SRI SHANMUGHA COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution)

Pullipalayam, Morur (Po.), Sankari (Tk.),
Salem (Dt.) - 637 304.

B.TECH.
ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

CURRICULUM

CHOICE BASED CREDIT SYSTEM

REGULATIONS 2023

SRI SHANMUGHA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Approved by AICTE, Affiliated to Anna University,
Accredited by NAAC, NBA (ECE/CSE/MECH) and ISO 9001:2015
Certified
Pullipalayam, Sankari, Salem (Dt.)

CURRICULUM AND SYLLABI

CHOICE BASED CREDIT SYSTEM

B.TECH.
ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

REGULATION 2023

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023

Approved in Academic Council Meeting on 07.11.2023

Institute Vision

To be an institute of repute in all fields of education by implementing the best practices akin to global standards for fostering domain knowledge and developing research attitude among students to make them globally competent.

Institute Mission

- Achieving excellence in Teaching & Learning process using state-of-the-art resources.
- Extending opportunity to upgrade faculty knowledge and skills.
- Implementing the best student training practices for requirements of industrial scenario of the state.
- Motivating faculty and students in research activity for real time application.

Department of Artificial Intelligence and Data Science

Vision

Envision to have Global recognition by producing high quality, creative and ethical engineers and technologists to contribute effectively through innovations and research excellence in the advancing field of Artificial Intelligence and Data Science.

Mission

M1 To empower the cognitive skills in the students in pioneering domain of Artificial Intelligence and Data Science by providing content based learning with quality teaching and learning opportunities, industry institute interaction activities and centers of excellence.

M2 To transform professionals into technically competent to contribute to the society positively by inducing entrepreneurship skills through collaborative teaching, innovations and research.

Program Educational Outcomes (PEOs)

PEO 1 Graduates will be able to demonstrate their technical skills and competency in various applications by providing creative and novel technological solutions.

PEO 2 Graduates will be able to ensure the effective contribution to the society through critical

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thinking, innovations and research with the broad spectrum of skills in frontline technologies.

PEO 3   Graduates will be equipped with multidisciplinary initiatives and visions towards the growth of society with respect to ethical and lifelong learning.

PROGRAM OUTCOMES (POs)

PO 1   **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO 2   **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO 3   **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health, safety, cultural, societal and environmental considerations.

PO 4   **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data and synthesis of the information to provide valid conclusions.

PO 5   **Modern tool usage:** Create, select, apply appropriate techniques, resources, modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6   **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7   **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal, environmental contexts, demonstrate the knowledge and need for sustainable development.

PO 8   **Ethics:** Apply ethical principles, commit to professional ethics, responsibilities and norms of the engineering practice.

PO 9   **Individual and team work:** Function effectively as an individual, as a member or leader in diverse teams and in multidisciplinary settings.

PO 10   **Communication:** Communicate effectively on complex engineering activities with the engineering community with society at large being able to comprehend, write effective reports, design documentation, make effective presentations and receive clear instructions.

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PO 11 **Project management and finance:** Demonstrate knowledge, understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12 **Life-long learning:** Recognize the need, ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1 Ability to identify, design and apply domain knowledge and computational skills to evolve novel intelligent solutions for Artificial Intelligence and Data Science related processes in our ecosystem.

PSO 2 Ability to critique the role of Artificial Intelligence and Data Science in multi-disciplinary areas to transform thoughts into products through research and innovative career.

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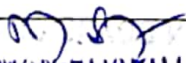
REGULATION – 2023
CHOICE BASED CREDIT SYSTEM
CURRICULUM

I SEMESTER									
Course Code	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23EN101	Communicative English	HSMC	3	0	0	3	40	60	100
23MA201	Engineering Mathematics-I	BSC	3	1	0	4	40	60	100
23PH202	Physics for Information Science	BSC	3	0	0	3	40	60	100
23CY201	Chemistry for Engineers	BSC	3	0	0	3	40	60	100
23CS301	Problem Solving and Python Programming	ESC	3	0	0	3	40	60	100
23TA101	Heritage of Tamils/தமிழர் மரபு	HSMC	1	0	0	1	100	-	100
Practical Course(s)									
23PC201	Physics and Chemistry Laboratory	BSC	0	0	4	2	60	40	100
23CS302	Problem Solving and Python Programming Laboratory	ESC	0	0	4	2	60	40	100
23EN102	Communication Laboratory	HSMC	0	0	2	1	60	40	100
Mandatory Course									
23MC801	Induction Programme	MC	2 Weeks			0	100	-	100
TOTAL			16	1	10	22	580	420	1000

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Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

II SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23MA202	Engineering Mathematics-II	BSC	3	1	0	4	40	60	100
23EC301	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	40	60	100
23CS401	Data Structures and Algorithms	PCC	3	0	0	3	40	60	100
23TA102	Tamils and Technology / தமிழரும் தொழில்நுட்பமும்	HSMC	1	0	0	1	100	-	100
23ME301	Engineering Graphics	ESC	3	1	0	4	40	60	100
Theory with Practical Course(s)									
23IT301	Programming in C	ESC	3	0	2	4	50	50	100
Practical Course(s)									
23ME302	Engineering Practices Laboratory	ESC	0	0	4	2	60	40	100
23CS402	Data Structures and Algorithms Laboratory	PCC	0	0	4	2	60	40	100
Employability Enhancement Course(s)									
23HS701	Soft skills-I	EEC	1	0	0	1	100	-	100
	TOTAL		17	2	10	24	530	370	900

III SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23MA203	Discrete Mathematics	BSC	3	1	0	4	40	60	100
23CS404	Operating Systems	PCC	3	0	0	3	40	60	100
23IT403	Database Management Systems	PCC	3	0	0	3	40	60	100
23CS403	Computer Networks	PCC	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23EC304	Digital Principles and Computer Organization	ESC	3	0	2	4	50	50	100
23CS405	Design and Analysis of Algorithms	PCC	3	0	3	4.5	50	50	100
Practical Course(s)									

Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

Code No.	Course	Category	L	T	P	C	CIA	ESE	Total
23IT404	Database Management Systems Laboratory	PCC	0	0	3	1.5	60	40	100
Employability Enhancement Course(s)									
23HS702	Soft skills-II	EEC	1	0	0	1	100	-	100
	TOTAL		19	1	8	24	420	380	800

IV SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23MA205	Probability, Queuing Theory and Statistics	BSC	3	1	0	4	40	60	100
23CS407	Software Engineering	PCC	3	0	0	3	40	60	100
23CS406	Object Oriented Programming	PCC	3	0	0	3	40	60	100
23AD401	Artificial Intelligence	PCC	3	0	0	3	40	60	100
23HS101	Universal Human Values-II	HSMC	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23AD406	Data Mining and Data Warehousing	PCC	3	0	2	4	50	50	100
Practical Course(s)									
23AD407	Artificial Intelligence Laboratory	PCC	0	0	3	1.5	60	40	100
23CS409	Object Oriented Programming Laboratory	PCC	0	0	3	1.5	60	40	100
Employability Enhancement Course(s)									
23ME701	Design Thinking	EEC	2	0	0	2	40	60	100
	TOTAL		20	1	8	25	410	490	900

V SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23AD408	Fundamentals of Data Science and Analytics	PCC	3	0	0	3	40	60	100
23AD409	Machine learning	PCC	3	0	0	3	40	60	100
23AD6XX	Open Elective –I*	OEC	3	0	0	3	40	60	100

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

Theory with Practical Course(s)

Code No.	Course	Category	L	T	P	C	CIA	ESE	Total
23AD410	Data Exploration and Visualization	PCC	3	0	2	4	50	50	100
23AD415	Big Data Analytics	PCC	3	0	2	4	50	50	100
23AD5XX	Professional Elective I	PEC	2	0	2	3	50	50	100
Practical Course(s)									
23AD411	Data Science and Analytics Laboratory	PCC	0	0	3	1.5	60	40	100
23AD412	Machine Learning Laboratory	PCC	0	0	3	1.5	60	40	100
Employability Enhancement Course(s)									
23HS703	Soft skills-III	EEC	1	0	0	1	100	-	100
	TOTAL		**18**	**0**	**12**	**24**	**490**	**410**	**900**

*Open Elective - Shall be chosen from the list of open electives offered by other Programs

VI SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23AD5XX	Open Elective –II	OEC	3	0	0	3	40	60	100
23AD6XX	Open Elective – III	OEC	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23CS410	Embedded Systems and IoT	ESC	3	0	2	4	50	50	100
23AD414	Deep Learning	PCC	3	0	2	4	50	50	100
23AD5XX	Professional Elective II	PEC	2	0	2	3	50	50	100
Employability Enhancement Course(s)									
23AD701	Mini Project	EEC	0	0	4	2	100	-	100
23HS704	Soft skills-IV	EEC	1	0	0	1	100	-	100
Employability Enhancement Course(s)									
23MC802	Environmental Sciences and Disaster Management	MC	2	0	0	0	100	-	100
	TOTAL		**17**	**0**	**10**	**20**	**530**	**270**	**800**

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VII SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23HS103	Entrepreneurship and IPR	HSMC	3	0	0	3	40	60	100
23AD6XX	Open Elective – IV	OEC	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23AD5XX	Professional Elective III	PEC	2	0	2	3	50	50	100
23AD6XX	Professional Elective IV	PEC	2	0	2	3	50	50	100
23AD6XX	Professional Elective V	PEC	2	0	2	3	50	50	100
Employability Enhancement Course(s)									
23AD702	Internship	EEC	2 Weeks			1	100	-	100
Mandatory Course									
23MC804	Indian constitution	MC	1	0	0	0	100	-	100
	TOTAL		13	0	6	16	430	270	700

VIII SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Employability Enhancement Course(s)									
23AD703	Project Work	EEC	0	0	20	10	60	40	100
	TOTAL		0	0	20	10	60	40	100

Total Credits: 165

CHAIRMAN-BOARD OF STUDIES

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PROFESSIONAL ELECTIVES									
Vertical – I Vertical for Artificial Intelligence & Machine Learning									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
23AD511	Natural Language Processing	PEC	2	0	2	3	50	50	100
23AD512	Recommender Systems	PEC	2	0	2	3	50	50	100
23AD513	Knowledge Engineering	PEC	2	0	2	3	50	50	100
23AD514	Reinforcement Learning	PEC	2	0	2	3	50	50	100
23AD515	AI for Robotics	PEC	2	0	2	3	50	50	100
23AD516	Generative AI	PEC	2	0	2	3	50	50	100
Vertical – II Vertical for Data Science									
23AD521	Pattern Recognition	PEC	2	0	2	3	50	50	100
23AD522	Social Network Analytics	PEC	2	0	2	3	50	50	100
23AD523	Cyber Threat Analytics	PEC	2	0	2	3	50	50	100
23AD524	Business Analytics	PEC	2	0	2	3	50	50	100
23AD525	Image and video analytics	PEC	2	0	2	3	50	50	100
23AD526	Health Care Analytics	PEC	2	0	2	3	50	50	100
Vertical – III Full Stack Development for IT									
23AD531	Full stack Development	PEC	2	0	2	3	50	50	100
23AD532	App Development	PEC	2	0	2	3	50	50	100
23AD533	Web Frameworks	PEC	2	0	2	3	50	50	100
23AD534	UI and UX Design	PEC	2	0	2	3	50	50	100
23AD535	Software Testing and Automation	PEC	2	0	2	3	50	50	100
23AD536	DevOps	PEC	2	0	2	3	50	50	100
Vertical – IV Cloud Computing and Data Center Technologies									
23AD541	Cloud Computing	PEC	2	0	2	3	50	50	100

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

23AD542	Cloud Virtualization	PEC	2	0	2	3	50	50	100
23AD543	Cloud Service Management	PEC	2	0	2	3	50	50	100
23AD544	Storage Technologies	PEC	2	0	2	3	50	50	100
23AD545	Software Defined Networks	PEC	2	0	2	3	50	50	100
23AD546	Cloud Strategy Planning and Management	PEC	2	0	2	3	50	50	100

Vertical – V Cyber Security and Data Privacy

23AD551	Vulnerability Assessment and Penetration Testing	PEC	2	0	2	3	50	50	100
23AD552	Digital and Mobile Forensics	PEC	2	0	2	3	50	50	100
23AD553	Social Network Security	PEC	2	0	2	3	50	50	100
23AD554	Modern Cryptography	PEC	2	0	2	3	50	50	100
23AD555	Information Security	PEC	2	0	2	3	50	50	100
23AD556	Cyber Physical Systems	PEC	2	0	2	3	50	50	100

Vertical – VI Creative Media

23AD561	Multimedia and Animation	PEC	2	0	2	3	50	50	100
23AD562	Video Creation and Editing	PEC	2	0	2	3	50	50	100
23AD563	Visual Effects	PEC	2	0	2	3	50	50	100
23AD564	Multimedia Data Compression and Storage	PEC	2	0	2	3	50	50	100
23AD565	Digital Marketing	PEC	2	0	2	3	50	50	100
23AD566	3D Animation	PEC	2	0	2	3	50	50	100

Vertical – VII Emerging Technologies

23AD571	Augmented Reality/Virtual Reality	PEC	2	0	2	3	50	50	100
23AD572	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	3	50	50	100
23AD573	Cyber Security	PEC	2	0	2	3	50	50	100
23AD574	Quantum Computing	PEC	2	0	2	3	50	50	100
23AD575	Cognitive Science	PEC	2	0	2	3	50	50	100

CHAIRMAN-BOARD OF STUDIES

23AD576	Game Development	PEC	2	0	2	3	50	50	100

OPEN ELECTIVE COURSES OFFERED BY AGRICULTURAL ENGINEERING

Course Code	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
23AG601	Principles of Food Preservation	OEC	3	0	0	3	40	60	100
23AG602	Organic Farming	OEC	3	0	0	3	40	60	100
23AG603	Renewable Energy Technology	OEC	3	0	0	3	40	60	100
23AG604	Urban Horticulture	OEC	3	0	0	3	40	60	100
23AG605	Roof Top Gardening Techniques	OEC	3	0	0	3	40	60	100
23AG606	Value Addition in Agricultural Products	OEC	3	0	0	3	40	60	100

OPEN ELECTIVE COURSES OFFERED BY BIOMEDICAL ENGINEERING

Course Code	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
23BM601	Sensors and Transducers	OEC	3	0	0	3	40	60	100
23BM602	Fundamentals of Healthcare Analytics	OEC	3	0	0	3	40	60	100
23BM603	ICU Equipment	OEC	3	0	0	3	40	60	100
23BM604	Basics of Biomedical Engineering	OEC	3	0	0	3	40	60	100
23BM605	Fundamentals of Medical Imaging Systems	OEC	3	0	0	3	40	60	100
23BM606	Medical Electronics	OEC	3	0	0	3	40	60	100

OPEN ELECTIVE COURSES OFFERED BY ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

23EC601	Fundamentals of Communication Systems	OEC	3	0	0	3	40	60	100
23EC602	Remote Sensing Concepts	OEC	3	0	0	3	40	60	100
23EC603	Wireless Networks	OEC	3	0	0	3	40	60	100
23EC604	Consumer Electronics	OEC	3	0	0	3	40	60	100
23EC605	Fundamentals of Image Processing	OEC	3	0	0	3	40	60	100
23EC606	Machine Vision System	OEC	3	0	0	3	40	60	100

OPEN ELECTIVE COURSES OFFERED BY MECHANICAL ENGINEERING									
Course Code	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
23ME601	Industrial Safety	OEC	3	0	0	3	40	60	100
23ME602	Electric Vehicle Technology	OEC	3	0	0	3	40	60	100
23ME603	Digital Manufacturing	OEC	3	0	0	3	40	60	100
23ME604	Fundamentals of Robotics	OEC	3	0	3	3	40	60	100
23ME605	Total Quality Management	OEC	3	0	3	3	40	60	100
23ME606	Engineering Economics	OEC	3	0	3	3	40	60	100

OPEN ELECTIVE COURSES (For Other Programmes)									
Course Code	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
23AD601	Artificial Intelligence for Everyone	OEC	3	0	0	3	40	60	100
23AD602	Fundamentals of Machine Learning	OEC	3	0	0	3	40	60	100
23AD603	Data Science for Engineers	OEC	3	0	0	3	40	60	100
23AD604	Artificial Intelligence in Healthcare	OEC	3	0	3	3	40	60	100
23AD605	Business Intelligence and Analytics	OEC	3	0	3	3	40	60	100
23AD606	Java Programming	OEC	3	0	3	3	40	60	100

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

MINOR DEGREE IN DATA SCIENCE									
Course Code	**Course**	**Periods / Week**			**C**	**Maximum Marks**			
		L	**T**	**P**		**CIA**	**ESE**	**Total**	
1	Database Management Systems	3	0	0	3	40	60	100	
2	Data Mining and Data Warehousing	3	0	0	3	40	60	100	
3	Fundamentals of Data Science and Analytics	3	0	0	3	40	60	100	
4	Cloud Computing	3	0	3	3	40	60	100	
5	Data Exploration and Visualization	3	0	3	3	40	60	100	
6	Big Data Analytics	3	0	3	3	40	60	100	

SUMMARY

S.No	Category	Credits per semester								Total Credits	Credits as per AICTE
		I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**		
1	HSMC	5	1	0	3	0	0	3	0	12	15
2	BSC	12	4	4	4	0	0	0	0	24	23
3	ESC	5	13	4	0	0	4	0	0	26	22
4	PCC	0	5	15	16	17	4	0	0	57	54
5	PEC	0	0	0	0	3	3	9	0	15	18
6	OEC	0	0	0	0	3	6	3	0	12	15
7	EEC	0	1	1	2	1	3	1	10	19	16
8	MC	✓	-	-	-	-	✓	✓	-	0	0
	Total	22	24	24	25	24	20	16	10	165	163

HSM - Humanities and Social Sciences

BS - Basic Science Courses

ES - Engineering Science Courses

PC - Professional Core Courses

PE - Professional Elective Courses

OE - Open Elective Courses

EE - Employability Enhancement Courses

MC - Mandatory Courses (Non-Credit Courses)

CIA - Continuous Internal Assessment

ESE - End Semester Examination

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

B.Tech. Artificial Intelligence and Data Science (R-2023)
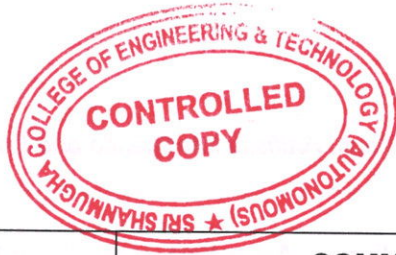
I SEMESTER

23EN101	COMMUNICATIVE ENGLISH (Common to all B.E./B.Tech Programmes)	L	T	P	C
		3	0	0	3
Category	HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSE (HSMC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Enable the students to assimilate the correct patterns of the language.
- Develop students' insight into the structure of the English language.
- Enrich vocabulary bank, to communicate more effectively in English,
- Express opinions including facts & ideas & maintain conversation in everyday situations.
- Use digital literacy tools their LSRW skills can be enhanced and to master good speaking skills with different strategies.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Outline the basics of English communication	Understand
CO 2	Contrast the ways in which written and spoken communication differ.	Understand
CO 3	Relate the descriptive and analytical words, phrases, and sentence structures.	Understand
CO 4	Identify various text kinds and understand their connotative and denotative implications.	Apply
CO 5	Utilize several text kinds using the proper formats.	Apply

Course Contents

Unit – I	Basics of Communication	9

Listening – Telephone conversation & Writing message, gap filling; Reading – Telephone message, bio-note; Writing – Personal profile; Grammar – Simple present tense, Present continuous tense, Asking questions (wh-questions); Vocabulary – GRE Vocabulary.

Unit – II	Narration	9

Listening – Travel/Fiction podcast, Watching a travel documentary; Reading – An excerpt from a travelogue, Newspaper Report; Writing – Narrative (Event, personal experience etc.); Grammar – Subject – verb agreement, Simple past, Past continuous Tenses; Vocabulary – Antonyms, Word formation (Prefix and Suffix).

Unit – III	Description	9

Listening – Conversation, Radio/TV advertisement/BBC Documents; Reading – A tourist brochure and planning an itinerary, descriptive article / excerpt from literature; Writing – Definitions, Descriptive writing, Checklists; Grammar – Future tense, Perfect tenses, Preposition; Vocabulary – Adjectives and Adverbs.

CHAIRMAN-BOARD OF STUDIES

Unit – IV	Classification	9

Listening – Announcements and filling a table; Reading – An article, social media posts and classifying (channel conversion – text to table), IELTS & TOEFL, BEC materials; Writing – Note making, Note taking and Summarising, a classification paragraph; Grammar – Connectives, Transition words; Vocabulary – Contextual vocabulary, Words used both as noun and verb, Classification related words.

Unit – V	Expression of Views	9

Listening – Debate / Discussion; Reading – Formal letters, Letters to Editor, Opinion articles / Blogs; Writing – Letter writing/ Email writing (Enquiry / Permission, Letter to Editor), Resume Writing; Grammar – Question tags, Indirect questions, Yes / No questions; Vocabulary – Compound words, Phrasal verbs, Articles-Review of Movie/Documentary/Short-films.

Total : 45 Hours

Text Books

1. Anna University, Division of Humanities and Social Sciences. English for Engineers and Technologists. Vol. 1: A Skills Approach, Orient Longman, 2002.
2. Trimble, Louis, English for Science and Technology. Vol. 1: A Discourse Approach, Cambridge University Press. 2023.
3. Kumar, Sanjay & Lata, Pushp. Communication Skills. New Delhi: Oxford University Press, 2018.

Reference Books

1. C.Richards Jack. Interchange Fifth Edition, Cambridge University Press, 2017.
2. Wallwork Adrian, Springer. English for Academic Correspondence and Socializing. Cambridge University Press. 2011.
3. Cortrell, Stella. The Study Skills Handbook. Fourth Edition,Red Globe Press, 2013.
4. Kumar, Sanjay & Lata, Pushp. Communication Skills,Oxford University Press, 2011.

Additional / Web References

1. https://nptel.ac.in/courses/109106094
2. nptel.ac.in/courses/109/104/109104090/
3. http://www.uefap.com/grammar/gramfram.htm

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO 1	-	-	-	-	2	-	-	-	2	3	-	3			
CO 2	-	-	-	-	2	-	-	-	2	3	-	3			
CO 3	-	-	-	-	2	-	-	-	2	3	-	3			
CO 4	-	-	-	-	2	-	-	-	2	3	-	3			
CO 5	-	-	-	-	2	-	-	-	2	3	-	3			
Average	-	-	-	-	2	-	-	-	2	3	-	3			

3 – High   2 – Medium   1 – low   "-" - No Correlation

CHAIRMAN-BOARD OF STUDIES

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12		
CIA II	3 hours	2.5 units	100	12	24	
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	60
				Total	40	60

23MA201	ENGINEERING MATHEMATICS- I (Common to all B.E/ B.Tech Programmes)	L	T	P	C
		3	1	0	4
Category	Basic science (BS)				
Pre requisites	Nil				

Course Objectives

The course is intended to
- Develop the use of matrix algebra techniques that are needed by engineers for practical applications.
- Familiarize the student with differentiation rules.
- Familiarize the student with functions of several variables this is needed in many branches of engineering.
- Acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.
- Acquire the knowledge of ordinary differential equation in both variable and constant coefficients.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Make use of matrix theory for solving system of linear equations and compute eigenvalues and eigenvectors required for matrix diagonalization process.	Apply
CO 2	Interpret various concepts of differential calculus like limit, continuity, differentiability, Successive differentiation and study it's applicability in maxima and minima of one variable.	Understand
CO 3	Construct the application of partial differentiation and apply for evaluating maxima and minima of functions of multi variables.	Apply
CO 4	Make use of the concept of change of order of integration to evaluate multiple integrals and their usage in computing the area and volume.	Apply

CHAIRMAN-BOARD OF STUDIES

CO 5	Illustrate ordinary differential equations to solve constant and variable coefficient problems.	Understand

Course Contents

Unit – I	Matrices	9+3

Characteristic equation -Eigenvalues and Eigenvectors of a real matrix – Properties of Eigenvalues and Eigenvectors - Diagonalization of matrices- Reduction of a quadratic form to canonical form by orthogonal transformation- Nature of quadratic form-Cayley -Hamilton theorem.

Unit – II	Differential Calculus	9+3

Representation of functions -Limit of a function - Continuity- Derivatives -Differentiation rules - Taylor's series - Maclaurin series- Maxima and Minima of functions of one variable.

Unit – III	Multivariable Calculus	9+3

Partial differentiation - Homogeneous functions and Euler's theorem - Jacobians -Taylor's series for functions of two variables - Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

Unit – IV	Multiple Integrals	9+3

Double integrals - Area enclosed by plane curves- Double integrals in polar coordinates - Change of order of integration -Triple integrals - Volume of solids (Cartesian Co-ordinates only).

Unit – V	Ordinary Differential Equations	9+3

Higher order linear differential equations with constant coefficients -Homogeneous Equation of Euler's and Legendre's Types of linear equations with Variable Coefficients - Method of variation of parameters.

Total : 60 Periods

Text Books

1. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Grewal.B.S. "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.
3. James Stewart, " Calculus: Early Transcendentals ", Cengage Learning, 8th Edition, New Delhi, 2015.

Reference Books

1. Anton. H, Bivens. I and Davis. S, "Calculus", Wiley, 10th Edition, 2016.
2. Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", Firewall Media, New Delhi, 7th Edition, 2009.
3. Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.

Additional / Web References

1. https://nptel.ac.in/courses/122104018
2. https://nptel.ac.in/courses/111105122
3. https://nptel.ac.in/courses/111107108

CHAIRMAN-BOARD OF STUDIES

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Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)												
COs	POs											
CO 1	1	2	3	4	5	6	7	8	9	10	11	12
CO 2	3	2							1	1		
CO 3	3	2							1	1		
CO 4	3	2							1	1		
CO 5	3	2							1	1		
Average	3	2							1	1		

"3"– High   "2" – Medium   "1" – low   "-" - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
				Total	40	60

23PH202	PHYSICS FOR INFORMATION SCIENCE		L	T	P	C
	(Common to CSE, IT, AI&DS,CYBER)		3	0	0	3
Category	Basic Sciences					
Pre requisites	Nil					

Course Objectives

The course is intended to

- Enable the students to gain knowledge of electromagnetic waves and its applications.

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

- Introduce the basics of oscillations, optics and lasers.
- Equip the students to be successfully understand the importance of quantum physics.
- Make the students to understand the basics of crystallography and its importance in studying materials properties.
- Make the students understand the importance in studying electrical and semiconducting properties of materials.

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Utilize the concept in electromagnetic waves to understand interaction of electromagnetic waves with matter.	Understand
CO 2	Interpret the foundational knowledge of physics to recognize phenomena of oscillations, optics and lasers.	Understand
CO 3	Explain the concepts of waves and matter in atomic and subatomic level.	Understand
CO 4	Identify the different crystal structures of materials and its role in their physical properties.	Understand
CO 5	Reveal the concepts of carrier transport in conducting and semiconducting materials.	Understand

Course Contents

Unit – I	Electromagnetic Waves	9

The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum, Conditions on the wave field - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - polarization - Producing electromagnetic waves - Energy and momentum in EM waves: Intensity, waves from localized sources, momentum and radiation pressure - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium vacuum interface for normal incidence.

Unit – II	Oscillations, Optics and Lasers	9

Simple harmonic motion - resonance –analogy between electrical and mechanical oscillating systems - waves on a string - standing waves - traveling waves - Energy transfer of a wave - sound waves - Doppler effect. Reflection and refraction of light waves - total internal reflection - interference –Michelson interferometer –Theory of air wedge and experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients - population inversion - Nd-YAG laser, CO_2 laser, semiconductor laser –Basic applications of lasers in industry.

CHAIRMAN-BOARD OF STUDIES

Unit – III	**Quantum Mechanics**	9

Photons and light waves - Electrons and matter waves –Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle.

Unit – IV	**Crystallography**	9

Crystal structures: Crystal lattice – basis - unit cell and lattice parameters – crystal systems and Bravais lattices – Structure and packing fractions of SC, BCC, FCC, HCP and diamond structures – crystal planes, directions and Miller indices –Techniques for growing crystals - Bridgman method, Czochralski method, vapor deposition. X-ray diffraction: Bragg's Law-Von Laue Equations-X-ray diffraction methods-Laue's Method- powder method

Unit – V	**Conducting and Semiconducting Materials**	9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Wiedemann-Franz law – Success and failures - electrons in metals – Particle in a three dimensional box – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids. Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature

Total : 45 Hours

Text Books

1. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw-Hill (Indian Edition), 2017.
2. Gaur R K, Gupta S L "Engineering Physics", Dhanpat Rai Publications., 2013.
3. Hugh D. Young, Roger A. Freedman, Lewis Ford .A "University Physics with Modern Physics", Pearson Education., India, 2008.
4. R.F.Pierret. Semiconductor Device Fundamentals. Pearson (Indian Edition), 2006.

Reference Books

1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
2. Solid State Physics, R.K.Puri, V.K Babbar, S.Chand& Company Ltd., 2008
3. Tipler, P.A. & Mosca, G. "Physics for Scientists and Engineers with Modern Physics'. W.H.Freeman, 2007.

Additional / Web References

1. https://archive.nptel.ac.in/courses/115/106/115106119/
2. https://archive.nptel.ac.in/courses/115/101/115101005/
3. https://archive.nptel.ac.in/courses/115/102/115102124/
4. https://archive.nptel.ac.in/courses/115/101/115101107/

CHAIRMAN-BOARD OF STUDIES

Mapping of Course Outcomes (COs) with Programme Outcomes (POs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	-	-	-	-	-	-	-	2	-	-	2
CO 2	3	-	-	-	-	-	-	-	2	-	-	2
CO 3	3	-	-	-	-	-	-	-	2	-	-	2
CO 4	3	-	-	-	-	-	-	-	2	-	-	2
CO 5	3	-	-	-	-	-	-	-	2	-	-	2
Average	3	-	-	-	-	-	-	-	2	-	-	2

3 – High   2 – Medium   1 – low   '-" - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
			Total	40	60	

23CY201	CHEMISTRY FOR ENGINEERS (Common to all B.E.,/B.Tech Programmes)	L	T	P	C
		3	0	0	3
Category	Basic Sciences				
Pre requisites	Nil				

Course Objectives

The course is intended to
- Impart knowledge on the various sources of water and its impurities.
- Impart knowledge on the basic principles and preparatory methods of nanomaterials.

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- Facilitate the understanding of different types of fuels, their preparation, properties and Combustion characteristics.
- Familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.
- Familiarize different types of polymeric materials, their general preparation methods and applications to futuristic material fabrication needs.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Recognize water quality parameters and water treatment techniques for the polluted water.	Understand
CO 2	Outline the various synthesis processes of nanomaterial and enumerate its applications in various fields.	Understand
CO 3	Illustrate the composition, calorific values, uses of natural fuels and the manufacture of synthetic and bio fuels.	Understand
CO 4	Infer the knowledge of operating ideology, working process and application of energy conversion and storage devices.	Understand
CO 5	Reveal the basic concepts, processing of polymer and its chemistry in engineering and technology.	Understand

Course Contents

Unit – I	Water treatment	9

Water: Sources and impurities, Water quality parameters: Definition and significance of-color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, flouride and arsenic. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process.

Unit – II	Nanochemistry	9

Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials: Definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.

Unit – III	Fuels and combustion	9

Fuels: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking - octane number, diesel oil – cetane number; Power alcohol and biodiesel. Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method. CO_2 emission and carbon foot print.

Unit – IV	**Energy sources and storage devices**	9

Stability of nucleus: mass defect (problems), binding energy; Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Wind energy; Geothermal energy; Batteries: Types of batteries, Primary battery - dry cell, Secondary battery - lead acid battery and lithium-ion battery; Electric vehicles – working principles; Fuel cells: H_2-O_2 fuel cell, microbial fuel cell; Supercapacitors: Storage principle, types and examples.

Unit – V	**Polymer chemistry**	9

Introduction: Functionality-degree of polymerization. Classification of polymers (Source, Structure, Synthesis and Intermolecular forces). Mechanism of free radical addition polymerization. Properties of polymers: Tg, tacticity, molecular weight-number average, weight average, viscosity average and polydispersity index (Problems). Techniques of polymerization: Bulk, emulsion, solution and suspension. Engineering Plastics: Polyamides, Polycarbonates and Polyurethanes. Compounding and Fabrication Techniques: Injection, Extrusion, Blow and Calendaring.

Total : 45 Hours

Text Books

1. P. C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B.,"Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi,2012.
3. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

Reference Books

1. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
2. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
3. O.V. Roussak and H.D. Gesser, Applied Chemistry: A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

Additional / Web References

1. https://nptel.ac.in/courses/122101001

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

Mapping of Course Outcomes (COs) with Programme Outcomes (POs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	2	-	-	-	-	2	-	1	-	-	1
CO 2	3	-	-	-	-	-	-	-	-	-	-	1
CO 3	3	-	-	-	-	-	2	-	1	-	-	1
CO 4	3	-	-	-	-	-	2	-	-	-	-	1
CO 5	3	-	-	-	-	-	-	-	1	-	-	1
Average	3	-	-	-	-	-	2	-	1	-	-	1

3 – High   2 – Medium   1 – low   "-" - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
				Total	40	60

23CS301	PROBLEM SOLVING AND PYTHON PROGRAMMING (Common to all B.E/ B.Tech Programmes)	L	T	P	C
		3	0	0	3
Category	Engineering Science				
Pre requisites	Nil				

Course Objectives

The course is intended to
- Understand the basics of algorithmic problem solving.
- Develop and solve problems using python conditionals and loops.
- Develop and use function calls to solve problems.
- Construct python data structures - lists, tuples, dictionaries to represent complex data.
- Implement input/output with file exceptions in python.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CHAIRMAN-BOARD OF STUDIES

CO. No	Course Outcome	Bloom's Level
CO 1	Develop logical solutions to simple and complex computational problems.	Apply
CO 2	Develop and execute python programs using conditionals and loops	Apply
CO 3	Implement python programs using functions for searching operations	Apply
CO 4	Execute the lists, tuples and dictionary created in python	Apply
CO 5	Implement a module to read & write data with exceptions.	Apply

Course Contents

Unit – I	Basic Programming Representations	9

Fundamentals of Computer, Identification of Computational Problems, Algorithms, building blocks of algorithms (statements, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

Unit – II	Different Data Types	9

Introduction to python, Python interactive and script mode, data types: numeric, boolean, string, list, tuple, dictionary and set; identifier, variables, keywords, expressions, statements, assignment, precedence of operators, comments, indentation; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

Unit – III	Functional Flow	9

Conditionals: Boolean values and Operators, if statement, alternative statement, nested statements, chained conditional; Iteration: state, while, for, break, continue, pass; Input and Output; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string methods, string module; Lists as arrays, creation of arrays and operations on arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

Unit – IV	Types of Data Structures	9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, advanced list processing - list comprehension (Map, Filter, Lambda and Reduce); Tuples: tuple introduction, tuple assignment, tuple as return value; Dictionaries: operations and methods; Sets: set introduction, set operations; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation.

Unit – V	Files, Modules, Packages	9

Files: text files, reading and writing files, file positions, format operator, directory methods, command line arguments, Exceptions: errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).

Total : 45 Periods

Text Books
1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.
Reference Books

CHAIRMAN-BOARD OF STUDIES

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021.

Additional / Web References

1. https://learnengineering.in/ge3151-problem-solving-and-python-programming/
2. https://www.scribd.com/document/546667558/GE3151-PROBLEM-SOLVING-AND-PYTHON-PROGRAMMING
3. https://padeepz.net/ge3151-notes-problem-solving-and-python-programming-regulation-2021-anna-university/
4. https://onlinecourses.nptel.ac.in/noc21_cs32/

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	3	3	3	2	-	-	-	-	-	2	2
CO 2	3	3	3	3	2	-	-	-	-	-	2	2
CO 3	3	3	3	3	2	-	-	-	-	-	2	2
CO 4	2	2	-	2	2	-	-	-	-	-	2	2
CO 5	3	2	-	-	2	-	-	-	-	-	2	2
Average	2	3	3	3	2	-	-	-	-	-	2	2

3 – High   2 – Medium   1 – Low   '-" - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12		
CIA II	3 hours	2.5 units	100	12	24	
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	60
				Total	40	60

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தமிழர் மரபு

23TA101

<div align="right">

LTPC

1001

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அலகு 1 மொழி மற்றும் இலக்கியம்:

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

அலகு 2 மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக்கலை:

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

அலகு 3 நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு 4 தமிழர்களின் திணைக் கோட்பாடுகள்:

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்க காலத்தில் ஏற்றுமமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு 5 இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:

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

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 Tamils of Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – 'Sangam City Civilization on thebanks of river Vaigai; (Jointly published by: Department of Archaelogy & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
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, Tamilandu).
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by RMRL) – Reference Book.

CHAIRMAN-BOARD OF STUDIES

HERITAGE OF TAMILS

23TA101

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UNIT I LANGUAGE AND LITERATURE

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

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

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

UNIT III FOLK AND MARTIAL ARTS

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

UNIT IV THINAI CONCEPT OF TAMILS

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

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

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

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 நதிக்கரையயில் 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 Tamils of Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – 'Sangam City Civilization on thebanks of river Vaigai; (Jointly published by: Department of Archaelogy & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
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, Tamilandu).
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by RMRL) – Reference Book.

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23PC201	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
	(Common to all B.E./B.Tech Programmes)	0	0	4	2

Category	Basic sciences
Pre requisites	Physics and chemistry

Course Objectives

The course is intended to

- Measure various physical parameter of solid and matter waves.
- Identify the velocity of ultrasonic waves in different liquid medium.
- Measure acceptance angle, groove width and wave length of laser.
- Demonstrate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO and chloride.
- Familiarize with electro analytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Develop the experimental skills on physical properties of materials and matter waves.	Apply
CO 2	Make use of concepts of sound to measure physical properties of given liquids.	Apply
CO 3	Identify various physical parameters of object with concepts of optics.	Apply
CO 4	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	Apply
CO 5	Determine the amount of metal ion through volumetric techniques.	Apply

List of Experiments in physics (Any Seven Experiments)

S.No	List of Exercises	CO	Blooms Taxonomy
1.	Simple harmonic oscillations of cantilever.	CO 1	Apply
2.	Non-uniform bending - Determination of Young's modulus.	CO 1	Apply
3.	Melde's string experiment.	CO 1	Apply
4.	Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids.	CO 2	Apply
5.	Photoelectric effect.	CO 3	Apply
6.	Air wedge - Determination of thickness of a thin sheet/wire.	CO 3	Apply
7.	a) Optical fibre -Determination of Numerical Aperture and acceptance angle b) Compact disc- Determination of width of the groove using laser.	CO 3	

CHAIRMAN-BOARD OF STUDIES

			Apply
8.	Laser- Determination of the wave length of the laser using grating.	CO 3	Apply

Total : 30 Periods

List of Experiments in Chemistry (Any Seven Experiments)

S.No	List of Exercises	CO	Blooms Taxonomy
1.	Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard.	CO 4	Apply
2.	Determination of types and amount of alkalinity in a water sample - Split the first experiment into two.	CO 4	Apply
3.	Determination of total, temporary & permanent hardness of water by EDTA method.	CO 4	Apply
4.	Determination of DO content of water sample by Winkler's method.	CO 4	Apply
5.	Determination of chloride content of water sample by Argentometric method.	CO 4	Apply
6.	Determination of strength of given hydrochloric acid using pH meter.	CO 5	Apply
7.	Determination of strength of acids in a mixture of acids using conductivity meter.	CO 5	Apply
8.	Estimation of iron content of the given solution using potentiometer.	CO 5	Apply

Total : 30 Periods

Mapping of Course Outcomes (COs) with Programme Outcomes (POs)

CO	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	2	2	-	-	-	-	-	-	2	-	-	-
CO 2	2	2	-	-	-	-	-	-	2	-	-	-
CO 3	2	2	-	-	-	-	-	-	2	-	-	-
CO 4	2	2	-	-	-	-	-	-	2	-	-	-
CO 5	2	2	-	-	-	-	-	-	2	-	-	-
Average	2	2	-	-	-	-	-	-	2	-	-	-

3 – High   2 – Medium   1 – Low   '-" - No Correlation

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
			Total	60	40

23CS302	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY (Common to all B.E/ B.Tech Programmes)	L	T	P	C
		0	0	3	1.5
Category	**Engineering Science**				
Pre requisites	Nil				

Course Objectives

The course is intended to
- Develop the problem-solving skills to complex problems
- Develop the basic programming constructs in Python.
- Implement various gaming strategies in python to solve real world problems.
- Model a data structure using lists, tuples, dictionaries in python.
- Make use of input / output operations with files in Python.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO No.	Course Outcome	Bloom's Level
CO 1	Develop algorithmic solutions to simple computational problems	Apply
CO 2	Implement programs in Python using conditionals and loops for solving problems.	Apply
CO 3	Implement programs in Python for real time applications using functions	Apply
CO 4	Implement programs in Python for real time applications using exception handling.	Apply
CO 5	Develop gaming applications using Python	Apply

CHAIRMAN-BOARD OF STUDIES

S.No	List of Exercises	CO	Bloom's Taxonomy
1.	Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.)	CO 1	Apply
2.	Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).	CO 2	Apply
3.	Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)	CO 2	Apply
4.	Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building – operations of list & tuples)	CO 3	Apply
5.	Implementing programs using Functions. (Factorial, largest number in a list, area of shape)	CO 3	Apply
6.	Implementing programs using written modules and Python Standard Libraries (pandas, numpy. Matplotlib, scipy)	CO 4	Apply
7.	Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)	CO 4	Apply
8.	Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation)	CO 4	Apply
9.	Exploring Pygame tool.	CO 4	Apply
10.	Developing a game activity using Pygame like bouncing ball, car race etc.	CO 5	Apply
			Total : 45 Periods

Reference Books
1. Manual-prepared by SSCET

Additional / Web References
1. http://nptel.ac.in/courses/112104113/
2. http://nptel.ac.in/courses/112108148/

CHAIRMAN-BOARD OF STUDIES

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

CO	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	3	3	3	2	-	-	-	-	-	2	2
CO 2	3	3	3	3	2	-	-	-	-	-	2	2
CO 3	3	3	3	3	2	-	-	-	-	-	2	-
CO 4	2	2	-	2	2	-	-	-	-	-	2	-
CO 5	2	2	-	-	2	-	-	-	-	-	2	-
CO 6	2	2	-	-	2	-	-	-	-	-	2	-
Average	2	3	3	3	2	-	-	-	-	-	2	2

3– High   2 – Medium   1 – low   '-" - No Correlation

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
			Total	60	40

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

23EN102	**Communication Laboratory** (Common to All B.E/B.Tech Programs)	**L**	**T**	**P**	**C**
		0	**0**	**2**	**1**
Category	**HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSE (HSMC)**				
Pre requisites	Nil				

Course Objectives

The course is intended to
- Improve the communicative competence of learners

- Help learners use language effectively in academic /work contexts

- Develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.

- Build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.

- Use language efficiently in expressing their opinions via various media.

Course Contents		
Unit – I	**Introduction to Fundamental of Communication**	**6**
Listening - Listening for general information-specific details- conversation: Introduction to classmates - Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form; BBC Radio/Research find YouTube channel. Speaking - making telephone calls-Self Introduction; Introducing a friend; - 42 politeness strategies- making polite requests, making polite offers, replying to polite requests and offers- understanding basic instructions(filling out a bank application for example), PPT Presentation.		
Unit – II	**Narration**	**6**
Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities, Oral writing (Extract videos), and Document national statement. Listening to TED Talks. Speaking - Narrating personal experiences / events-Talking about current and temporary situations & permanent and regular situations* - describing experiences and feelings engaging in small talk- describing requirements and abilities, making predictions- talking about a given topic-giving opinions, understanding a website-describing processes.		

CHAIRMAN-BOARD OF STUDIES

Unit – III	Reading	6

Reading – Reading Novel/ Auto-biography/ Award winning novels/ Self motivation books/ Basic economics books.

Unit – IV	Reading	6

Reading- longer texts- close reading, Reading exercise: IELTS & TOEFL, BEC, Journals, Newspapers, Reading edition, Comprehension-reading longer texts- reading different types of texts- magazines.

Unit – V	Writing	6

Writing- brainstorming -writing short essays – developing an outline- identifying main and subordinate ideas- dialogue writing. Fill in the blanks: Proposal, Resume writing, PPT, AI tools, Letter writing, informal or personal letters-e-mails-conventions of personal email. Using Chat GPT & Language tools, screening of English movies.

Total : 30 Hours

Text Books

1. Anna University, Division of Humanities and Social Sciences, *English for Engineers and Technologists. Vol. 1: A Skills Approach,* Orient Longman, 2002.
2. Trimble Louis, *English for Science and Technology, Vol. 1: A Discourse Approach.* England: Cambridge University Press, 2023.
3. Kumar, Sanjay & Lata, Pushp. *Communication Skills,* Oxford University Press, 2011.

Reference Books

1. C.Richards Jack. *Interchange Fifth Edition*, Cambridge University Press, 2017.
2. Wallwork Adrian, Springer. *English for Academic Correspondence and Socializing,* Cambridge University Press. 2011.

Additional / Web References

1. https://nptel.ac.in/courses/109106094

2. nptel.ac.in/courses/109/104/109104090/

3. http://www.uefap.com/grammar/gramfram.html

CHAIRMAN-BOARD OF STUDIES

Cos	POs												PSOs		
Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	-	-	-	-	2	-	-	-	2	3	-	3			
CO 2	-	-	-	-	2	-	-	-	2	3	-	3			
CO 3	-	-	-	-	2	-	-	-	2	3	-	3			
CO 4	-	-	-	-	2	-	-	-	2	3	-	3			
CO 5	-	-	-	-	2	-	-	-	2	3	-	3			
Average	-	-	-	-	2	-	-	-	2	3	-	3			

"3"– High   "2" – Medium   "1" – low   "-" - No Correlation

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
			Total	**60**	**40**

23MC801   INDUCTION PROGRAMME

This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over. The induction programme has been introduced by AICTE with the following objective:

"Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed."

"One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character. "

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Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

i.   Physical Activity

This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc.

ii.   Creative Arts

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later.

iii.   Universal Human Values

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not

be through do's and dont's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

iv.   Literary Activity
Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

v.   Proficiency Modules

This would address some lacunas that students might have, for example, English, computer familiarity etc.

vi.   Lectures by Eminent People

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Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

vii.   Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

viii.   Familiarization to Dept./Branch & Innovations

They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

ix.   Department Specific Activities

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering

/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

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II SEMESTER

23MA202	ENGINEERING MATHEMATICS-II	L	T	P	C
	(Common to all B.E/ B.Tech Programmes)	3	1	0	4
Category	Basic Sciences (BS)				
Pre requisites	23MA201				

Course Objectives
The course is intended to

- Demonstrate the basic concepts of PDE for solving standard partial differential equations.
- Interpreting techniques of vector calculus to solve problems in integration over a curve.
- Familiarize the concepts of complex integration to solve contour problems.
- Introduce Fourier series analysis which is central to many applications in Engineering apart from its use in solving boundary value problems.
- Acquaint the student with Fourier transform techniques used in wide variety of situations.

Course Outcomes (COs)
On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Demonstrate the formation of PDE to solve homogeneous and non-homogeneous problems.	Understand
CO 2	Acquire knowledge vector calculus to evaluate integration over a curve.	Apply
CO 3	Construct Cauchy integral theorem and residue theorem to evaluate contour integration.	Apply
CO 4	Utilize the fourier series of periodic functions and solve differential equations using fourier analysis.	Apply
CO 5	Contrast mathematical principles on transforms of periodic and non-periodic functions.	Understand

Course Contents		
Unit – I	**Partial Differential Equations**	9+3

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Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

Formation of partial differential equations - Singular integrals - Solutions of standard types of first order partial differential equations - Lagrange's linear equation - Homogenous Linear partial differential equations of second and higher order with constant coefficients.

Unit – II	Vector calculus	9+3

Gradient and directional derivative - Divergence and curl - Irrotational and solenoidal vector fields - Line integral over a plane curve - Surface integral and volume integral - Green's, Gauss divergence and Stokes' theorems (proofs excluded).

Unit – III	Complex Integration	9+3

Line integral - Cauchy's theorem and integral formula -Taylor's and Laurent's series - Singularities - Residues - Residue theorem-Application of residue theorem for evaluation of real integrals - Use of circular contour and semi-circular contour with no pole on real axis.

Unit – IV	Fourier series	9+3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range Sine and Cosine series - Parseval's identity – Harmonic Analysis – Complex form of Fourier series.

Unit – V	Fourier Transform	9+3

Fourier integral theorem - Fourier transform pair - Sine and Cosine transforms - Properties - Transform of elementary functions - Convolution theorem - Parseval's identity.

Total : 60 Periods

Text Books

1. Friedberg. A.H., Insel. A.J. and Spence. L., "Linear Algebra", Prentice Hall of India, New Delhi, 4th Edition, 2004.

2. Grewal. B.S, "Higher Engineering Mathematics", 41st Edition, Khanna Publications, New Delhi, 2011.

3. Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", Eighth Edition, Laxmi Publications Pvt Ltd., 2011.

Reference Books

1. Kolman. B. Hill. D.R., "Introductory Linear Algebra", Pearson Education, New Delhi, First Reprint, 2009.

2. Dass, H.K., and Er. Rajnish Verma," Higher Engineering Mathematics", S. Chand Private

CHAIRMAN-BOARD OF STUDIES

	Ltd., 2011.	
3.	Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2012.	

Additional / Web References

1.https://nptel.ac.in/courses/111106094

2.https://archive.nptel.ac.in/courses/111/103/111103070/

3.https://nptel.ac.in/courses/111106111

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs											
CO 1	1	2	3	4	5	6	7	8	9	10	11	12
CO 2	3	2							1	1		
CO 3	3	2							1	1		
CO 4	3	2							1	1		
CO 5	3	2							1	1		
Average	3	2							1	1		

"3"– High   "2" – Medium   "1" – low   "-" - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12		
CIA II	3 hours	2.5 units	100	12	24	
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	60
				Total	40	60

23EC301	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common to all B.E/ B.Tech. Programmes)	L	T	P	C
		3	0	0	3
Category	Engineering Sciences				
Pre requisites	Nil				

Course Objectives

The course is intended to
- Solve electric circuits using basic laws.
- Impart knowledge of types, construction and working principles of transformer and concepts of protective devices.
- Familiarize the types, construction and working principles of electrical machines.
- Introduce the characteristics and applications of analog devices and logic gates.
- Acquaint the functional elements and working of measuring instruments.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Compute the electric circuit parameters using basic laws.	Apply
CO 2	Explain the construction and working of transformers and the concepts of protective devices.	Understand

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

CO 3	Explain the construction and working principles of Electrical Machines.	Understand
CO 4	Interpret the characteristics of analog electronic devices and logic gates	Apply
CO 5	Select appropriate measuring instruments for the given application.	Apply

Course Contents		
Unit – I	**ELECTRICAL CIRCUITS**	9
DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws –Independent and Dependent Sources – Simple problems- Nodal Analysis, Mesh analysis with independent sources only Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor, Steady state analysis of RLC circuits	
Unit – II	**TRANSFORMERS AND ELECTRICAL INSTALLATIONS**	9
	Transformer: Single Phase Transformer: Construction, principle of operation, EMF Equation, types of transformer, Regulation, Efficiency and applications of Transformer, Three phase transformer. Types of wires and cables, earthing, protective devices - switch fuse unit - Miniature circuit breaker - moulded case circuit breaker - earth leakage circuit breaker, safety precautions and First Aid.	
Unit – III	**ELECTRICAL MACHINES**	9
	Construction of electrical machine, Working principle of Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction and working principle of alternator, Single phase Induction Motor, three phase induction motor.	
Unit – IV	**ANALOG AND DIGITAL ELECTRONICS**	9
	Analog electronics: Resistor, Inductor and Capacitor in Electronic Circuits- Semiconductor Materials: Silicon, Germanium – PN Junction Diodes, Zener Diode –Characteristics Applications, Transistors: IV characteristics of BJT, FET, IGBT, UJT, Applications **Digital electronics:** Number Systems - Code Converters: BCD, Gray Code, Excess 3 – 1's complement, 2's complement - Logic Gates.	
Unit – V	**MEASUREMENTS AND INSTRUMENTATION**	9
	Functional elements of an instrument, Operating Principle, types –Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Standards and calibration, Instrument Transformers-CT and PT, DSO- Block diagram- Data acquisition.	
	Total : 45 Hours	

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Text Books
1. S. K, Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2011.
2. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", McGraw Hill Education, Second Edition, 2020
3. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, New Delhi, 2014.
4. James A Svoboda, Richard C. Dorf, Introduction to Electric Circuits, Wiley,2018

Reference Books
1. Muthusubramanian, R. Basic Electrical & Electronics Engineering, Tata McGraw Hill Education Private Limited, 2009.
2. Thomas L. Floyd, 'Electronic Devices', Pearson Education, Tenth Edition, 2017.
3. Thomas L. Floyd, 'Digital Fundamentals', Pearson Education, Eleventh Edition, 2018.
4. H.S. Kalsi, 'Electronic Instrumentation', McGraw-Hill education, New Delhi, 2018

Additional / Web References
1. https://archive.nptel.ac.in/courses/117/106/117106108/
2. https:// nptel.ac.in/courses/108/105/108105132/
3. https://nptel.ac.in/courses/108105153

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	-	-	-	-	-	-	-	2	2			
CO 2	3	2	2	-	-	-	-	-	-	-	1	2			
CO 3	3	2	2	-	-	-	-	-	-	-	2	2			
CO 4	3	2	2	-	-	-	-	-	-	-	2	2			
CO 5	3	1	1	-	-	-	-	-	-	-	2	2			
Average	3	1.8	1.8	-	-	-	-	-	-	-	1.8	2			

3 – High   2 – Medium   1– Low   '-" - No Correlation

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assesment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
				Total	40	60

23ME301	ENGINEERING GRAPHICS	L	T	P	C
		3	1	0	4
Category	Engineering Sciences				
Pre requisites	NIL				

Course Objectives

The course is intended to

- Develop graphical skills for the construction of curves
- Expose the orthographic principles through lines and planes.
- Demonstrate the concepts of orthographic projections of solids
- Impart the knowledge on sectioning solids and development of lateral surfaces of solids
- Exposure to the significance of isometric projections

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Sketch the engineering curves as per engineering drawing standards	Understand
CO 2	Illustrate the orthographic projections to construct lines and planar surface	Understand
CO 3	Construct the orthographic views of solids	Apply
CO 4	Develop the lateral surfaces of solids using drawing standards	Apply
CO 5	Sketch the isometric projection and perspective projection of simple solids	Apply

Course Contents

Unit – I	Plane Curves	12

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Importance of graphics in engineering applications – Use of drafting instruments – Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves.

Unit – II	Projection of Lines and Plane Surface	12

Orthographic projection-Principal planes-First angle projection-Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

Unit – III	Projection of Solids	12

Projection of solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three Dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects.

Unit – IV	Projection of Sectioned Solids and Development of Surfaces	12

Sectioning of prisms, pyramids, cylinder, and cone in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other - obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids - Prisms, pyramids cylinders and cones.

Unit – V	Isometric Projection	12

Principles of isometric projection — isometric scale - isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method. Practicing three dimensional modeling of isometric projection of simple objects by CAD Software (Not for examination)

Total : 60 Hours

Text Books
1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Natarajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
3. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.
Reference Books

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2 nd Edition, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27thEdition, 2017.
3. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015
4. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.

Additional / Web References
1. https://nptel.ac.in/courses/112103019
2. https://en.wikipedia.org/wiki/Engineering_drawing

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
CO 2	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
CO 3	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
CO 4	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
CO 5	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
Average	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-

3 – High   2 – Medium   1 – low   '-" - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
				Total	40	60

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

23CS401	Data Structures and Algorithms	L	T	P	C
	(Common to CSE, IT, AI & DS & Cyber Security)	3	0	0	3

Category	Engineering Science
Pre requisites	Nil

Course Objectives

The Course will enable learners to:

- To understand the concepts of List ADT.
- To learn linear data structures – stacks and queues ADTs.
- To understand and apply Tree data structures
- To understand and apply Graph structures.
- To analyze sorting, searching and hashing algorithms.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Implement abstract data types for lists.	Apply
CO 2	Solve real world problems using appropriate linear data structures	Apply
CO 3	Apply appropriate tree data structures in problem solving	Apply
CO 4	Implement appropriate Graph representations & solve real-world applications	Apply
CO 5	Implement various searching and sorting algorithms.	Apply

Course Contents

Unit – I	LINEAR DATA STRUCTURES – LIST	9

Algorithm analysis - running time calculations - Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation – singly linked lists - circularly linked lists - doubly-linked lists – applications of lists – Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal).

Unit – II	LINEAR DATA STRUCTURES – STACKS, QUEUES	9

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Stack ADT – Stack Model - Implementations: Array and Linked list - Applications - Balancing symbols - Evaluating arithmetic expressions - Conversion of Infix to postfix expression - Queue ADT – Queue Model - Implementations: Array and Linked list - applications of queues - Priority Queues – Binary Heap – Applications of Priority Queues.

Unit – III	NON LINEAR DATA STRUCTURES – TREES	9

Tree ADT – tree traversals - Binary Tree ADT – expression trees – applications of trees – binary search tree ADT– AVL Tree.

Unit – IV	NON LINEAR DATA STRUCTURES - GRAPHS	9

Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Applications of graphs – BiConnectivity – Euler circuits.

Unit – V	SEARCHING, SORTING AND HASHING TECHNIQUES	9

Searching- Linear Search - Binary Search - Sorting - Bubble sort - Selection sort - Insertion sort – Hashing - Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing

Total : 45 Periods

Text Books

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", 4th Edition, Pearson Education, 2014.

2. Sartaj Sahni, "Data Structures, Algorithms and Applications in C++", Silicon paper publications, 2004.

Reference Books

1. Jean-Paul Tremblay and Paul Sorenson, "An Introduction to Data Structures with Application", McGraw-Hill, 2017.

2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in Java", Third Edition, Pearson Education, 2012.

3. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, University Press, 2008.

4. Ellis Horowitz, Sartaj Sahni, Dinesh P Mehta, "Fundamentals of Data Structures in C++", Second Edition, Silicon Press, 2007.

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toc/lex_auth_0135015781650513921 0584/overview

CHAIRMAN-BOARD OF STUDIES

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	3	3	3	2	-	-	-	-	-	2	2
CO 2	3	3	3	3	2	-	-	-	-	-	2	2
CO 3	3	3	3	3	2	-	-	-	-	-	2	2
CO 4	2	2	-	2	2	-	-	-	-	-	2	2
CO 5	3	2	-	-	2	-	-	-	-	-	2	2
Average	2	3	3	3	2	-	-	-	-	-	2	2

3 – High   2 – Medium   1 – Low   '-" - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12		
CIA II	3 hours	2.5 units	100	12	24	
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	60
				Total	40	60

CHAIRMAN-BOARD OF STUDIES

தமிழரும் தொழில்நுட்பமும்

23TA102

LTPC
1001

அலகு 1   நெசவு மற்றும் பானைத் தொழில்நுட்பம்:

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

அலகு 2   வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:

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

அலகு 3   உற்பத்தித் தொழில்நுட்பம்:

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

அலகு 4   வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்:

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

அலகு 5   அறிவியல் தமிழ் மற்றும் கணித்தமிழ்:

அறிவியல் தமிழின் வளர்ச்சி – கணித்தமிழ் வளர்ச்சி – தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருள்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

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 Tamils of Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – 'Sangam City Civilization on thebanks of river Vaigai; (Jointly published by: Department of Archaelogy & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
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, Tamilandu).
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by RMRL) – Reference Book.

CHAIRMAN-BOARD OF STUDIES

TAMILS AND TECHNOLOGY

23TA102   LTPC1001

UNIT I WEAVING AND CERAMIC TECHNOLOGY

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

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY

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

UNIT III MANUFACTURING TECHNOLOGY

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

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY

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

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.

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 Tamils of Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – 'Sangam City Civilization on thebanks of river Vaigai; (Jointly published by: Department of Archaelogy & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
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, Tamilandu).
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by RMRL) – Reference Book.

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23IT301	PROGRAMMING IN C	L	T	P	C
	(Common for all programmes)	3	0	2	4
Category	Engineering Science				
Pre requisites	Nil				

Course Objectives

The course is intended to

1. Illustrate the constructs of C Language.

2. Summarize C programs using arrays and strings.

3. Implement modular applications in C using functions.

4. execute applications in C using pointers and structures.

5. Examine the input/output and file handling in C.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
	Theory	
CO 1	Summarize the fundamentals of C Programming constructs.	Understand
CO 2	Illustrate the applications using arrays and strings.	Understand
CO 3	Integrate the modular applications in C using functions.	Apply
CO 4	Execute the applications in C using structures and pointers.	Apply
CO 5	Prepare the applications using sequential and random access file processing.	Apply
	Laboratory	
CO 6	Execute the knowledge on C programming constructs.	Apply

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

CO 7	Experiment the programs in C using arrays and strings.	Apply
CO 8	Choose the applications in C using functions.	Apply
CO 9	Examine the applications in C using structures and pointers.	Apply
CO 10	Prepare the applications in C using file processing.	Apply

Course Contents		
Unit – I	**Basics of C Programming**	**9**
Introduction to programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements – Decision making statements - Switch statement - Looping statements		
Unit – II	**Arrays and Strings**	**9**
Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.		
Unit – III	**Functions and Pointers**	**9**
Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions –Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.		
Unit – IV	**Structures and Union**	**9**
Structure - Nested structures – Pointer and Structures – Array of structures – Self-referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.		
Unit – V	**File Processing**	**9**
Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.		
		Total : 45 Periods

CHAIRMAN-BOARD OF STUDIES

List of Exercises

S.No.	Name of the Exercise	CO	Bloom's Level
1	I/O statements, operators, expressions	CO 6	Apply
2	decision-making constructs: if-else, go to, switch-case, break-continue	CO 6	Apply
3	Loops: for, while, do-while	CO 6	Apply
4	Arrays: 1D and 2D,multi-dimensional arrays, traversal	CO 7	Apply
5	Strings: operations	CO 7	Apply
6	Functions: call, return, passing parameters by (value, reference), passing arrays to function.	CO 8	Apply
7	Recursion	CO 8	Apply
8	Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers	CO 9	Apply
9	Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.	CO 9	Apply
10	Files: reading and writing, File pointers, file operations, random access, processor directives.	CO 10	Apply

Text Books

1. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.

2. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Pearson Education, Second Edition, 2015.

Reference Books

1. Paul Deitel and Harvey Deitel, "C How to Program: with an Introduction to C++", Pearson Education, Eighth edition, 2018.

2. Yashwant Kanetkar, Let us C, BPB Publications, 17th Edition, 2020.

3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.

CHAIRMAN-BOARD OF STUDIES

4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford University Press, Second Edition, 2013.

5. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Pearson Education, 1st Edition, 2013.

Additional / Web References

1. https://nptel.ac.in/courses/106104128
2. https://www.coursera.org/specializations/c-programming
3. https://www.udemy.com/course/c-programming-for-beginners-/

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	-	3	-	-	-	2	-	-	2	-	-	-
CO 2	3	2	2	-	3	-	-	-	2	-	-	3	-	-	-
CO 3	3	3	2	-	3	-	-	-	2	-	-	2	-	-	-
CO 4	3	2	2	-	3	-	-	-	2	-	-	3	-	-	-
CO 5	3	2	3	-	3	-	-	-	2	-	-	2	-	-	-
CO 6	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
CO 7	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
CO 8	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
CO 9	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
CO 10	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
Average	3	2.1	2.1	3	3	2	-	-	2	-	-	2.7	-	-	-

Title: **Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)**

3 – High   2 – Medium   1– Low   '-" - No Correlation

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

Assessment	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
Theory Component						
CIA I	3 hours	2.5 units	100	10	20	50
CIA II	3 hours	2.5 units	100	10		
Practical Component						
Observation & Analysis of Experimental results, Viva Voce, Quiz based on rubrics.		All Experiments	75	22.5	30	-
Model Exam	3 hours		25	7.5		
Total					50	50

23ME302	ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2
Category	Engineering Sciences				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Understand the basic carpentry, plumbing, sheet metal and welding operations.
- Understand various wiring circuits and soldering & checking of continuity.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work	Understand
CO 2	Make joints in wood materials used in common household wood work	Apply

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   Approved in Academic Council Meeting on 07.11.2023

CO 3	Weld various joints in steel plates using arc welding work and use sheet metal practices in fabrication	Apply
CO 4	Wire various electrical joints in common household electrical wiring	Apply
CO 5	Solder and test simple electronic circuits; Assemble and dismantle computer	Apply

S.No	List of Exercises	CO	Blooms Taxonomy
	GROUP-A (CIVIL & MECHANICAL)		
1.	Assemble the pipeline connections using tools for the given layout	CO 1	Apply
2.	Making wooden T- Joint, and lap joint using carpentry tools	CO 1	Apply
3.	Basic machining work- simple turning and facing	CO 2	Apply
4.	Welding a butt and lap joint using welding process	CO 3	Apply
5.	Make a tray in sheet metal for the given dimensions	CO 3	Apply
	GROUP-B (ELECTRICAL & ELECTRONICS)		
6.	Stair case wiring	CO 4	Apply
7.	Fluorescent lamp wiring	CO4	Apply
8.	Energy meter wiring	CO4	Apply
9.	Soldering simple electronic circuits and check the continuity	CO 5	Apply
10.	Assembly and dismantle of computer/ laptop/Mobile phones	CO 5	Apply

Total : 60 Periods

Reference Books

1. Manual-prepared by SSCET

Web References

1. https://be-iitkgp.vlabs.ac.in/exp/familiarisation-resistor/
2. https://fab-coep.vlabs.ac.in/exp/computer-controlled-cutting/

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)		
CO	POs	PSOs

CHAIRMAN-BOARD OF STUDIES

	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
CO 2	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
CO 3	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
CO 4	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
CO 5	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
Average	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-

3 – High   2 – Medium   1 – low   '-" - No Correlation

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
	Total			60	40

23CS402	Data Structures and Algorithms Laboratory	L	T	P	C
	(Common to CSE, IT, AI & DS, Cyber Security)	0	0	3	1.5
Category	Engineering Science				
Pre requisites	Nil				

CHAIRMAN-BOARD OF STUDIES

Passed in Board of studies Meeting on 26.10.2023   *Approved in Academic Council Meeting on 07.11.2023*

Course Objectives
The course is intended to 1. design linear data structures – lists 2. design linear data structures – stacks, and queues 3. understand sorting, searching and hashing algorithms 4. apply Tree structures 5. apply Graph structures.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	implement linear data structures.	Apply
CO 2	implement Stack and Queue ADT operations.	Apply
CO 3	Analyze the efficiency of different searching and sorting algorithms	Apply
CO 4	Use tree ADT for searching applications.	Apply
CO 5	Apply appropriate graph algorithms for shortest path applications.	Apply

S.No	Exercise	CO	Bloom's Level
1.	Write a program that uses functions to perform the following operations on singly linked list i) Creation ii) Insertion iii) Deletion iv) Traversal	1	Apply
2.	Write a program that uses functions to perform the following operations on doubly linked list i) Creation ii) Insertion iii) Deletion iv) Traversal.	1	Apply
3.	Write a program that uses functions to perform the following operations on circular linked List i) Creation ii) Insertion iii) Deletion iv) Traversal.	1	Apply

CHAIRMAN-BOARD OF STUDIES

4.	Write a program that implements stack (its operations) using i) Arrays ii) Linked list(Pointers).	2	Apply
5.	Write a program that implements Queue (its operations) using i) Arrays ii) Linked list(Pointers).	2	Apply
6.	Write a program that uses both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers: a) Linear search b) Binary search	3	Apply
7.	Write a program that implements the following sorting i) Bubble sort ii) Selection sort iii)Quick sort..	3	Apply
8.	Write a program that implements the following i) Insertion sort ii) Merge sort iii)Heap sort.	3	Apply
9.	Write a program to perform the following operations: a) Insert an element into a binary search tree. b) Delete an element from a binary search tree. c) Search for a key element in a binary search tree.	4	Apply
10.	Write a program to implement the tree traversal methods.	4	Apply
11.	Write a program to perform the following operations: a) Insert an element into an AVL tree. b) Delete an element from an AVL tree. c) Search for a key element in a AVL tree	4	Apply
12.	Write a program to perform DFS and BFS of Graph using Graph ADT.	5	Apply
13	Write a program to find the shortest path using Graph ADT using graph algorithms	5	Apply

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12

CHAIRMAN-BOARD OF STUDIES

CO 1	3	3	3	3	2	-	-	-	-	-	2	2
CO 2	3	3	3	3	2	-	-	-	-	-	2	2
CO 3	3	3	3	3	2	-	-	-	-	-	2	2
CO 4	2	2	-	2	2	-	-	-	-	-	2	2
CO 5	3	2	-	-	2	-	-	-	-	-	2	2
Average	**2**	**3**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**2**

3– High   2 – Medium   1 – Low   '-" - No Correlation

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
	Total			**60**	**40**

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