the R programming language.

MODULE - I TESTING OF HYPOTHESIS 7

Test of hypothesis – concept and formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing.

MODULE - II LINEAR STATISTICAL MODELS AND DESIGN OF EXPERIMENTS 7

Simple linear regression and correlation, multiple regression and multiple correlation. Analysis of Variance (one-way, two-way with as well as without interaction).

MODULE - III ESTIMATION AND SUFFICIENT STATISTIC 10

Point estimation, criteria for good estimates (unbiasedness, consistency), Methods of estimation including maximum likelihood estimation. Sufficient statistics – concept and examples, complete sufficiency, their application in estimation.

MODULE - IV NON-PARAMETRIC INFERENCE 12

Comparison with parametric inference, use of order statistics, Sign test, Wilcoxon signed rank test, Mann-Whitney test, Run test, Kolmogorov-Smirnov test, Spearman's and Kendall's test. Tolerance region.

MODULE - V BASICS OF TIME SERIES AND FORECASTING 10

Stationary, ARIMA Models: Identification, Estimation and Forecasting.

MODULE - VI R STATISTICAL PROGRAMMING LANGUAGE 14

Introduction to R, Functions, Control flow and Loops, Working with Vectors and Matrices, Reading in Data, Writing Data, Working with Data, Manipulating Data, Simulation, Linear model, Data Frame, Graphics in R.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Probability and Statistics for EngineersMiller and Freund's, R.A. Johnson, 9th edition, Pearson Publications, January 2020.
2. Fundamentals of Statistics (Vol. I), A. Goon, M. Gupta and B. Dasgupta, World press, 2013.
3. Fundamentals of Statistics (Vol. II), A. Goon, M. Gupta and B. Dasgupta, World press, 2016.
4. The Analysis of Time Series: An Introduction, Chris Chatfield, 6th edition, CRC press, 2017.

REFERENCES:

1. Introduction to Linear Regression Analysis, D. C. Montgomery and E. Peck, G.Geofferry , WILEY student's edition, Third edition, Dec 2006.
2. Introduction to the Theory of Statistics, A. M. Mood, F. A. Graybill and D.C. Boes, Mc Graw Hill, India edition, 2017.
3. Applied Regression Analysis, N. Draper and H. Smith, Wiley Publications, 1998.
4. Hands on Programming With R: Write Your Own Functions and Simulations , Garrett Grolemund , Grayscale edition, O'REILLY, 2014.
5. R for Everyone: Advanced Analytics and Graphics, Jared P. Lander, 2nd edition, 2018.

WEB RESOURCES:

1. https://onlinecourses.swayam2.ac.in/cec24_ma03
2. https://onlinecourses.nptel.ac.in/noc24_ma46
3. https://online.stat.psu.edu/stat415/lesson/26/26.1.pdf
4. https://learningstatisticswithr.com/book/hypothesistesting.html

5. https://www.machinelearningplus.com/time-series/arima-model-time-series-forecasting-python/
6. https://onlinecourses.swayam2.ac.in/ini24_ge09

ONLINE RESOURCES

1. https://www.youtube.com/watch?v=VPZD_aij8H0
2. https://www.youtube.com/watch?v=yZ0g-DIfVpc

OUTCOMES:

Upon completion of the course, the student should be able to

1. Use testing of hypotheses to infer the given data. (K3)
2. Apply the methods of Simple, Multiple - Correlation, Regression , Design of experiments to infer the relation among the given data. (K3)
3. Analyze the properties of good estimators and methods of estimation in Statistical analysis. (K3)
4. Apply the appropriate non parametric hypothesis testing procedures based on inferences. (K3)
5. Analyze the various models of time series analysis for forecasting. (K3)
6. Apply the features of R language to carry out statistical tests for the given data. (K3)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1	3	1	-	-	-	1	-	1	3	3
CO2	3	1	1	1	3	1	-	-	-	1	-	1	3	3
CO3	3	1	1	1	3	1	-	-	-	1	-	1	3	3
CO4	3	1	1	1	3	1	-	-	-	1	-	1	3	3
CO5	3	1	1	1	3	1	-	-	-	1	-	1	3	3
CO6	3	1	1	1	3	1	-	-	-	1	-	1	3	3

SEMESTER - II

24CBPC201 SDG NO. 4 & 9	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the basic terminologies of algorithm and data organization.
- To recognize and distinguish the applications of various linear data structures
- To analyze the concepts of non linear data structures.
- To be able to incorporate various searching and sorting techniques in real time scenarios.
- To understand the concept of files and its operations.

MODULE - I BASIC TERMINOLOGIES AND INTRODUCTION TO ALGORITHM 7

Algorithm Specification - Recursion - Performance Analysis – Asymptotic Notation - The Big-O - Omega and Theta Notation - Programming Style –Refinement of Coding-Time-Space TradeOff-Testing-Data Abstraction.

MODULE - II LINEAR DATA STRUCTURES 9

Array-Stack–Operations-Evaluating Arithmetic Expressions-Conversion of Infix to Postfix Expression-Queue–Circular Queue–DeQueue-Operations-Linked_List and its Types - Various Representations - Applications of Linear Data Structures.

MODULE - III NON-LINEAR DATA STRUCTURE–TREES 7

Trees–Tree Traversals-Binary Tree- Threaded Binary Tree-Binary Search Tree- B & B+ Tree – AVL Tree-Splay Tree-Graph-Directed-Undirected

MODULE - IV NON-LINEAR DATA STRUCTURE–GRAPHS 7

Basic Terminologies and Representations – Graph Search and Traversal Algorithms –Operations & Applications of Non-Linear Data Structures.

MODULE - V SEARCHING AND SORTING ON VARIOUS DATA STRUCTURES 9

Sequential Search-Binary Search-Breadth First Search-Depth First Search Insertion Sort - Selection Sort - Shell Sort - Divide and Conquer Sort – Merge Sort-Quick Sort-Heap Sort-Introduction to Hashing.

MODULE - VI FILES **6**

File Organisation - Sequential - Direct - Indexed Sequential - Hashed and Various Types of Accessing Schemes.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. E.Horowitz,S.Sahni,S.A-"Fundamentals of Data Structures",Universities Press, Second Edition,2008.
2. A.V.Aho, J.E.Hopperoft, J.D.UIlman, "Data Structures and Algorithms", Pearson Education, 1983.

REFERENCES:

1. The Art of Computer Programming: Volume1: Fundamental Algorithms, Donald E.Knuth.
2. Introduction to Algorithms, Thomas, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, The MIT Press.
3. Open Data Structures: An Introduction (Open Paths to Enriched Learning), 31stEdition, Pat Morin, UBCPress.

WEB REFERENCES:

1. https://swayam.gov.in/nd2_cec19_cs04/preview
2. https://nptel.ac.in/courses/106102064/

ONLINE RESOURCES:

1. https://www.codechef.com/certification/data-structures-and-algorithms/prepare
2. https://www.coursera.org/specializations/data-structures-algorithms

OUTCOMES:

Upon completion of the course, the student should be able to

1. Understand the various data structure concepts.(K2)
2. Apply the different linear data structures to problem solutions. (K3)
3. Apply the trees non-linear data structures to problem solutions. (K3)
4. Apply the graphs non-linear data structures to problem solutions. (K3)
5. Analyse the various searching and sorting algorithms. (K3)
6. Understand the concept of files and its operations. (K2)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	-	1	1	1	-	2	1	3	1
CO2	3	3	3	3	2	-	-	1	1	-	1	1	3	1
CO3	3	3	3	3	2	-	-	1	1	-	1	1	3	1
CO4	3	3	3	3	1	-	-	1	1	-	1	1	3	1
CO5	3	3	3	3	1	-	-	1	1	-	1	1	3	1
CO6	3	3	3	3	2	-	-	1	1	-	1	1	3	1

SEMESTER - II

24HSTA201 SDG NO. 4	TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1

OBJECTIVES:

- Understand the techniques that help for a better livelihood
- Identify the methods used for scientific Tamil computing

UNIT - I WEAVING AND CERAMIC TECHNOLOGY 3

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

UNIT - II DESIGN AND CONSTRUCTION TECHNOLOGY 3

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.

UNIT - III MANUFACTURING TECHNOLOGY 3

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

UNIT - IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

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

UNIT - V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

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.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

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

தமிழர் மரபு

அலகு - I நெசவு மற்றும் பானைத் தொழில்நுட்பம்: 3

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு - II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: 3

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

அலகு - III உற்பத்தித் தொழில் நுட்பம்: 3

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

அலகு - IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: 3

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.

அலகு - V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்: 3

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூ லகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

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

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

OUTCOMES:

Upon completion of the course, the learners will be able to:

1. Understand Weaving and Ceramic Technology during Sangam Age (K2)
2. Explore about Design & Construction of House and Temples during Sangam Age (K2)
3. Appreciate Manufacturing Technology of Tamils (K2)
4. Perceive Agriculture and Agro-processing during Sangam Age (K2)
5. Comprehend Ancient Knowledge of Ocean & Fisheries(K2)
6. Understand the Scientific Tamil & Tamil Computing (K2)

CO- PO, PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	3	-	-	-	-	-	3	-	-
CO2	3	-	-	-	-	3	-	-	-	-	-	3	-	-
CO3	3	-	-	-	-	3	-	-	-	-	-	3	-	-
CO4	3	-	-	-	-	3	-	-	-	-	-	3	-	-
CO5	3	-	-	-	-	3	-	-	-	-	-	3	-	-
CO6	3	-	-	-	-	3	-	-	-	-	-	3	-	-

SEMESTER - II

24CYMC201 SDG NO. 1-17	ENVIRONMENTAL STUDIES	L	T	P	C
		2	0	0	0

OBJECTIVES:

- To introduce the basic concepts of the environment, ecosystems, and biodiversity, and emphasize the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects, and control or prevention measures of environmental pollution and natural disasters.
- To promote awareness of sustainable energy practices to encourage adoption and contribute to a greener and more sustainable future.

- To introduce the basic structure and components of the atmosphere, including an overview of the photochemical reactions involved.
- To familiarize with the concept of Sustainable Development Goals (SDGs) and analyze climate change, the concept of carbon credits, and the challenges of environmental management.
- To inculcate and embrace sustainability practices, develop a broader understanding of green materials and energy cycles, and analyze the role of sustainable urbanization.

MODULE - I ENVIRONMENT AND BIODIVERSITY 5

Definition, scope and importance of environment - need for public awareness. Ecosystem and Energy flow-ecological succession. Types of biodiversity: genetic, species and ecosystem diversity- values of biodiversity, India as a mega-diversity nation hot-spots of biodiversity threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts - endangered and endemic species of India - conservation of biodiversity: In-situ and ex-situ.

MODULE - II ENVIRONMENTAL POLLUTION 5

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollution. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts

MODULE - III RENEWABLE SOURCES OF ENERGY 5

Energy management and conservation, New Energy Sources: Need of new sources. Different types, new energy sources. Applications of Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy

MODULE - IV ATMOSPHERIC CHEMISTRY 5

Atmospheric Chemistry - Composition and structure of atmosphere. Climate change - greenhouse effect- role of greenhouse gasses on global warming. Chemical and photochemical reactions in the atmosphere - Formation of smog, PAN, acid rain (causes, effect and control measures). Oxygen and ozone chemistry - Ozone layer depletion (causes, effect and control measures).

MODULE - V SUSTAINABILITY AND MANAGEMENT 5

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols - Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global,

Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

MODULE - VI SUSTAINABILITY PRACTICES 5

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles- carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization-Socio- economical and technological change.

TOTAL: 30 PERIODS

TEXT BOOKS:

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
3. Ravikrishnan A, 'Environmental Science and Engineering', Sri Krishna Hitech Publishing Company Pvt. Ltd, Revised Edition 2024.

REFERENCES:

1. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
2. Erach Bharucha, "Textbook of Environmental Studies'', Universities Press(I) PVT, LTD, Hyderabad, 2015.
3. G. Tyler Miller and Scott E. Spoolman, "Environmental Science", Cengage Learning India PVT, LTD, Delhi, 2014.
4. Chemistry for Environmental Engineering, Clair N. Sawyer, Perry L. Mc Carty, Gene F. Parkin, 4th Edition, McGraw-Hill.

OUTCOMES:

Upon completion of the course, the student should be able to

1. Explain the fundamental concepts of the environment, ecosystems, biodiversity, and the conservation practices within complex ecological systems. (K3)
2. Apply knowledge of the causes and effects of environmental pollution and natural disasters to contribute to preventive measures in society. (K3)
3. Recognize renewable and non-renewable resources, describe various methods for harnessing energy from different sources and explain their applications in various contexts. (K3)

4. Identify the primary components of the atmosphere, explain the causes of atmospheric pollution and propose strategies to promote a sustainable and clean atmosphere. (K3)
5. Describe the diverse goals of sustainable development and apply them to promote appropriate technological advancement and societal progress. (K3)
6. Demonstrate various sustainability practices, identify examples of green materials, describe their life cycle impacts, and assess their suitability for sustainable development. (K3)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	-	-	-	-	-	-	1
CO2	3	3	3	2	-	-	-	-	-	-	-	1
CO3	3	3	3	2	-	-	-	-	-	-	-	1
CO4	3	3	3	2	-	-	-	-	-	-	-	1
CO5	3	3	3	1	-	-	-	-	-	-	-	1
CO6	3	3	3	1	-	-	-	-	-	-	-	1

SEMESTER - II

24HSNC201 SDG NO. 4	NCC COURSE LEVEL 1	L	T	P	C
		2	0	0	0

ARMY WING

NCC GENERAL **6**

NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2

NATIONAL INTEGRATION AND AWARENESS **4**

NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1

PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1
		TOTAL: 30 PERIODS

NAVAL WING

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2

LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1
	TOTAL: 30 PERIODS	

ARMY WING

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2

SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL: 30 PERIODS

SEMESTER - II

24BSPL201 SDG NO. 4	PRINCIPLES OF ELECTRONICS ENGINEERING LABORATORY	L	T	P	C
		0	0	2	1

OBJECTIVES:

- To learn about the working of semiconductor diodes and its applications.
- To learn about the working of transistor circuits.
- To learn about the working of JFET, Oscillators and Amplifiers.

LIST OF EXPERIMENTS:

1. Characteristics of PN junction Diode.
2. Characteristics of Zener Diode.
3. Diode-wave shaping circuit
4. Half wave and full wave Rectifier.
5. Characteristics of BJT in (NPN/PNP Transistor) C-E configuration.
6. Characteristics of BJT in common base (NPN/PNP Transistor) C-B configuration.
7. Characteristics of BJT in common collector (NPN/PNP Transistor) C-C configuration.
8. Characteristics of Junction Field Effect Transistor.
9. Determination of frequency using Hartley Oscillator.
10. Integrators and Differentiator circuit using IC 741 operational amplifier.
11. Operational amplifiers applications using IC 741.

TOTAL:30 PERIODS

LAB REQUIREMENT FOR A BATCH OF 30 STUDENTS /
2 - STUDENTS PER EXPERIMENT:
LAB REQUIREMENTS

1. SEMICONDUCTOR DIODES 3. 4. 5. 6. 7. 8., ETC 15 sets

2.	2. SEMICONDUCTOR DIODE CIRCUIT SET	15 sets
3.	TRANSISTOR CIRCUIT SET	15 sets
4.	TRANSISTORS (NPN, PNP)	15 sets
5.	JFET CIRCUIT SET	15 sets
6.	OSCILLATOR CIRCUIT SET	15 sets
7.	AMPLIFIER CIRCUIT SET	15 nos
8.	ELECTRONIC WIRES, ACCESSORIES	15 nos

OUTCOMES:

Upon completion of the course, the student should be able to

1. Understand the diode circuits and its application. (K2)
2. Apply how to construct the transistor circuit and its working and its applications. (K2)
3. Design the Junction field effect transistor and its working. (K2)
4. Design the oscillators circuit and its output waveform and their application. (K2)
5. Gain knowledge of operational amplifier circuit and its application. (K2)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	-	-	-	-	-	-	2
CO2	3	2	2	2	3	-	-	-	-	-	-	2
CO3	3	3	2	2	2	-	-	-	-	-	-	1
CO4	3	2	2	2	2	-	-	-	-	-	-	2
CO5	3	3	2	2	2	-	-	-	-	-	-	1
CO6	3	3	2	2	2	-	-	-	-	-	-	1

SEMESTER - II

24CBPL201 SDG NO. 4	DATA STRUCTURES AND ALGORITHMS LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- Design and implement linear and non-linear data structures
- Develop & implement binary search trees with all operations
- Write functions to implement graph traversal algorithms
- Familiarize in sorting and searching algorithm
- Appropriately use the linear / non-linear data structure operations for a given problem

LIST OF EXPERIMENTS:

1. Implementations of Stack and Queue
2. Applications of Stack and Queue (Tower of Hanoi, Infix, Postfix and Prefix Conversion, Expression Evaluation)
3. Implementations of Singly, Doubly and Circular List
4. Polynomial Manipulations
5. Implementation of Trees
6. Implementation of BFS and DFS
7. Implementation of Search Operations
8. Implementation of Sorting algorithms
9. Implementation of Hashing Techniques

TOTAL: 45 PERIODS

LAB REQUIREMENT FOR A BATCH OF 30 STUDENTS / 2 STUDENTS PER EXPERIMENT

Equipments:

Standalone desktops with C compiler 30 Nos OR Server with C compiler supporting 30 terminals or more.

OUTCOMES:

Upon completion of the course, the student should be able to

1. Implement linear data structures such as stacks, queues using array and linked list. (K3)
2. Understand and implement non-linear data structures such as trees(K3)
3. Make use of graph algorithms in various applications of graph traversal,shortest path and sorting techniques.(K3)

4. Implement various kinds of searching and traversal techniques(K3)
5. Implement various kinds of sorting and traversal techniques(K3)
6. Solve real world problems using suitable data structures(K3)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	-	-	1	2	-	1	1	-	2
CO2	2	2	2	-	2	2	3	1	2	2	-	2
CO3	1	1	1	1	-	1	1	-	1	2	-	1
CO4	2	2	2	2	1	1	1	-	1	1	1	1
CO5	2	2	1	-	-	1	1	-	-	-	1	-
CO6	1	1	1	1	1	1	1	1	1	1	1	1

SEMESTER - II

24ENTP201 SDG NO. 4	DIGITAL DYNAMICS	L	T	P	C
		0	0	2	0

OBJECTIVES:

- Explore online communication
- Master computer skills
- Use virtual platforms
- Understand digital ethics and cyber security
- Observe and follow do's and don'ts

MODULE - I DIGITAL CULTURE AND SOCIETY **6**

Adapting to changes
Importance in today's digital landscape
Digital identity and self- presentation
Online communities and forums
Digital divide and consequences
Online collaboration and collective action

MODULE - II DIGITAL LITERACY AND ACCESS TO TECHNOLOGY **5**

Computer skills
Social and cultural understanding
Social media campaign and Activism
Netiquettes
Trending Technologies
Digital tools and softwares

MODULE - III DIGITAL ETHICS **3**

Digital ethics and moral panics
The art of protecting secrets
Overview of digital tools

MODULE - IV CYBER SECURITY **3**

Threats, vulnerability and consequences
Data making and usage practice
Importance of security

MODULE - V DIGITAL NETWORKING **7**

Remote work and virtual teams
Authenticity in digital interactions
Engaging content creation
Tools and and techniques for insightful usage
Balancing online and offline interactions
Collaboration for research and innovation

MODULE - VI BUREAU OF INDIAN STANDARDS (BIS): BASIC CONCEPTS, STANDARDS FORMATION PROCESS AND CHALLENGES **6**

Standardization –Basic Concepts:

Basic concepts of standardization

Purpose of standardization, marking and certification of articles and processes

Importance of standards to industry, policy makers, trade, sustainability and innovation

Standards Formulation Process and Challenges:

Objectives, roles and functions of BIS, Bureau of Indian Standards Act, ISO/ IEC Directives

WTO Good Practices for Standardization

World of Standards:

Important Indian and International Standards

TOTAL: 30 PERIODS

REFERENCES:

1. Communication Skills and Soft Skills – an Integrated Approach. Edited by E. Sureshkumar, P. Sreehari and J. Savithri, Pearson.
2. Silvia. P.J.2007. How to Read a Lot. Washington DC, American Psychological Association.

WEB REFERENCES:

1. https://swayam.gov.in/nd1_noc19_hs31/preview
2. https://www.sscnasscom.com/ssc-projects/capacity-building-and-development/training/gbfs/

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Demonstrate basic understanding of effective online communication techniques (K1)
2. Show and utilize fundamental computer skills (K1)
3. Comprehend and apply the use of virtual platforms to enhance communication reachability (K2)
4. Understand and implement principles of digital ethics (K2)
5. Use basic technologies for securing data and maintaining information integrity (K1)
6. Understand the importance of standardization and adhere to BIS (K2)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	2	-	2	-	-

SEMESTER - II

24ESID201 SDG NO. 1-17	IDEA ENGINEERING LAB - II	L	T	P	CP	C
		0	0	2	2	1

OBJECTIVES:

To impart the basics of technologies that are used to identify sustainable solutions to societal problems

- To Provide awareness on Printed Circuit Board (PCB) design using ORCAD software.
- To Raise awareness of at least three Internet of Things (IoT) projects and their applications.
- To Upskill learners through practical experience with 3D printing and scanning technologies.
- To prepare the learners to correctly align the ideas to SDGs
- To comprehensive knowledge on entrepreneurship and effective idea presentation techniques.
- To evaluate the effectiveness and implementation strategy of SDGs through SCOUT for SDGs

MODULE-1 BASICS OF DESIGN THINKING IN ELECTRICAL AND ELECTRONIC COMPONENTS 4

- Awareness Session on Basics of Design Thinking
- Study of Active & Passive Electronic Components
- Study of Basic AC & DC Electrical Circuits
- Study of Microprocessors & Microcontrollers
- Demonstration of Arduino Board, ESP 32 Board ,Raspberry Pi Board & PCB design software-Eagle
- Demonstration of PCB design using the software's Orcad, Eagle etc.

MODULE-2 EMBEDDED SYSTEMS, IOT AND ROBOTICS 4

- Study of sensors and transducers
- Study of embedded protocols
- Study of IOT protocols
- Demonstration of applications using embedded C
- Demonstration of robotic models
- Demonstration of drone models

MODULE-3 BASICS OF MECHANICAL ENGINEERING 4

- Study of mechanical modeling using fusion 360
- Demonstration of 3D scanner
- Demonstration of 3D printer
- Demonstration of laser cutter and RD works software
- Study of slicer software
- Study of master cam software

MODULE 4 ALIGNMENT AND MAPPING OF IDEAS 4

- Project Title: Problem Statement, solution and justification for SDG and SAP

MODULE-5 ENTREPRENEURSHIP SKILLS 4

- Startup Awareness
- Entrepreneurship Opportunities
- Mock Presentations
- Innovation
- Novelty Feasibility
- Presentation Skills

MODULE-6 SCOUT for SDGs 4

History of Scouting and Guiding - Introduction to Rovering and Rangering - Education objectives - Different Sections of Scouting- Bunnies, Cubs-Bulbuls, Scouts-Guides, Rovers-Ranger

Promise and Law: Scouting and Guiding with meaning to each point-how a boy and girl implement it on the daily life, saving life, Duties as citizens.

Leadership Skills: Mindsets of Leadership, Carrier Council. Community Service: Meaning, Types, duration, difference between community Service and Community Development.

Sairam SDG Ideathon 6

- Preparedness of Ideathon
- Idea Pitching

TOTAL: 30 PERIODS

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4. Basic Mechanical Engineering by Pravin Kumar, Pearson Education
5. Robert Barton, Patrick Grossetete, David Hanes, Jerome Henry, Gonzalo Salgueiro, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", CISCO Press, 2017.
6. R.K.Mittal and I.J.Nagrath, Robotics and Control, Tata McGraw Hill, New Delhi,4th Reprint, 2017.
7. JohnJ.Craig ,Introduction to Robotics Mechanics and Control, Third edition, Pearson Education, 2009.
8. Scouts Hand Book

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2. https://onlinecourses.nptel.ac.in/noc24_cs115/preview
3. https://onlinecourses.nptel.ac.in/noc24_me104/preview
4. https://onlinecourses.nptel.ac.in/noc24_me88/preview
5. http://sdgs.scout.org

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Gain the knowledge on Basic Electronics & Electrical Circuits (K2)
2. Understand the Basics of Embedded systems, IOT & Robotics (K1)
3. Explore the Basics of Mechanical Modeling (K2)
4. Interpret the mapping of SDGs to ideas. (K2)
5. Comprehend the guidance for the Idea presentation and to Innovate the ideas for market opportunities (K2)
6. Understand the scouting as a way of life for community development and illustrate the ideas for Ideathon event emphatically (K4)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Po11
CO1	3	-	-	-	-	2	2	-	2	-	2
CO2	3	-	-	-	-	2	2	-	2	-	2
CO3	3	-	-	-	-	2	2	-	2	-	2
CO4	3	-	-	-	-	2	2	-	2	-	2
CO5	3	-	-	-	-	2	2	-	2	-	2
CO6	2	2	-	-	2	2	2	-	2	-	2

Imagine the Future and

Make it happen!

Together let's build a better world where there is NO POVERTY and ZERO HUNGER.

We have GOOD HEALTH AND WELL BEING QUALITY EDUCATION and full GENDER EQUALITY everywhere.

There is CLEAN WATER AND SANITATION for everyone. AFFORDABLE AND CLEAN ENERGY

which will help to create DECENT WORK AND ECONOMIC GROWTH. Our prosperity shall be fuelled

by investments in INDUSTRY, INNOVATION AND INFRASTRUCTURE that will help us to

REDUCE INEQUALITIES by all means. We will live in SUSTAINABLE CITIES AND COMMUNITIES.

RESPONSIBLE CONSUMPTION AND PRODUCTION will help in healing our planet.

CLIMATE ACTION will reduce global warming and we will have abundant,

flourishing LIFE BELOW WATER, rich and diverse LIFE ON LAND.

We will enjoy PEACE AND JUSTICE through STRONG INSTITUTIONS

and will build long term PARTNERSHIPS FOR THE GOALS.

For the goals to be reached, everyone needs to do their part: governments, the private sector, civil society and **People like you.**

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Sai Prakash Leo Muthu

Chairman & CEO – Sairam Institutions

We build a Better nation through Quality education.

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