
**RAJALAKSHMI ENGINEERING COLLEGE
(AN AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

DEPARTMENT VISION AND MISSION

VISION

To be an international centre in education, research and the application of knowledge, to benefit the society globally in the field of Electrical and Electronics Engineering

MISSION

- To impart high quality technical education and develop Electrical and Electronics Engineers with a sound theoretical combined with practical skills in all the areas concerning the discipline.
- To inculcate innovative research capabilities and exemplary professional conduct to lead and to use technology for the progress of our country.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- [1] To provide students with a strong foundation in mathematics, science and engineering, necessary to understand and solve engineering problems. Prepare the students for a successful career in industries and also for higher studies.
- [2] To enable the students to acquire the ability to analyze, design and build electrical and electronic systems, needed in power electronic drives, variety of controllers, and power systems.
- [3] To impart students with a sound knowledge of software tools and skills for taking up research in upcoming areas in the field of electrical and electronics engineering, and for embarking on entrepreneurial ventures with an aptitude for lifelong learning.
- [4] To impart communication skills, to inculcate values and professional ethics, leadership qualities and team spirit for an overall personality development, to create environmental awareness and a passion for using the knowledge acquired, for addressing the societal concerns.

(A) PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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 and safety, and the cultural, societal, and environmental considerations.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and 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.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

(B) PROGRAM SPECIFIC OUTCOMES (PSOs)

- PSO 1.** Analyse, model and design Electrical and Electronic circuits and machines.
- PSO 2.** Comprehend the structure of power apparatus and systems and analyze their operation, control, protection and utilization.
- PSO 3.** Use of programmable devices, embedded systems and software 33 for the simulation, design and building newer electrical and electronic systems leading to research and invention.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
B.E. ELECTRICAL AND ELECTRONICS ENGINEERING
REGULATION – 2023
CHOICE BASED CREDIT SYSTEM
CURRICULUM AND SYLLABUS [I SEM –IV SEM]

SEMESTER I

S.NO	COURSE CODE	COURSE TITLE	PERIODS / WEEK					CATEGORY
			L	T	P	TOTAL	CREDITS	
1	HS 23111	Technical Communication I	2	0	0	2	2	HS
2	MA23111	Linear Algebra and Calculus	3	1	0	4	4	BS
3	CY23131	Chemistry for Electronics Engineering	3	0	2	5	4	BS
4	GE23131	Programming using C	1	0	6	7	4	ES
5	GE23111	Engineering Graphics	2	0	4	6	4	ES
6	GE23122	Engineering Practices - Electrical and Electronics	0	0	2	2	1	ES
7	MC23111	Indian Constitution and Freedom Movement	3	0	0	3	0	MC
8	GE23117	தமிழர்மரபு /Heritage of Tamils	1	0	0	1	1	HS
TOTAL			15	1	14	30	20	

SEMESTER II

S.NO	COURSE CODE	COURSE TITLE	PERIODS / WEEK					CATEGORY
			L	T	P	TOTAL	CREDITS	
1	HS23221/ HS 23222	Technical Communication II/ English for Professional Competence	0	0	2	2	1	HS
2	MA23212	Differential Equation and Complex Variables	3	1	0	4	4	BS
3	PH23232	Physics for Electronics Engineering	3	0	2	5	4	BS
4	CS23231	Data Structures	3	0	4	7	5	ES
5	EE23212	Electric Circuits	3	0	0	3	3	PC
6	EE23221	Electric Circuits Laboratory	0	0	2	2	1	PC
7	GE23121	Engineering Practices - Civil and Mechanical	0	0	2	2	1	ES
8	MC23112	Environmental Science and Engineering	3	0	0	3	0	MC
9	GE23217	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	1	1	HS
TOTAL			16	1	12	29	20	

SEMESTER III

S.NO	COURSE CODE	COURSE TITLE	PERIODS / WEEK					CATEGORY
			L	T	P	TOTAL	CREDITS	
1	MA23312	Fourier Series and Number Theory	3	1	0	4	4	BS
2	EE23311	Electromagnetic Theory	3	0	0	3	3	ES
3	EE23312	Electrical Machines – I	3	0	0	3	3	PC
4	EE23313	Measurements and Instrumentation	3	0	0	3	3	PC
5	EE23314	Electronic Devices and Circuits	3	0	0	3	3	PC
6	EE23315	Power Plant Engineering	3	0	0	3	3	ES
7	EE23321	Electronic Devices and Circuits Laboratory	0	0	2	2	1	PC
8	CS23336	Introduction to Python Programming	1	0	4	5	3	ES
TOTAL			19	1	6	26	23	

SEMESTER IV

S.NO	COURSE CODE	COURSE TITLE	PERIODS / WEEK					CATEGORY
			L	T	P	TOTAL	CREDITS	
1	EE23411	Electrical Machines – II	3	0	0	3	3	PC
2	EE23412	Transmission and Distribution	3	0	0	3	3	PC
3	EE23431	Digital Logic Circuits	3	0	2	5	4	PC
4	EE23432	Linear Integrated Circuits and Applications	3	0	2	5	4	PC
5	*****	Open Elective – I	3	0	0	3	3	OE
6	EE23421	Electrical Machines Laboratory	0	0	4	4	2	PC
7	GE23327	Soft Skills-I	0	0	2	2	1	EEC
8	CS23422	Python Programming for Machine Learning	0	0	4	4	2	ES
TOTAL			15	0	14	29	22	

SEMESTER V

S.NO	COURSE CODE	COURSE TITLE	PERIODS / WEEK					CATEGORY
			L	T	P	TOTAL	CREDITS	
1	EE23511	Power System Analysis	3	0	0	3	3	PC
2	EE23512	Power Electronics	3	0	0	3	3	PC
3	EE23513	Control Systems	3	0	0	3	3	PC
4	EE23P**	Professional Elective I	3	0	0	3	3	PE
5	EE23531	Microprocessors, Microcontrollers and Applications	3	0	2	5	4	PC
6	*****	Open Elective – II	3	0	0	3	3	OE
7	EE23521	Control and Instrumentation Laboratory	0	0	2	2	1	PC
8	EE23522	Innovation and Design Thinking for Electrical Engineers	0	0	4	4	2	EEC
9	GE23427	Soft Skills-II	0	0	2	2	1	EEC
TOTAL			18	0	10	28	23	

SEMESTER VI

S.NO	COURSE CODE	COURSE TITLE	PERIODS / WEEK					CATEGORY
			L	T	P	TOTAL	CREDITS	
1	EE23611	Protection and Switchgear	3	0	0	3	3	PC
2	EE23612	Solid State Drives	3	0	0	3	3	PC
3	EE23613	Electric Energy Utilization and Conservation	3	0	0	3	3	PC
4	EE23631	Applications of IoT in Electrical Engineering	2	0	2	4	3	PC
5	EE23P**	Professional Elective II	3	0	0	3	3	PE
6	EE23P**	Professional Elective III	3	0	0	3	3	PE
7	EE23621	Power Electronics and Drives Laboratory	0	0	2	2	1	PC
8	EE23622	Applications of AI and ML in Electrical Engineering	0	0	4	4	2	EEC
9	GE23627	Problem Solving Techniques	0	0	2	2	1	EEC
TOTAL			17	0	10	27	22	

SEMESTER VII

S.NO	COURSE CODE	COURSE TITLE	PERIODS / WEEK					CATEGORY
			L	T	P	TOTAL	CREDITS	
1	EE23711	Smart Grid	3	0	0	3	3	PC
2	EE23712	Power System Operation and Control	3	0	0	3	3	PC
3	EE23731	Renewable Energy Systems	3	0	2	5	4	PC
4	EE23P**	Professional Elective IV	3	0	0	3	3	PE
5	EE23721	Power System Simulation Laboratory	0	0	4	4	2	PC
6	EE23722	Project (Phase-I)	0	0	8	8	4	EEC
7		Industry Internship (2/4 weeks)	-	-	-	-	1	EEC
TOTAL			12	0	14	26	20	

SEMESTER VIII

S.NO	COURSE CODE	COURSE TITLE	PERIODS / WEEK					CATEGORY
			L	T	P	TOTAL	CREDITS	
1	EE23P**	Professional Elective V	3	0	0	3	3	PE
2	EE23P**	Professional Elective VI	3	0	0	3	3	PE
3	EE23821	Project Work(Phase –II)	0	0	12	12	6	EEC
TOTAL			6	0	12	18	12	
TOTAL CREDITS : 162								

CREDIT DISTRIBUTION

CATEGORY	I	II	III	IV	V	VI	VII	VIII	Total
HS	3	2							5
BS	8	8	4						20
ES	9	6	9	2					26
EEC				1	3	3	5	6	18
PC		4	10	16	14	13	12		69
PE					3	6	3	6	18
OE				3	3				6
TOTAL	20	20	23	22	23	22	20	12	162

PROFESSIONAL ELECTIVES

Professional Elective	Vertical I Renewable Energy Technologies	Vertical II Electric Vehicle Technology	Vertical III Advanced Power Engineering	Vertical IV Advanced Power Electronic Systems	Vertical V Advanced Control System Engineering
1.	EE23A11 - Solar Energy Systems	EE23B11- Electric Vehicle Architecture	EE23C11- HVDC Transmission	EE23D11- Analysis of Electrical Machines	EE23E11- Advanced Control Systems
2.	EE23A12 - Wind Energy Conversion Systems	EE23B31- Design of Electric Vehicle Charging System	EE23C12- Power Systems Transients	EE23D12- Power Electronics for Renewable Energy Systems	EE23E12- Digital Control Systems
3.	EE23A13 - Hybrid Energy Technology	EE23B32- Power Converters and Motors for Electric Vehicles	EE23C13- FACTS	EE23D13- Multilevel Power Converters	EE23E13- Fundamentals of Embedded Systems
4.	EE23A14 - Energy Storage Systems	EE23B33- Control of Electric Vehicles	EE23C14- Restructured Power systems	EE23D14- Modern Rectifiers and Resonant Converters	EE23E14- PLC & SCADA
5.	EE23A15 - Grid Integrating Techniques and Challenges	EE23B12- Electric Vehicles and Power Management	EE23C15- Power Quality	EE23D15- SMPS and UPS	EE23E15- Embedded Systems for Automobile Applications
6.	EE23A16 - Design, Modelling and Fabrication of Renewable Energy System Components	EE23B13- Grid Integration of Electric Vehicles	EE23C16- Power Systems Dynamics	EE23D31- Control of Power Electronic Circuits	EE23E16- Embedded Control for Electric Drives

SEMESTER - I

Course Code	Course Title	Category	L	T	P	C
HS23111	Technical Communication I	Theory	2	0	0	2
Common to all branches of I sem. B.E./ B.Tech. programmes						
Objectives:						
To facilitate students develop their comprehension skills						
To enable students to improve their receptive skills						
To equip learners with better vocabulary and enhance their writing skills						
To aid students speak effectively in all kinds of communicative contexts.						
To improve the learners' basic proficiency in workplace communication						
UNIT-I	DEVELOPING COMPREHENSION SKILLS					6
Listening: Introduction to Informational listening – Listening to Podcasts, News						
Reading: Intentional Reading - Short Narratives and Passages.						
Speaking: Introducing Oneself, Narrating a Story / Incident.						
Writing: Sequential Writing – connecting ideas using transitional words (Jumbled Sentences), Process Description						
Grammar: Verbs – Main & Auxiliary: Simple Tenses – Form, Function and Meaning.						
Vocabulary: Word formation – Prefix, Suffix, Compound Words.						
UNIT-II	LISTENING AND EXTENDED READING					6
Listening: Deep Listening – Listening to Talk Shows and Debates						
Reading: In-depth Reading - Scanning Passages						
Speaking: Describing Current Issues, Happenings, etc.,						
Writing: Note Making, Note Taking – Paragraph Writing						
Grammar: Continuous Tenses, Prepositions, Articles						
Vocabulary: One Word Substitutes, Phrasal Verbs.						
UNIT-III	FORMAL WRITING AND VERBAL ABILITY					6
Listening: Listening to Lectures and Taking Notes						
Reading: Interpretation of Tables, Charts and Graphs						
Speaking: SWOT Analysis on Oneself						
Writing: Formal Letter Writing and Email Writing						
Grammar: Perfect Tenses, Phrases and Clauses, Discourse Markers						
Vocabulary : Verbal Analogy / Cloze Exercise						
UNIT-IV	ENHANCING SPEAKING ABILITY					6
Listening: Listening to eminent voices of one's interest (Martin Luther King, APJ Abdul Kalam, etc..)						
Reading: Timed Reading, Filling KWL Chart.						
Speaking: Just a Minute, Impromptu						
Writing: Check-list, Instructions.						
Grammar: 'Wh' Questions / 'Yes' or 'No' Questions, Imperatives						
Vocabulary: Synonyms, Antonyms, Different forms of the same words.						
UNIT-V	LANGUAGE FOR WORKPLACE					6
Listening: Extensive Listening (Audio books, rendering of poems, etc.)						
Reading: Extensive reading (Jigsaw Reading, Short Stories, Novels)						
Speaking: Short Presentations on Technical Topics						
Writing: Recommendations, Essay Writing						
Grammar: Impersonal Passive, Reported Speech, Concord						
Vocabulary : Informal Vocabulary and Formal Substitutes						
Total Contact Hours: 30						
Course Outcomes:						
On completion of the course students will be able to						
apply their comprehension skills and interpret different contents effortlessly						
read and comprehend various texts and audio visual contents						
infer data from graphs and charts and communicate it efficiently in varied contexts						
participate effectively in diverse speaking situations						
to present, discuss and coordinate with their peers in workplace using their language skills						
SUGGESTED ACTIVITIES						
<ul style="list-style-type: none"> ● Ice breaker ● Just A Minute ● Ship wreck 						

<ul style="list-style-type: none"> • Hot seat • Vocabulary building • Chinese whispers • Case study
SUGGESTED EVALUATION METHODS
<ul style="list-style-type: none"> • Assignment topics • Quizzes • Class Presentation/Discussion • Continuous Assessment Tests
Text Book(s):
1. Effective Technical Communication by M. Ashraf Rizvi (Author) 2nd Edition Paperback 2017
2. Sylvan Barnet and Hugo Bedau, 'Critical Thinking Reading and Writing', Bedford/st. Martin's: Fifth Edition (June 28, 2004)
3. Meenakshi Upadhyay, Arun Sharma – Verbal Ability and Reading Comprehension.
4. Teaching Speaking: A Holistic Approach, Book by Anne Burns and Christine ChuenMeng Goh, Cambridge University Press
Reference Books(s) / Web links:
1. Basic Vocabulary in Use: 60 Units of Vocabulary Practice in North American English With Answers 2nd Edition by Michael McCarthy (Author), Felicity O'Dell (Author), John D. Bunting (Contributor)
2. Reading Development and Difficulties By Kate Cain
3. The 7 Habits of Highly Effective People by Stephen Covey, Simon and Schuster, UK
4. Everybody Writes: Your Go-To Guide to Creating Ridiculously Good Content Hardcover by Ann Handley (Author)

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-
CO 2	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-
CO 3	-	1	-	1	-	-	-	-	-	3	-	-	-	-	-
CO 4	-	-	-	2	-	-	-	-	1	3	-	-	-	-	-
CO 5	-	-	-	1	-	-	-	-	1	3	-	-	-	-	-
Average	-	1	-	1.2	-	-	-	-	1	3	-	-	-	-	-

Course Code	Course Title	Category	L	T	P	C
MA23111	LINEAR ALGEBRA & CALCULUS	BS	3	1	0	4
Common to I sem. B.E. – Computer Science and Engineering, Electrical and Electronics Engineering, Electronics and Communication Engineering, Biomedical Engineering & Computer Science and Engineering (Cyber Security) and B.Tech. – Information Technology						
Objectives:						
<ul style="list-style-type: none"> • To introduce the matrix techniques and to explain the nature of the matrix. • To collect the matrix algebra techniques and the concepts of basis and dimension in vector spaces. • To construct normalization of vectors and ortho-normal vectors. • To understand techniques of calculus which are applied in the Engineering problems. • To apply the techniques of Integration in finding area and volumes. 						
UNIT-I	MATRICES					12
Matrices - Eigenvalues and eigenvectors - Diagonalization of matrices using orthogonal transformation - Cayley-Hamilton Theorem(without proof) - Quadratic forms - Reduction to canonical form using orthogonal transformation - Numerical computation of Eigen value using Power method.						
UNIT-II	LINEAR TRANSFORMATION					12
Vector spaces – Subspaces – Linear combinations and system of Linear equations – Linear independence and Linear dependence – Bases and Dimensions – Linear Transformation – Matrix representation of Linear Transformation - Null space, Range space and dimension theorem (without proof).						

UNIT-III	INNER PRODUCT SPACES	12
Inner product and norms - Gram Schmidt orthonormalization process - QR Factorization - Singular value decomposition.		
UNIT-IV	FUNCTIONS OF SEVERAL VARIABLES	12
Partial differentiation–Total derivative–Change of variables–Jacobians–Partial differentiation of implicit functions–Taylor’s series for functions of two variables–Maxima and minima of functions of two variables–Lagrange’s method of undetermined multipliers.		
UNIT-V	MULTIPLE INTEGRALS	12
Double integrals–Change of order of integration–Area enclosed by plane curves–Triple integrals–Volume of solids–Numerical computation of double integrals–trapezoidal rule.		
Total Contact Hours: 60		
Course Outcomes:		
On completion of the course, students will be able to		
<ul style="list-style-type: none"> ● Demonstrate the matrix techniques in solving the related problems in engineering and technology. ● Apply the concepts of basis and dimension in vector spaces to the solution of related complex engineering problems. ● Construct orthonormal basis by the concepts of normalization in inner products and to analyse complex engineering problems. ● Interpret the problems in Engineering and Technology using the principles of mathematical calculus. ● Evaluate multiple integrals to conduct investigations of complex problems. 		
SUGGESTED ACTIVITIES		
<ul style="list-style-type: none"> ● Problem solving sessions ● Activity Based Learning ● Implementation of small module 		
SUGGESTED EVALUATION METHODS		
<ul style="list-style-type: none"> ● Problem solving in Tutorial sessions ● Assignment problems ● Quizzes and class test ● Discussion in classroom 		
Text Book(s):		
1.	Grewal B.S., “ Higher Engineering Mathematics ”, Khanna Publishers, New Delhi, 43rd Edition, 2014.	
2.	T Veerarajan , Linear Algebra and Partial Differential Equations, Mc Graw Hill Education,2019.	
3.	Friedberg, A.H., Insel, A.J. and Spence, L., Elementary Linear Algebra, a matrix approach, 2 nd edition, Pearson, 2014.	
4.	T Veerarajan, Engineering Mathematics –I , McGraw Hill Education, 2018.	
5.	Introduction to linear algebra, 5th Edition, Gilbert Strang, 2016. Wellesley Publishers.	
Reference Books(s) / Web links:		
1.	Ramana. B.V., " Higher Engineering Mathematics ", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.	
2.	Erwin Kreyszig , " Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2016.	
3.	Bali, N.P. and Manish Goyal, A Text Book of Engineering Mathematics, Lakshmi Publications Pvt. Ltd., New Delhi, 2006.	
4.	Advanced Engineering Mathematics, (Seventh Edition), Peter V. O'Neil, Thomson Learning, 2020.	
5.	Williams, G, “Linear Algebra with Applications”, Jones & Bartlett Learning, First Indian Edition, New Delhi, 2017.	

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	2	1	-	-	-	-	-	-	-	1	-	1	1	-
CO 2	3	3	-	-	-	-	-	-	-	-	-	-	1	1	-

CO 3	3	2	-	-	-	-	-	-	-	-	-	-	1	1	-
CO 4	2	2	-	-	-	-	-	-	-	-	1	1	1	1	-
CO 5	2	2	-	-	-	-	-	-	-	-	-	1	1	1	-
Average	2.6	2.2	1	-	-	-	-	-	-	-	1	1	1	1	-

Course Code	Course Title						Category	L	T	P	C
CY23131	CHEMISTRY FOR ELECTRONICS ENGINEERING						BS	3	0	2	4
Common to I sem. B.E. – Electronics and Communication Engineering, Biomedical Engineering and Electrical and Electronics Engineering											
And											
Common to II sem. B.E. - Mechatronics and Robotics & Automation											
Objectives:											
<ul style="list-style-type: none"> ● To understand the principles of electrochemical processes ● To explore the functioning of sensors and their applications in industries and health care ● To get familiarized with the functioning of batteries and fuel cells ● To acquire knowledge on polymeric materials used in electronics ● To develop proficiency in nanomaterials 											
UNIT-I	DYNAMIC ELECTROCHEMISTRY										9
Applied Electrochemistry: Electrode Potential - EMF series - Corrosion- Causes, Consequences and Prevention. Surface Preparation- electropolishing -Electroplating of copper, electrophoretic deposition - Electrochemical machining, electrochemical etching - electrochemical etching of Cu from PCB.											
UNIT-II	ELECTROCHEMICAL SENSORS										9
Electrodes - reference electrodes - ion-selective electrode, determination of electrode potential- Galvanic and concentration cells - potentiometric, amperometric and conductometric methods of analysis - potentiometric sensor, optical sensor, thermal sensor, chemical biosignals- sensors for health care – glucose and urea sensors, gas sensors for CO ₂ , O ₂ and NH ₃ sensing- blood oxygen sensor.											
UNIT-III	ELECTROCHEMICAL ENERGY SYSTEMS										9
Batteries- types - characteristics-fabrication and working of lead-acid battery- NICAD battery – Nickel metal hydride batteries -lithium-ion battery - Supercapacitors- introduction - types - electrochemical double layer capacitor - activated carbon - carbon aerogels. Fuel cells - classification – principle, working and applications of hydrogen-oxygen fuel cell - solid oxide fuel cell - direct methanol fuel cell and proton exchange membrane fuel cells-biofuel cells.											
UNIT-IV	POLYMERS IN ELECTRONICS										9
Conducting polymers - conducting mechanisms- polyaniline, Poly pyrrole - photonic polymers - photo resists - Introduction, Liquid crystalline phases, Identification of the mesophases, Lyotropic main chain liquid crystalline polymers, Thermotropic main chain liquid crystal polymers, Applications of liquid Crystals in Displays (LCDs) - Organic LEDs- functioning-advantages and disadvantages over conventional LEDs- commercial uses.											
UNIT-V	NANO MATERIALS										9
Introduction-Types of nanomaterials-Emergence and challenges in nanotechnology- Synthesis routes for nanomaterials: Bottom-up and top-down approaches- Sol-gel, precipitation, Hydrothermal, Solvothermal, Microwave irradiation, Chemical Vapour Deposition (CVD), Electro deposition- Properties of nanomaterials- Mechanical properties, Chemical, Optical, Electrical and Magnetic properties-applications of nanomaterials.											
Total Contact Hours: 45											
Description of the Experiments											
1.	Construction and determination of EMF of simple electrochemical cells and concentration cells										
2.	Estimation of acids by pH metry										
3.	Determination of corrosion rate on mild steel by weight loss method										
4.	Estimation of mixture of acids by conductometry										
5.	Estimation of extent of corrosion of iron pieces by potentiometry										
6.	Estimation of copper / ferrous ions by spectrophotometry										

7.	Estimation of DO by using sensors
8.	Estimation of concentration of sulphate/chloride ions in the given sample solution.
9.	Determination of molecular weight of a polymer by viscometry method
10.	Synthesis of nanomaterials by simple precipitation method
Total Contact Hours:30	
Course Outcomes:	
<ul style="list-style-type: none"> Apply the knowledge of electrochemistry in exploring electrochemical processes. Associate the knowledge of sensors in health care and in pollution abatement Recognize the types of batteries and fuel cells Employ advanced materials in industrial applications and display techniques Develop nano and biomaterials for medical applications 	
SUGGESTED ACTIVITIES	
<ul style="list-style-type: none"> Electroplating process by group of students Ceramic coating on implant materials Electropolishing of metals and alloys 	
SUGGESTED EVALUATION METHODS	
<ul style="list-style-type: none"> Continuous assessment tests Assignments Model lab examination End semester examination 	
Text Book(s):	
1. P. C. Jain and Monika Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2015	
2. O.G.Palanna, "Engineering Chemistry", McGraw Hill Education (India) Pvt, Ltd, New Delhi, 2017	
3. Shikha Agarwal "Engineering Chemistry-Fundamentals and applications", Cambridge University Press, New Delhi, 2015	
Reference Books(s) / Web links:	
<ul style="list-style-type: none"> Gowarikar V. R., Viswanathan N.V. and Jayadev Sreedhar, —Polymer Science, New Age International (P) Ltd., New Delhi, 2011 Sujata V Bhat, "Biomaterials", Narosa Publishing House, New Delhi, 2002 Pradeep T, "A Text Book of Nanoscience and Nanotechnology", Tata McGraw Hill, New Delhi, 2012 An Introduction to Nanomaterials and Nanoscience (PB 2020) : Asim K Das, Mahua Das, CBS publishers and distributors Pvt. Ltd. NPTEL course Elementary Electrochemistry course url https://onlinecourses.nptel.ac.in/noc23_cy19/preview For downloading text/reference books the weblink is given below can be used http://libgen.rs/ 	

Lab equipment required:

S. No	Name of the Equipment	Quantity Required
1.	Oxygen sensors	10
2.	Ion selective electrodes for various ions in solution	10
3	Spectrophotometer	4
4	Magnetic stirrer with hot plate	10

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	2	2	1	-	-	-	-	-	-	-	-	1	-	-	-
CO 2	3	2	1	-	-	1	1	-	-	-	-	1	-	-	-

CO 3	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO 4	2	1	1	-	-	-	-	-	-	-	-	1	-	-	-
CO 5	3	2	2	-	-	-	-	-	-	-	-	1	-	-	-
Average	2.4	1.6	1.2	-	-	1	1	-	-	-	-	1	-	-	-

Course Code	Course Title(Laboratory Integrated Theory Course)					Category	L	T	P	C
GE23131	PROGRAMMING USING C					ES	1	0	6	4
Course Objectives:										
<ul style="list-style-type: none"> To develop simple algorithms for arithmetic and logical problems. To develop C Programs using basic programming constructs To develop C programs using arrays and strings To develop applications in C using functions , pointers and structures To develop applications using structures and union 										
List of Experiments										
1.Overview of C, Constants, Variables and Data Types										
2.Operators and Expressions, Managing Input and Output Operations										
3.Decision Making and Branching										
4.Decision Making and Looping										
5.Nested Loops - while and for, Jumps in Loops										
6.One-Dimensional Arrays										
7.Pointers										
8.Searching Algorithms - Linear and Binary										
9.Sorting Algorithms - Bubble and Selection										
10.Two-Dimensional and Multi-dimensional Arrays										
11.Character Arrays and Strings Handling Functions										
12.User-Defined Functions - Recursive Functions										
13.Passing Arrays and Strings to Functions										
14.Scope, Visibility and Lifetime of Variables										
15.Structures and Unions										
16.The Preprocessor										
									Total Contact Hours:	90
Platform Needed: GCC Compiler for Windows/Linux										
Text Book(s):										
1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Second Edition, PHI publishers, 2017										
2. Byron Gottfried, "Programming in C", Second Edition, Schaum Outline Series, Tata McGraw - Hill Pub . Co. Ltd. , New Delhi , 1996										
Reference Books(s) / Web links:										
1. Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw Hill, 2003										
2. YashavantKanetkar, "Let Us C", BPB Publications, 15 th Edition, 2016										
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill, 8 th Edition, 2019										
4. NPTEL course , "Problem Solving Through Programming In C", By Prof. Anupam Basu, IIT Kharagpur										
Course Outcomes: At the end of the course, students will be able to										
<ul style="list-style-type: none"> formulate simple algorithms for arithmetic and logical problems. implement conditional branching, iteration. decompose a problem into functions and synthesize a complete program. use arrays, pointers and structures to formulate algorithms and programs. apply programming to solve simple numerical method problems. 										

SUGGESTED ACTIVITIES:

- Practice small and tricky codes
- Practice problems in portals like Digital Café
- Debugging the codes
- Completing the function definitions etc

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	2	2	2	1	-	-	-	1	2	1	1	1	1	1
CO 2	1	1	1	1	1	-	-	-	-	-	1	1	1	1	1
CO 3	1	1	2	1	1	-	-	-	-	-	1	1	1	1	1
CO 4	2	2	3	2	1	-	-	-	1	-	2	1	1	1	1
CO 5	2	2	3	2	1	-	-	-	-	-	2	1	1	1	1
Average	1.4	1.6	2.2	1.6	1.0	-	-	-	1.0	2.0	1.4	1.0	1.0	1.0	1.0

Course Code	Course Title(Theory Course)	Category	L	T	P	C
GE23111	ENGINEERING GRAPHICS	ES	2	0	4	4
Objectives:						
•	To understand the importance of the drawing in engineering applications					
•	To develop graphic skills for communication of concepts, ideas and design of engineering products					
•	To expose them to existing national standards related to technical drawings.					
•	To improve their visualization skills so that they can apply this skill in developing new products.					
•	To improve their technical communication skill in the form of communicative drawings					
CONCEPTS AND CONVENTIONS (Not for Examination)						1
Importance of graphics in engineering applications–Use of drafting instruments– BIS conventions and specifications– Size, layout and folding of drawing sheets– Lettering and dimensioning. Basic Geometrical constructions.						
UNIT-I	PLANE CURVES AND PROJECTION OF POINTS					5+12
Curves used in engineering practices: Conics–Construction of ellipse, parabola and hyperbola by eccentricity method – Cycloidal Curves–Construction of cycloid, epicycloid and hypocycloid – Construction of involutes of square and circle–Drawing of tangents and normal to the above curves. Principles of Projection and Projection of points.						
UNIT-II	PROJECTION OF LINES AND PLANE SURFACES					6+12
Projection of straight lines (First angle projection) 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 AND PROJECTION OF SECTIONED SOLIDS					6+12
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method. Sectioning of solids in simple vertical position when the cutting plane is inclined to HP and perpendicular to VP – obtaining true shape of the section. Practicing three-dimensional modeling of simple objects by CAD software (Not for examination)						
UNIT-IV	DEVELOPMENT OF SURFACE AND ISOMETRIC PROJECTIONS					6+12
Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Principles of isometric projection–isometric scale–Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders and cones Model making of isometric projection of combination of solids as assignment (Not for End semester)						
UNIT-V	FREE HAND SKETCHING AND PERSPECTIVE PROJECTIONS					6+12
Free Hand sketching: Freehand sketching of multiple views from pictorial views of objects - Freehand sketching of pictorial views of object from multiple views Perspective projection of simple solids-Prisms, pyramids, cylinder and cone by visual ray method.						

	Total Contact Hours	:	L=30; T=60 (90 Periods)
Course Outcomes: On completion of the course, the students will be able to			
●	construct different plane curves and to comprehend the theory of projection		
●	draw the basic views related to projection of lines and planes		
●	draw the projection of simple solids and to draw the projection of development of surfaces of Sectioned solids in simple vertical position		
●	draw the orthographic projection from pictorial objects and Isometric projections of simple solids		
●	visualize Perspective view of simple solids		
Text Book (s):			
1	Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010.		
2	Natarajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2017.		
Reference Books(s) :			
1	Varghese P I., “Engineering Graphics”, McGraw Hill Education (I) Pvt.Ltd., 2013.		
2	V.B Sikka “Civil Engineering Drawing”, S.K Kataria & Sons, New Delhi.		
3	Venugopal K. and PrabhuRaja V., “Engineering Graphics”, New Age International (P)Limited, 2008.		
4	Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), Subhas Stores, Bangalore, 2017.		
5	Basant Agarwal and Agarwal C.M., “Engineering Drawing”, McGraw Hill Publishing Company Limited, New Delhi, 2018.		

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	2	2	1	-	1	-	2	2	2	-	2	-	-	-
CO 2	3	2	2	1	-	1	-	2	2	2	-	2	-	-	-
CO 3	3	2	2	1	-	1	-	2	2	2	-	2	-	-	-
CO 4	3	2	2	1	-	1	-	2	2	2	-	2	-	-	-
CO 5	3	2	2	1	-	1	-	2	2	2	-	2	-	-	-
Average	3	2	2	1	-	1	-	2	2	2	-	2	-	-	-

Course Code	Course Title(Laboratory Course)	Category	L	T	P	C
GE23122	ENGINEERING PRACTICES - ELECTRICAL AND ELECTRONICS	ES	0	0	2	1
Objectives:						
•	To provide hands-on experience on various basic engineering practices in Electrical Engineering.					
•	To provide hands-on experience on various basic engineering practices in Electronics Engineering.					
List of Experiments						
A. ELECTRICAL ENGINEERING PRACTICE						
1	Residential house wiring using switches, fuses, indicators, lamp and energy meter.					
2	Fluorescent lamp wiring.					
3	Stair case wiring.					
4	Measurement of electrical quantities – voltage, current, power & power factor in RL circuit.					
5	Measurement of earth resistance using Megger.					
6	Study of Ceiling Fan and Iron Box					
B. ELECTRONICS ENGINEERING PRACTICE						
1	Study of electronic components and equipment – Resistor, colour coding, measurement of AC signal parameters (peak-peak, rms period, frequency) using CRO/DSO.					
2	(a) Measurement of electrical quantities using Multimeter (b) Testing of electronic components.					
3	Study of logic gates : AND, OR, EXOR and NOT.					
4	Generation of Clock Signals.					
5	Soldering practice – Components Devices and Circuits – Using general purpose PCB.					

6	Measurement of ripple factor of Half-wave and Full-wave Rectifiers.	Total Contact Hours	:	30
Course Outcomes:				
On completion of the course, the students will be able to				
•	fabricate the basic electrical circuits			
•	implement the house wiring circuits			
•	fabricate the electronic circuits			
•	verify the truth table of logic gates			
•	design the Half-wave and Full-wave Rectifiers using diodes and passive components			
SUGGESTED EVALUATION METHODS				
• Experiment based Viva				
REFERENCE				
1	Bawa H.S., “Workshop Practice”, Tata McGraw – Hill Publishing Company Limited, 2007.			
2	Jeyachandran K., Natarajan S. & Balasubramanian S., “A Primer on Engineering Practices Laboratory”, Anuradha Publications, 2007.			
3	Jeyapooan T., Saravanapandian M. &Pranitha S., “Engineering Practices Lab Manual”,Vikas Publishing House Pvt.Ltd, 2006.			
4	Rajendra Prasad A. &Sarma P.M.M.S., “Workshop Practice”, SreeSai Publication, 2002.			

Lab Equipments Required:

S. No.	Name of the Equipment	Quantity Required
1	Residential house wiring using switches, fuse, indicator, lamp and energy	3 Nos
2	Fluorescent lamp wiring.	3 Nos
3	Stair case wiring	3 Nos
4	Measurement of electrical quantities – voltage, current, power & power factor	2 Nos
5	Study purpose items: Iron box, Ceiling fan.	2 each
6	Megger (250V/500V)	2 Nos.
7	Soldering guns	10 Nos.
8	Assorted electronic components for making circuits	50 Nos.
9	Small PCBs	10 Nos.
10	Multimeters	10 Nos.
11	Digital trainer kit	5 Nos.
12	CRO	8 Nos.
13	Transformer	8 Nos.
14	Function Generator	8 Nos.

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	3	3	2	-	-	2	-	3	2	-	3	3	3	2
CO 2	3	3	2	2	-	-	2	-	3	2	-	3	3	3	2
CO 3	3	3	3	2	-	-	2	-	3	2	-	3	3	3	2
CO 4	3	3	3	2	-	-		-	3	2	-	3	3	3	2
CO 5	3	3	3	2	-	-		-	3	2	-	3	3	3	2
Average	3	3	2.67	2	-	-	2	-	3	2	-	3	3	3	2

Course Code	Course Title	Category	L	T	P	C
MC23111	INDIAN CONSTITUTION AND FREEDOM MOVEMENT	MC	3	0	0	0
<p>Common to I sem. B. E. – Computer Science and Engineering, Electronics and Communication Engineering, Electrical and Electronics Engineering & Computer Science and Design & Computer Science and Engineering (Cyber Security) and B.Tech. - Computer Science and Business Systems, Artificial Intelligence and Machine Learning and Artificial Intelligence & Data Science and Common to II sem. B.E. – Aeronautical Engineering, Automobile Engineering, Biomedical Engineering, Civil Engineering, Mechanical Engineering, Mechatronics and Robotics & Automation and B.Tech. - Chemical Engineering, Food Technology & Information Technology and IV sem. - B.Tech. – Biotechnology.</p>						
Objectives:						
<ul style="list-style-type: none"> To apprehend the sacrifices made by the freedom fighters. To inculcate the values enshrined in the Indian constitution. To instil a sense of responsibility as the citizens of India. To familiarise about the functions of the various levels of Government. To be informed about Constitutional and Non- Constitutional bodies. 						
UNIT-I	INDIAN FREEDOM MOVEMENT					9
British Colonialism in India-Colonial administration till 1857- Revolt of 1857- Early Resistance to British Rule-Rise of Nationalism in India-Indian Freedom Struggle under Mahatma Gandhi-Non- Cooperation Movement-Civil Disobedience Movement- Quit India Movement-British Official response to National movement- Independence of India Act 1947-Freedom and Partition.						
UNIT-II	CONSTITUTION OF INDIA					9
Historical Background – Indian Constitution: Constitution’ meaning of the term, Sources and constitutional history, Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.						
UNIT-III	STRUCTURE AND FUNCTIONS OF CENTRAL GOVERNMENT					9
Union Government – Structure of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.						
UNIT-IV	STRUCTURE AND FUNCTION OF STATE GOVERNMENT AND LOCAL BODY					9
State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts- Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati Raj: Introduction, Elected officials and their roles, Village level: Role of Elected and Appointed officials.						
UNIT-V	CONSTITUTIONAL FUNCTIONS AND BODIES					9
Indian Federal System – Centre – State Relations – President’s Rule – Constitutional Functionaries – Assessment of working of the Parliamentary System in India- CAG, Election Commission, UPSC, GST Council and other Constitutional bodies-. NITI Aayog, Lokpal, National Development Council and other Non –Constitutional bodies.						
Total Contact Hours: 45						
Course Outcomes: Upon completion of the course, students will be able to:						
<ul style="list-style-type: none"> appreciate the sacrifices made by freedom fighters during freedom movement. be responsible citizens and abide by the rules of the Indian constitution. be aware of the functions of the Indian government. be knowledgeable about the functions of the state Government and the Local bodies. apply the knowledge on constitutional functions and role of constitutional bodies and non-constitutional bodies. 						
SUGGESTED ACTIVITIES						
<ul style="list-style-type: none"> Famous speeches from around the world relating to independence Case study Quiz on Portfolio and Cabinet Discussions on International Associations like the UN, BRICS, QUAD Presentation on issues around the world 						
SUGGESTED EVALUATION METHODS						

- Assignment topics
- Quizzes
- Class Presentation/Discussion
- Continuous assessments (CAT)

Text Book(s):

5. M. Laxmikanth , “Indian Polity:, McGraw-Hill, New Delhi.
6. Durga Das Basu, “Introduction to the Constitution of India “, Lexis Nexis, New Delhi. 21sted 2013.
7. P K Agarwal and K N Chaturvedi ,PrabhatPrakashan, New Delhi, 1sted , 2017.

Reference Books(s) / Web links:

1. Sharma, Brij Kishore, “Introduction to the Constitution of India:., Prentice Hall of India, New Delhi.
2. U.R.Gahai, “Indian Political System “, New Academic Publishing House, Jalaendhar
3. Bipan Chandra, India’s Struggle for Independence, Penguin Books, 2016.
4. Maciver and Page, “Society: An Introduction Analysis “, Mac Milan India Ltd., New Delhi.2nded, 2014.
5. Bipan Chandra, History of Modern India, Orient Black Swan, 2009.

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO 3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-
CO 4	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
CO 5	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-
Average	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-

GE23117

தமிழர் மரபு

L T P C

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அலகு I மொழி மற்றும் இலக்கியம்:

3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமய சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழிக் 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 II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை:

3

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

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:

3

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

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்: 3

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

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: 3

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

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

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

SEMESTER II

Course Code	Course Title	Category	L	T	P	C
HS 23221	TECHNICAL COMMUNICATION II	HS	0	0	2	1
Common to all branches of II sem. B.E./ B.Tech. programmes						
Objectives:						
<ul style="list-style-type: none"> • To facilitate students to improve their vocabulary for a better communication • To enable learners to understand and reproduce language • To aid students to write technical reports in a convincing manner • To expose students to different sentence structures • To equip learners to present their ideas in an efficient manner 						
UNIT-I	VOCABULARY FOR BETTER COMMUNICATION					6
Listening: Telephonic Conversations and TV News Reading: Newspapers and Magazines Speaking: Conversational Practice: Speaking in a given situation, Asking permission and requesting etc., Writing: Job Application Letter and Resume Grammar: Reference words: pronouns and determiners Vocabulary: Guessing meanings of words in different contexts.						
UNIT-II	FUNCTIONAL LANGUAGE ASPECTS					6
Listening: Motivational listening – listening to real life challenges Reading: Articles and Technical reports Speaking: Using Polite Expressions, Indirect Questions Writing: Paraphrasing a Text, Poem Grammar: Purpose Statements, Cause and Effect Expressions Vocabulary: Neologisms.						
UNIT-III	TECHNICAL REPORTWRITING					6
Listening: Empathetic Listening – Giving Solutions to Problems Reading: Inferential Reading Speaking: Dialogues – Interviewing Celebrities / Leaders / Sportspersons, etc., Writing: Report Writing Grammar: Functional Usage of Expressions – used to, gone / been, etc., Vocabulary: Words Often Confused						
UNIT-IV	STRUCTURAL GRAMMAR					6
Listening: Comprehension (IELTS practice tests) Reading: Intensive Reading for specific information Speaking: Pick and Talk Writing: Proposals Grammar: Sentence Structures – Simple, Compound, Complex Sentences Vocabulary: Replacing dull words with vivid ones						
UNIT-V	PRESENTATION SKILLS					6
Listening: Discriminative listening – sarcasm, irony, pun, etc., Reading: Practice of chunking – breaking up reading materials Speaking: Mini presentation on some topic Writing: Minutes of the meeting Grammar: Correction of Errors Vocabulary: Advanced vocabulary – fixing appropriate words in the given context.						
Total Contact Hours: 30						
Course Outcomes:						
On completion of the course students will be able to						
<ul style="list-style-type: none"> • communicate effectively using appropriate vocabulary • use the acquired language skills to comprehend various types of language contents • evaluate different texts and write effective technical content • use appropriate sentence structures to convey their thoughts in varied contexts • present their concepts and ideas in an effective manner 						
SUGGESTED ACTIVITIES						
<ul style="list-style-type: none"> • Story Lines • One truth and two lies • Hang Man 						

<ul style="list-style-type: none"> ● Pictionary ● Word Scramble ● Case study
SUGGESTED EVALUATION METHODS
<ul style="list-style-type: none"> ● Assignment topics ● Quizzes ● Class Presentation/Discussion ● Continuous Assessment Tests
Text Book(s):
1. Raymond Murphy, "Intermediate English Grammar," Second Edition, Cambridge University Press, 2018
2. Meenakshi Raman & Sangeeta Sharma, "Technical Communication" Third Edition, Oxford University Press, 2015
3. Teaching Speaking: A Holistic Approach, Book by Anne Burns and Christine ChuenMeng Goh, Cambridge University Press
Reference Books(s) / Web links:
1. Michael McCarthy (Author), Felicity O'Dell (Author), John D. Bunting (Contributor), "Basic Vocabulary in Use: 60 Units of Vocabulary Practice in North American English With Answers" 2nd Edition
2. Dale Carnegie, "The Art of Public Speaking," Insight Press
3. Jack C. Richards & Theodore S. Rodgers, "Approaches and Methods in Language Teaching, Second Edition, Cambridge University Press

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-
CO 2	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-
CO 3	-	2	-	1	-	-	-	-	-	3	-	-	-	-	-
CO 4	-	-	-	1	-	-	-	-	2	3	-	-	-	-	-
CO 5	-	-	-	1	-	-	-	-	2	2	-	-	-	-	-
Average	-	2	-	1	-	-	-	-	2	2.6	-	-	-	-	-

Course Code	Course Title	Category	L	T	P	C
HS23222	ENGLISH FOR PROFESSIONAL COMPETENCE	HS	0	0	2	1
Common to all branches of II sem. B.E./ B.Tech. programmes						
Objectives:						
<ul style="list-style-type: none"> ● To facilitate the learners in acquiring listening and reading competence ● To enable the learners to communicate effectively through written and oral medium ● To assist the learners in preparing for competitive examinations ● To train the students in acquiring corporate skills ● To inculcate professional standards among the students and make them realize their responsibility in addressing the challenges 						
UNIT-I	RECEPTIVE SKILLS					6
Listening – Comprehensive Listening – Watching the news – Listening to a peer giving presentation, etc. – Critical Listening – Watching a televised debate, Listening to poems – Reading – Extensive Reading – Short stories and One-act Plays – Intensive Reading – Articles or Editorials in Magazines, Blog posts on topics like science and technology, arts, etc.						
UNIT-II	PRODUCTIVE SKILLS					6
Speaking – Demonstrative Speaking – Process description through visual aids – Persuasive Speaking – Convincing the listener with the speaker's view – Writing – Descriptive Writing - Describing a place, person, process – Subjective Writing – Autobiography, Writing based on personal opinions and interpretations.						
UNIT-III	ENGLISH FOR COMPETITIVE EXAMS					6
An introduction to International English Language Testing System (IELTS) – Test of English as a Foreign Language (TOEFL) – Graduate Record Examination (GRE) – Civil Service, Indian Economic Service Examination, Indian Statistical Service Examination, Combined Defence Services Examination, Staff Selection- (Language Related) –						

Aptitude tests.	
UNIT-IV	CORPORATE SKILLS
6	
Critical Thinking and Problem Solving – Case Study, Brainstorming, Q & A Discussion – Team work and Collaboration – Activities like Office Debates, Perfect Square, Blind Retriever, etc. – Professionalism and Strong Work Ethics – Integrity, Resilience, Accountability, Adaptability, Growth Mind set.	
UNIT-V	PROJECT WORK
6	
Case Study based on the challenges faced by the employers and the employees – Devise Plan, Provide Solution	
Total Contact Hours: 30	
Course Outcomes:	
On completion of the course students will be able to	
<ul style="list-style-type: none"> • interpret and respond appropriately in the listening and reading contexts. • express themselves effectively in spoken and written communication • apply their acquired language skills in writing the competitive examinations • exhibit their professional skills in their work place • identify the challenges in the work place and suggest strategies solutions 	
SUGGESTED ACTIVITIES	
<ul style="list-style-type: none"> • Online Quizzes on Vocabulary • Online Quizzes on grammar • Communication Gap Exercises • Presentations • Word Building Games • Case study 	
SUGGESTED EVALUATION METHODS	
<ul style="list-style-type: none"> • Assignment topics • Quizzes • Class Presentation/Discussion • Continuous Assessment Tests 	
Text Book(s):	
1	How to Read Better & Faster, Norman Lewis, Goyal Publishers
2	Teaching Speaking: A Holistic Approach, Book by Anne Burns and Christine Chuen Meng Goh, Cambridge University Press
3	The Official Cambridge Guide To IELTS by Pauline Cullen, Cambridge University Press
4	The 7 Habits of Highly Effective People by Stephen Covey, Simon and Schuster, UK
Reference Books(s) / Web links:	
1.	Board of Editors. Sure Outcomes. A Communication Skills Course for Undergraduate Engineers and Technologists. Orient Black Swan Limited, Hyderabad, 2013.
2.	Hartley, Mary. “The Power of Listening,” JaicoPublishing House; First Edition (2015).
3.	Chambers, Harry. “Effective Communication Skills for Scientific and Technical Professionals,” Persues Publishing, Cambridge, Massachusetts, 2000.

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	-	1	-	-	-	-	-	-	-	3	-	-	-	-	-
CO 2	-	1	-	-	-	-	-	-	-	3	-	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO 4	-	-	-	-	-	-	2	2	-	3	-	-	-	-	-
CO 5	-	-	1	-	-	-	2	-	-	3	-	-	-	-	-
Average	-	1	1	-	-	-	2	2	0	3	-	-	-	-	-

Course Code	Course Title	Category	L	T	P	C
MA23212	DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLES	BS	3	1	0	4
<p>Common to II Sem. B.E. –Aeronautical Engineering, Automobile Engineering, Biomedical Engineering, Civil Engineering, Electrical and Electronics Engineering, Electronics and Communication Engineering, Mechanical Engineering, Mechatronics & Robotics & Automation and B. Tech. – Biotechnology, Food Technology & Chemical Engineering</p>						
Objectives:						
<ul style="list-style-type: none"> To provide students with an introduction to the theory of ordinary differential equations through applications, methods of solution, and numerical approximations. 						
<ul style="list-style-type: none"> To introduce students to how to solve linear Partial Differential with different methods. 						
<ul style="list-style-type: none"> To enable the students to study the Laplace Transforms, properties of Laplace Transform, inverse Laplace Transform and some applications to solve the differential equations and integral equations. 						
<ul style="list-style-type: none"> To explain the concept of a vector integration in a plane and in space. 						
<ul style="list-style-type: none"> To describe basic properties of complex variables and to have the ability to compute complex integrals. 						
UNIT-I	ORDINARY DIFFERENTIAL EQUATIONS					12
Second and higher order Linear differential equations with constant coefficients - Method of variation of parameters – Legendre’s linear equations – Numerical solution of ODE - Single Step methods: Taylor’s series method, Euler’s method.						
UNIT-II	PARTIAL DIFFERENTIAL EQUATIONS					12
Formation of partial differential equations - Classification of PDE – Solutions of standard types of first order partial differential equations - Lagrange’s linear equation –Linear homogeneous partial differential equations of second and higher order with constant coefficients.						
UNIT-III	LAPLACE TRANSFORM					12
Laplace transform –Basic properties – Transforms of derivatives and integrals of functions - Transforms of unit step function and impulse functions, periodic functions. Inverse Laplace transform – Problems using Convolution theorem – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques						
UNIT-IV	VECTOR CALCULUS					12
Gradient, divergence and curl – Directional derivative – Irrotational and Solenoidal vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stokes’ theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.						
UNIT-V	COMPLEX VARIABLES					12
Analytic functions — Construction of analytic function - Bilinear transformation –Singularities – Cauchy’s integral theorem (without proof) - Residues – Residue theorem (without proof) - Simple problems - Contour integral over $ z =1$.						
Total Contact Hours: 60						
Course Outcomes:						
On completion of the course students will be able to						
<ul style="list-style-type: none"> Apply the methods as a potent tool in the solution of a variety of problems in the natural sciences and technology. 						
<ul style="list-style-type: none"> Develop specific methodologies, techniques and resources in Partial differential equations to conduct research and produce innovative results in the area of specialisation. 						
<ul style="list-style-type: none"> Use Laplace transform and inverse transform techniques to solve the complex problems in engineering and technology. 						
<ul style="list-style-type: none"> Apply the concepts in multivariable analysis, including space curves; directional derivative; gradient; multiple integrals; line and surface integrals; vector fields; divergence, curl ; the theorems of Green and Stokes, and the divergence theorem in different fields of engineering. 						
<ul style="list-style-type: none"> Demonstrate the concept of Analytic functions, conformal mapping and complex integration in solving Engineering problems. 						
SUGGESTED ACTIVITIES						
<ul style="list-style-type: none"> Problem solving sessions Activity Based Learning 						

SUGGESTED EVALUATION METHODS	
<ul style="list-style-type: none"> ● Problem solving in Tutorial sessions ● Assignment problems ● Quizzes and class test ● Discussion in classroom 	
Text Book(s):	
1.	Grewal B.S., "Higher Engineering Mathematics ", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2.	Veerarajan. T, Engineering Mathematics –II, Mc Graw Hill Education, 2018.
3.	Erwin Kreyszig," Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2016.
4.	Glyn James, "Advanced Modern Engineering Mathematics", Pearson Education, 4th Edition, New Delhi, 2011.
5.	Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, 5 th Edition, New Delhi, 2017.
Reference Books(s) / Web links:	
1.	Ramana. B.V., "Higher Engineering Mathematics ", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
2.	T Veerarajan, Transforms and Partial Differential Equations, Third Edition, 2018.
3.	Bali, N.P. and Manish Goyal, A Text Book of Engineering Mathematics, Lakshmi Publications Pvt. Ltd., New Delhi, 4 th Edition 2006.
4.	Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, 7th Edition, New Delhi, 2012.

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	2	1	-	-	-	-	-	-	-	-	1	3	3	1
CO 2	3	2	1	-	-	-	-	-	-	-	-	1	3	3	1
CO 3	3	2	1	-	-	-	-	-	-	-	-	-	3	3	1
CO 4	2	2	1	-	-	-	-	-	-	-	-	-	3	3	1
CO 5	3	2	1	-	-	-	-	-	-	-	-	1	3	3	1
Average	2.8	2	1	-	-	-	-	-	-	-	-	1	3	3	1

Course Code	Course Title	Category	L	T	P	C
PH23232	PHYSICS FOR ELECTRONICS ENGINEERING	BS	3	0	2	4
Common to II sem. B.E. – Electronics and Communication Engineering & Electrical and Electronics Engineering						
Objectives:						
<ul style="list-style-type: none"> ● To understand the essential principles of electron transport properties. ● To impart the knowledge on the properties of semiconductors. ● To become proficient in magnetic, superconducting and dielectric properties of materials. ● To expose the properties and applications of optical materials. ● To enhance the fundamental knowledge on quantum confinement and nano based devices. 						
UNIT-I	ELECTRICAL PROPERTIES OF MATERIALS					9
Classical free electron theory - expression for electrical conductivity - electrons in metals –Introduction to quantum physics-wave function-Schrodinger equation- particle in a box-one dimension - degenerate states - Fermi Dirac statistics - density of energy states – Quantum mechanical theory of electrical conductivity- electron effective mass – concept of hole.						
UNIT-II	SEMICONDUCTOR PHYSICS					9
Intrinsic semiconductors - energy band diagram - direct and indirect semiconductors - carrier concentration in intrinsic semiconductors-Band gap determination –extrinsic semiconductors - carrier concentration in N-type and P-type semiconductors. Hall effect-determination of Hall co-efficient and applications. PN and Metal–Semiconductor						

Junctions: Energy band diagram and Depletion Layer of a PN Junction, Built-in potential, Carrier injection under forward bias.		
UNIT-III	MAGNETIC, SUPERCONDUCTOR AND DIELECTRIC PROPERTIES OF MATERIALS	9
Magnetism in materials - magnetic field and induction - magnetization - magnetic permeability and susceptibility - types of magnetic materials - microscopic classification of magnetic materials. Ferromagnetism: domain theory. Superconductor: critical temperature, zero electric resistance, Meissner effect and critical magnetic field. Dielectric materials: Polarization processes - internal field -dielectric loss -high-k dielectrics.		
UNIT-IV	OPTOELECTRONICS	9
Classification of optical materials - carrier generation and recombination processes. Absorption, emission and scattering of light in metals, insulators and semiconductors (concepts only). Solar cell - photo detectors - LED - Organic LED – laser diodes - NLO materials-properties and applications.		
UNIT-V	NANOELECTRONIC DEVICES	9
Introduction - size dependence of Fermi energy- quantum confinement - quantum structures. quantum well, quantum wire and quantum dot structures. Tunnelling-Coulomb blockade effects - single electron phenomena and single electron transistor - magnetic semiconductors–spintronics - Quantum computing basics of q-bits, superposition and quantum entanglement (qualitative), MEMS: Cantilever.		
Total Contact Hours: 45		
Description of the Experiments		
1.	Determination of Planck’s constant using colour LED	
2.	Determination of Band gap of semiconducting material.	
3.	Determination of Hall coefficient of semiconductor.	
4.	Determine the hysteresis loss in the transformer core using B-H curve unit.	
5.	Determination of free space permeability using Helmholtz coil.	
6.	Determination of magnetic susceptibility of ferrous liquid using Quincke’s Method.	
7.	Determination of Resonance frequency of LCR series circuit.	
8.	Determination of wavelength of diode laser using diffraction grating.	
9.	Determination of fill factor of solar cell.	
10.	Determination of quantum efficiency of photo diode from I-V Characteristic curve.	
Total Contact Hours:30		
Course Outcomes:		
On completion of the course, students will be able to		
	apply the concept of electron transport in devices.	
	analyse the physical properties of semiconductors.	
	analyse the properties of magnetic and dielectric materials.	
	analyse the properties of optical materials used for optoelectronics.	
	analyse the quantum behaviour of semiconductor MEMS and nanoelectronic devices.	
SUGGESTED ACTIVITIES		
	<ul style="list-style-type: none"> ● Problem solving sessions 	
SUGGESTED EVALUATION METHODS		
	<ul style="list-style-type: none"> ● Quizzes ● Class Presentation / Discussion 	
Text Book(s):		
6.	Kasap, S.O. Principles of Electronic Materials and Devices, McGraw-Hill Education, 2017.	
7.	Wahab, M.A. Solid State Physics: Structure and Properties of Materials. Narosa Publishing House, 2020.	
Reference Books(s) / Web links:		
1	Garcia, N. & Damask, A. Physics for Computer Science Students: with emphasis on Atomic and Semiconductor Physics. Springer-Verlag, 2012.	
2	Hanson, G.W. Fundamentals of Nanoelectronics. Pearson Education, 2009.	
3	Rogers, B., Adams, J. & Pennathur, S. Nanotechnology: Understanding Small Systems. CRC Press, 2014.	
4	S. O. Pillai, Solid State Physics (Multi colour Edition) , New Age International, 2018.	
5	Umesh K Mishra & Jasprit Singh, Semiconductor Device Physics and Design, Springer, 2008.	

List of Equipment Available
(Common to B.E. ECE and EEE)

S. No	Name of the equipment	Quantity Required	Quantity Available	Deficiency
1	Band gap of a semiconductor setup	8	19	-
2	Hall coefficient of semiconductor setup	4	4	-
3	B-H curve setup and CRO	6	7	-
4	Determination of permeability of free space - Helmholtz coil setup	5	5	-
5	Magnetic Susceptibility– Quincke’s tube, Electromagnet, Power supply Traveling Microscope	4	4	-
6	LCR circuit kit	7	7	-
7	Solar cell parameters setup	6	8	-
8	Determination of Plank’s constant - Rheostat, Multimeter, LED	8	10	-
9	Photo diode Characteristics.	6	6	-
10	Wavelength of Laser and Characteristics -Laser source and grating plate.	6	15	-

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO 2	3	2	1	-	-	-	-	-	-	-	-	1	2	-	-
CO 3	3	2	1	-	-	-	-	-	-	-	-	-	2	-	-
CO 4	3	2	1	-	-	-	-	-	-	-	-	1	2	-	-
CO 5	3	2	1	-	-	-	-	-	-	-	-	1	2	-	-
Average	3	2	1	-	-	-	-	-	-	-	-	1	2	-	-

Course Code	Course Title(Laboratory Integrated Theory Course)	Category	L	T	P	C
CS23231	DATA STRUCTURES	ES	3	0	4	5
Objectives:						
•	To apply the concepts of Linked List in the applications of various linear data structures.					
•	To demonstrate the understanding of stacks, queues and their applications.					
•	To apply the concepts of Linked List in the applications of various nonlinear data structures.					
•	To understand the implementation of graphs and their applications.					
•	To be able to incorporate various sorting and hashing techniques in real time scenarios					
UNIT-I	LINEAR DATA STRUCTURES –LIST					9
Self-Referential Structures, Dynamic Memory Allocation, Linked list implementation - Singly Linked List, Doubly Linked List, Circular Linked List, Applications of List.						
UNIT-II	LINEAR DATA STRUCTURES –STACK AND QUEUE					8
Stack – Operations, Array and Linked list implementation, Applications – Evaluation of Arithmetic Expressions, Queues- Operations, Array and Linked list Implementation.						
UNIT-III	NONLINEAR DATA STRUCTURES –TREES					10
Tree Terminologies, Binary Tree Representation, Tree Traversals, Binary Search Trees, Binary Heap, Height Balance Trees – AVL Trees.						
UNIT-IV	NONLINEAR DATA STRUCTURES –GRAPHS					9
Representation of Graphs, Topological Sort, Depth First Search and Breadth-First Search , Minimum Spanning Tree – Prim's Algorithm, Shortest path algorithm – Dijkstra’s Algorithm.						
UNIT-V	SEARCHING, SORTING AND HASHING TECHNIQUES					9

Sorting Techniques – Insertion Sort, Quick Sort, Merge Sort, Hashing- Hashing functions – Mid square, Division, Folding, Collision Resolution Techniques – Separate Chaining – Open Addressing – Rehashing.

Contact Hours : **45**

Course Outcomes: At the end of the course, students will be able to

- understand and apply the various concepts of Linear data Structures
- understand and apply the various concepts of Non Linear data Structures.
- understand and apply the various sorting and Hashing concepts.
- analyse and apply the suitable data structure for their research.
- choose efficient data structures and apply them to solve real world problems.

SUGGESTED ACTIVITIES

- Role play- Linked List (Unit 1).
- Mind Map, Poster Design - Stack and Queue (Unit 2).
- Flipped Classroom - Binary Heap (Unit 3).
- Poster Design - Graph (Unit4).
- Implementation of small module- Hashing (Unit5).

SUGGESTED EVALUATION METHODS

- Assignment problems - Linked List (Unit 1).
- Tutorial problems - Applications – Evaluation of Arithmetic Expressions (Unit 2).
- Quizzes - BST and Binary Heap (Unit 3).
- Tutorial problems- Graph traversal (Unit 4).
- Quizzes - Hashing and Sorting(Unit5) .

Text Book(s):

1. "Data Structures and Algorithm Analysis in C", Mark Allen Weiss, 2nd Edition, Pearson Education, 2005
2. "Data Structures and Algorithm Analysis in C++ - Anna University, Mark Allen Weiss, Pearson Education, 2017.

Reference Books(s) :

1. "Data Structures Using C and C++", Langsam, Augenstein and Tanenbaum, 2nd Edition, Pearson Education, 2015.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.

Web links for Theory & Lab(if any)

1. Data Structures - GeeksforGeeks
2. Data Structures | DS Tutorial - javatpoint
3. Data Structure and Types (programiz.com)

Lab Experiments

- 1 Implementation of Single Linked List (Insertion, Deletion and Display).
- 2 Implementation of Doubly Linked List (Insertion, Deletion and Display).
- 3 Implementation of Stack using Array and Linked List implementation.
- 4 Implementation of Queue using Array and Linked List implementation.
- 5 Implementation of Binary Search Tree and perform Tree Traversal Techniques.
- 6 Program to perform Quick Sort
- 7 Program to perform Merge Sort
- 8 Program to perform Linear Probing.
- 9 Program to perform Rehashing.
- 10 Mini Project:
 - Contact book application using Linked List.
 - Dictionary using Binary search trees.
 - Snake Game.
 - Chess Game.
 - Travel Planner (Shortest Path Algorithm).
 - Tic-Tac-Toe Game.
 - Library Management System.
 - Project Management System.
 - other projects

Contact Hours : **60**

Total Contact Hours : **105**

Course Outcomes: On completion of the course, the students will be able to

- analyze the various data structure concepts.
- implement Stacks and Queue concepts for solving real-world problems.
- analyze and structure the linear data structure using tree concepts.

• critically analyse various non-linear data structures algorithms.
• apply different Sorting, Searching and Hashing algorithms.

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	2	1	2	1	-	-	-	-	-	-	1	1	1	1
CO 2	1	1	2	1	1	-	-	-	-	-	-	2	1	1	1
CO 3	1	1	2	1	1	-	-	-	-	-	-	2	1	1	1
CO 4	1	1	2	1	1	-	-	-	-	-	-	2	1	1	1
CO 5	1	1	2	1	1	-	-	-	-	-	-	1	1	1	1
Average	1.0	1.2	1.8	1.2	1.0	-	-	-	-	-	-	1.6	1.0	1.0	1.0

Course Code	Course Title(Theory Course)	Category	L	T	P	C
EE23212	ELECTRIC CIRCUITS	PC	3	0	0	3
Objectives:						
•	To introduce DC circuits and provide knowledge on their analysis.					
•	To introduce AC circuits and impart knowledge on their analysis.					
•	To familiarise the phenomenon of resonance in series and parallel circuits.					
•	To impart knowledge on obtaining the transient response of RC, RL and RLC circuits.					
•	To provide knowledge on the analysis of three phase circuits with balanced and unbalanced loads.					
UNIT-I	ANALYSIS OF DC CIRCUITS					9
Electrical circuit elements – Ohm’s Law – V-I Characteristics (linear and non-linear elements) - Kirchoff’s laws – Resistors in series and parallel– Voltage and Current division method - Star Delta conversion - Source transformation - Mesh current and Nodal voltage methods of analysis – Network reduction using circuit theorems: Thevenin’s and Norton’s Theorems – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.						
UNIT-II	ANALYSIS OF AC CIRCUITS					9
Average and RMS Values of alternating current waveforms – R, L, C, RL, RC and RLC circuits - Impedance and Admittance – Power, Power Factor – Phasor diagram - Network reduction using circuit theorems for AC circuits – Analysis of two port networks - Impedance and admittance parameters.						
UNIT-III	RESONANCE AND COUPLED CIRCUITS					9
Series and parallel resonance –frequency response – Quality factor and Bandwidth - Self and mutual inductance – Coefficient of coupling – Single Tuned Circuits.						
UNIT-IV	TRANSIENT RESPONSE OF DC AND AC CIRCUITS					9
Transient response of RL, RC and RLC Circuits using Laplace transform for DC and AC sinusoidal inputs.						
UNIT-V	THREE PHASE CIRCUITS					9
Analysis of three phase 3-wire and 4-wire star circuits - delta circuits , balanced & unbalanced three phase loads - phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.						
Total Contact Hours						: 45
Course Outcomes: On completion of the course, the students will be able to						
•	analyse DC circuits and apply circuit theorems					
•	examine AC circuits using circuit theorems and analyze two port networks.					
•	analyse series and parallel resonant circuits					
•	obtain the transient response of DC and AC Circuits					
•	evaluate power in three phase circuits for balanced and unbalanced loads					
Suggested Activities						
•	Homework Problems					
•	Synthesizing Circuit Components based on given specifications					

Suggested Evaluation Methods	
•	Seminar Presentation
•	Group Assignments
Text Book (s):	
1	William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, “Engineering Circuits Analysis”, Tata McGraw Hill publishers, 8th edition, New Delhi, 2013.
2	Joseph A. Edminister, Mahmood, Nahri, “Electric Circuits” – Schaum Series and Systems”, Schaum’s Outlines, Tata McGrawHill, Indian. 5th Edition, 2017
3	Sudhakar A and Shyam Mohan SP, “Circuits and Network Analysis and Synthesis”, Tata McGraw Hill, 2015
4	Charles K. Alexander, Mathew N.O. Sadiku, “Fundamentals of Electric Circuits”, Sixth Edition, McGraw Hill, 2019.
Reference Books(s) :	
1	Chakrabati A, “Circuits Theory (Analysis and synthesis), Dhanpat Rai & Sons, New Delhi, 2013.
2	J. David Irwin, R. Mark Nelms with Amalendu Patnaik. “Engineering Circuit Analysis”, 11th Edition, Wiley Publishers, 2015
3	Allan H. Robbins, Wilhelm C. Miller, “Circuit Analysis: Theory and Practice”, 5 th Edition, Cengage publishers, 2013
Web links :	
1	NPTEL :: Electrical Engineering - NOC:Basic Electric Circuits
2	Example videos in www.circuitlab.com

COs/POs& PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	3	3	2	2	-	-	-	3	2	-	-	3	1	3
CO 2	3	3	3	2	2	-	-	-	3	2	-	2	3	1	3
CO 3	2	3	3	2	2	-	-	-	3	2	-	-	3	1	3
CO 4	3	3	3	2	2	-	-	-	3	2	-	-	3	1	3
CO 5	3	3	2	2	2	-	-	1	3	2	-	2	3	3	3
Average	2.8	3	2.8	2	2	-	-	1	3	2	-	2	3	1.4	3

Course Code	Course Title(Laboratory Course)	Category	L	T	P	C
EE23221	ELECTRIC CIRCUITS LABORATORY	PC	0	0	2	1

Objectives:

- To experimentally verify Kirchhoff’s laws.
- To understand the network theorem in DC circuits.
- To verify the phenomenon of resonance in AC circuits.
- To obtain the transient response of RL and RC circuits.
- To understand the concepts of three phase circuits.

List of Experiments

- 1 Kirchhoff’s laws
- 2 Network theorems (Thevenin’s, Norton’s, Superposition and Maximum power transfer Theorem).
- 3 Frequency response of RL, RC and RLC circuits.
- 4 Determination of time constant of series RL and RC circuits through simulation and experimentation.
- 5 Determination of time constant of parallel RL and RC circuits through simulation and experimentation.
- 6 Determination of coefficient of coupling of a single phase transformer.
- 7 Relation between line and phase quantities in three phase balanced star connected load.
- 8 Relation between line and phase quantities in three phase balanced delta connected load.
- 9 Experimental determination of power in three phase circuits by two-wattmeter method.

10	Simulation of three-phase balanced and unbalanced star delta networks circuits.	Total Contact Hours	:	30
Course Outcomes: On completion of the course, the students will be able to				
•	analyse DC circuits using Kirchhoff's laws.			
•	apply circuit theorems for DC circuits.			
•	analyse coupled circuits, series and parallel resonant circuits.			
•	obtain the transient response of DC circuits.			
•	realise the concept of three phase AC circuits and to evaluate its power.			
Suggested Evaluation Methods				
•	Experiment based viva			
•	Quizzes			

Lab Equipments Required:

S. No.	Name of the Equipment	Quantity Required
1	Dual DC Regulated Power Supply (0 – 30 V)	15 Nos.
2	Digital Function Generator (2 MHz) with Probes	10 Nos.
3	Digital Storage Oscilloscope (20 MHz) with Probes	10 Nos.
4	Single Phase autotransformer	3 Nos.
5	Single Phase transformer	3 Nos.
6	DC Ammeter (Various Ranges)	15 Nos.
7	DC Voltmeter (Various Ranges)	15 Nos.
8	AC Ammeter (Various Ranges)	10 Nos.
9	AC Voltmeter (Various Ranges)	10 Nos.
10	Single Phase Wattmeter - 600V, 10A,UPF	3 Nos.
11	Solder less Breadboard	15 Nos.
12	Digital Multimeter	5 Nos.
13	Decade Resistance Box, Decade Inductance Box, Decade Capacitance Box	5 Nos. Each
14	Variable 3Ø Resistive load	3 Nos.
15	Circuit Simulation Software with PC	5 Nos.
16	Printer	1 No.
17	Necessary Quantities of Resistors, Inductors, Capacitors of various capacities (Quarter Watt to 10 watt)	
18	Single strand Connecting wires	

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	3	3	2	2	-	-	-	3	2	-	-	3	1	3
CO 2	3	3	3	2	2	-	-	-	3	2	-	2	3	1	3
CO 3	2	3	3	2	2	-	-	-	3	2	-	-	3	1	3
CO 4	3	3	3	2	2	-	-	-	3	2	-	-	3	1	3
CO 5	3	3	2	2	2	-	-	1	3	2	-	2	3	3	3
Average	2.8	3	2.8	2	2	-	-	1	3	2	-	2	3	1.4	3

Course Code	Course Title(Laboratory Course)	Category	L	T	P	C
GE23121	ENGINEERING PRACTICES – CIVIL AND MECHANICAL	ES	0	0	2	1
Objectives:						
To provide exposure to the students with hands on experience on various basic engineering practices in Civil and Mechanical Engineering.						
List of Experiments						
CIVIL ENGINEERING PRACTICE						

1.	Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, and elbows in household fittings.
2.	Preparation of basic plumbing line sketches for wash basins, water heaters, etc.
3.	Hands-on-exercise: Basic pipe connections – Pipe connections with different joining components.
Carpentry Works:	
4.	Study of joints in roofs, doors, windows and furniture.
5.	Hands-on-exercise: Woodwork, joints by sawing, planning and chiselling.
MECHANICAL ENGINEERING PRACTICE	
6.	Preparation of butt joints, lap joints and T- joints by Shielded metal arc welding.
7.	Gas welding practice.
Basic Machining:	
8.	Simple Turning and Taper turning
9.	Drilling Practice
Sheet Metal Work:	
10.	Forming & Bending:
11.	Model making – Trays and funnels
12.	Different type of joints.
Machine Assembly Practice:	
13.	Study of centrifugal pump
14.	Study of air conditioner
Total Contact Hours	
: 30	
Course Outcomes: At the end of the course, students will be able to	
●	perform plumbing activities for residential and industrial buildings considering safety aspects while gaining clear understanding on pipeline location and functions of joints like valves, taps, couplings, unions, reducers, elbows, etc.
●	perform wood working carpentry activities like sawing, planning, cutting, etc. while having clear understanding of the joints in roofs, doors, windows and furniture.
●	produce joints like L joint, T joint, Lap joint, Butt joint, etc. through arc welding process while acquiring in depth knowledge in the principle of operation of welding and other accessories
●	perform operations like Turning, Step turning, Taper turning, etc. in lathe and Drilling operation in drilling machine
●	perform sheet metal operations like Forming, Bending, etc. and fabricating models like Trays, funnels, etc.

List of equipment and components

(For a Batch of 30 Students)

CIVIL

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings - 15 Sets.
2. Plumbing vice (fitted to work bench) – 15 Nos.
3. Carpentry vice (fitted to work bench) - 15 Nos.
4. Standard woodworking tools - 15 Sets.
5. Models of industrial trusses, door joints, furniture joints - 5 each
6. Power Tools: (a) Rotary Hammer - 1 No. (b) Circular Saw - 1 No. (c) Electric Planer - 1 No. (d) Hand Drilling Machine - 1 No. (e) Jigsaw - 1 No. (f) Cutoff Machine – 1 No.

MECHANICAL

1. Arc welding transformer with cables and holders - 5 Nos.
2. Welding booth with exhaust facility - 5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush, etc. - 5 Sets.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit - 1 No.
5. Centre lathe - 5 Nos.
6. Standard Sheet metal working tools – 2 sets
7. Study-purpose items: centrifugal pump, air-conditioner – 1 each.

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	1	1	-	-	2	1	-	2	-	-	2	-	-	-
CO 2	1	1	1	-	-		1	-		-	-		-	-	-
CO 3	1	1	1	-	-	2	1	-	2	-	-	2	-	-	-
CO 4	1	1	1	-	-	2	1	-	2	-	-	2	-	-	-
CO 5	1	1	1	-	-	2	1	-	2	-	-	2	-	-	-
Average	1	1	1	-	-	2	1	-	2	-	-	2	-	-	-

Course Code	Course Title	Category	L	T	P	C
MC23112	ENVIRONMENTAL SCIENCE AND ENGINEERING	MC	3	0	0	0
<p>Common to I sem. B.E. Aeronautical Engineering, Automobile Engineering, Biomedical Engineering, Civil Engineering, Mechanical Engineering, Mechatronics, and Robotics and Automation and B.Tech. – Biotechnology, Information Technology, Food Technology & Chemical Engineering and Common to II sem. B.E. – Electronics and Communication Engineering, Electrical and Electronics Engineering, Computer Science and Engineering, Computer Science and Design & Computer Science and Engineering (Cyber Security) and B.Tech. – Artificial Intelligence & Machine Learning and Artificial Intelligence & Data Science.</p>						
Objectives:						
<ul style="list-style-type: none"> To develop the understanding of environmental and associated issues To develop an attitude of concern for the environment To promote enthusiasm in participating environmental protection initiatives To nurture skills to solve environmental degradation issues To develop the knowledge about the environmental laws 						
UNIT-I	AIR AND NOISE POLLUTION					9
Definition –sources of air pollution –chemical and photochemical reactions in the atmosphere - formation of smog, PAN, acid rain, ozone depletion, particulate pollutants-Air quality standards-Air quality indices - control of particulate air pollutants-gravitational settling chambers, cyclone separators, wet collectors, fabric filters (Bag-house filter), electrostatic precipitators (ESP)-catalytic converters. Noise pollution –sources - health effects - standards- measurement and control methods.						
UNIT-II	WATER POLLUTION AND ITS MANAGEMENT					9
Definition-causes-effects of water pollution-point and nonpoint sources of wastewater-marine pollution - thermal pollution - Control of water pollution by physical, chemical and biological methods – wastewater treatment-primary, secondary and tertiary treatment-sources and characteristics of industrial effluents- zero liquid discharge.						
UNIT-III	SOLID WASTE AND HAZARDOUS WASTE MANAGEMENT					9
Solid waste – types- municipal solid waste management: sources, characteristics, collection, and transportation-sanitary landfill, recycling, composting, incineration, energy recovery options from waste - Hazardous waste – types, characteristics, and health impact - hazardous waste management: neutralization, oxidation reduction, precipitation, solidification, stabilization, incineration and final disposal. E-waste-definition-sources-effects on human health and environment- E-waste management- steps involved - Role of E-waste management within the initiatives of the Govt. of India- Swachh Bharat Mission.						
UNIT-IV	SUSTAINABLE DEVELOPMENT					9
Sustainable development- concept-dimensions-sustainable development goals - value education- gender equality – food security - poverty – hunger - famine - Twelve principles of green chemistry - Green technology - definition, importance - Cleaner development mechanism - carbon credits, carbon trading, carbon sequestration, eco labeling-International conventions and protocols-Disaster management.						

UNIT-V	ENVIRONMENTAL MANAGEMENT AND LEGISLATION	9
Environmental Management systems - ISO 14000 series- Environmental audit-Environmental Impact Assessment- life cycle assessment- human health risk assessment - Environmental Laws and Policy- Objectives - Polluter pays principle, Precautionary principle - The Environment (Protection) Act 1986 - Role of Information technology in environment and human health.		
Total Contact Hours:45		
Course Outcomes:		
On completion of the course, the students will be able to		
<ul style="list-style-type: none"> ● Associate air and noise quality standards with environment and human health. ● Illustrate the significance of water and devise control measures for water pollution. ● Analyze solid wastes and hazardous wastes. ● Outline the goals of sustainable development in an integrated perspective. ● Comprehend the significance of environmental laws. 		
SUGGESTED EVALUATION METHODS		
<ul style="list-style-type: none"> ● Continuous assessment tests ● Assignments ● Case studies, class room presentations (or) site visit 		
Text Book(s):		
3. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016		
4. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publisher, 2018.		
5. Johri R., E-waste: implications, regulations, and management in India and current global best practices, TERI Press, New Delhi		
Reference Books(s) / Web links:		
<ul style="list-style-type: none"> ● R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38. Edition 2010. ● Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001. ● Fowler B, Electronic Waste – 1 st Edition (Toxicology and Public Health Issues), 2017 Elsevier ● NPTEL course url https://onlinecourses.nptel.ac.in/noc19_ge22/NPTEL https://news.mit.edu/2013/ewaste-mit 		
1. For downloading text/reference books the weblink is given below can be used http://libgen.rs/		

COs/POs&PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	2	3	1	-	2	2	2	1	1	1	2	-	1	-
CO 2	1	2	3	1	-	2	2	2	1	1	1	2	-	1	-
CO 3	-	-	3	1	-	2	3	2	1	-	1	2	-	-	-
CO 4	-	1	2	1	1	3	3	2	1	1	1	2	-	-	-
CO 5	-	1	2	-	-	2	2	2	1	2	2	2	-	-	-
Average	1	1.5	2.6	1	1	2.2	2.4	2	1	1.25	1.2	2	-	1	-

GE23217

தமிழரும் தொழில்நுட்பமும்

L T P C

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அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்:

3

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

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: 3

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

அலகு III உற்பத்தித் தொழில் நுட்பம்: 3

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

அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: 3

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

அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ் : 3

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

TOTAL : 15 PERIODS**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருறை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr. K. K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils – The Classical Period (Dr. S. Singaravelu)(Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr. S. V. Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.