

GOVERNMENT COLLEGE OF ENGINEERING,

(An Autonomous Institution, Affiliated to Anna University, Chennai)

BARGUR – 635 104



Regulation 2022

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING
(Full Time)

CHOICE BASED CREDIT SYSTEM

Curriculum for SEMESTER I & SEMESTER II

(For the students admitted in the AY 2022-23 onwards)

OFFICE OF CONTROLLER OF EXAMINATIONS

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR – 635 104

Website: www.gcebargur.ac.in

Controller of Examinations
Government College of Engineering
Bargur-635 104

PRINCIPAL
Government College of Engg.,
BARGUR-635 104.

PROGRAM SPECIFIC OUTCOMES (PSOs):	
1	Graduates will be able to understand and apply the concepts of Electronics and Communication Engineering in the field of Communication, Microelectronics, Signal Processing, Networking, Embedded and VLSI Systems.
2	Graduates will be able to design and utilize advanced Hardware and Software tools to analyze and implement subsystems for real time applications.
3	Graduates will be able to apply domain knowledge to enhance research in the field of Communication Engineering, Embedded Systems and VLSI Systems.
PROGRAM OUTCOMES (POs)	
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, 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 modelling 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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
8	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.
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.

Mandatory Course: Induction Program

(Common to all branches)

Induction	3 Weeks Duration
Induction program for students to be Offered right at the start of the first year.	<ul style="list-style-type: none">• Physical activity• Creative Arts• Universal Human Values• Literary• Proficiency Modules• Lectures by Eminent People• Visits to local Areas• Familiarization to Dept./Branch & Innovations

**GOVERNMENT COLLEGE OF ENGINEERING (AUTONOMOUS), BARGUR
REGULATIONS 2022**

CHOISE BASED CREDIT SYSTEM

FULL TIME B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

CURRICULUM FOR SEMESTER I & SEMESTER II

SEMESTER I

Sl. No	COURSE CODE	COURSE TITLE	CAT	CONTACT HOURS	L	T	P	C
THEORY COURSES								
1.	22ZHS101	English for Engineers - I	HSMC	3	3	0	0	3
2.	22ZBS102	Matrices and Calculus	BSC	4	3	1	0	4
3.	22ZBS103	Engineering Physics	BSC	3	3	0	0	3
4.	22ZBS104	Engineering Chemistry	BSC	3	3	0	0	3
5.	22ZES105	Problem Solving and Python Programming	ESC	3	3	0	0	3
6.	22ZMC106	தமிழர் மரபு /Heritage of Tamils	MC	1	1	0	0	0
LABORATORY COURSES								
7.	22ZES107	Problem Solving and Python Programming Laboratory	ESC	3	0	0	3	1.5
8.	22ZBS108	Chemistry Laboratory	BSC	3	0	0	3	1.5
9.	22ZBS109	Physics Laboratory	BSC	3	0	0	3	1.5
10.	22ZHS110	Communication English Laboratory	HSMC	2	0	0	2	1
TOTAL					28	16	1	11 21.5

SEMESTER II

Sl. No	COURSE CODE	COURSE TITLE	CAT	CONTACT HOURS	L	T	P	C
THEORY COURSES								
1.	22ZHS201	English for Engineers - II	HSMC	3	3	0	0	3
2.	22ZBS202	Ordinary Differential Equation and Analytical Functions	BSC	4	3	1	0	4
3.	22ZBS203	Physics of Semiconductor Devices	BSC	3	3	0	0	3
4.	22LPC204	Circuit Theory	PCC	3	3	0	0	3
5.	22ZES205	Programming in C	ESC	3	3	0	0	3
6.	22LES206	Basic Electrical and Instrumentation Engineering	ESC	3	3	0	0	3
7.	22ZMC207	தமிழரும் தொழில்நுட்பமும்/ Tamils and Technology	MC	1	1	0	0	0
LABORATORY COURSES								
8.	22ZES209	Programming in C Laboratory	ESC	3	0	0	3	1.5
9.	22LPC210	Circuits and Devices Laboratory	PCC	3	0	0	3	1.5
10.	22ZES211	Engineering Practices Laboratory	ESC	3	0	0	3	1.5
TOTAL					29	19	1	9 23.5

REGULATION 2022

FULL TIME - B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER I

SYLLABI

(W.e.f. the AY 2022-2023 onwards)

R-2022	ENGLISH FOR ENGINEERS - I Common for all Branches	L	T	P	C				
222H5101		3	0	0	3				
OBJECTIVES:									
<ul style="list-style-type: none"> • Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. • To be aware of concepts in terms of situational and verbal context. • To acquire vocabulary by following the techniques of reading and listening comprehension. • Able to follow and glean the important information by listening and professional talk and classroom lectures. • Write coherently by following the principles of reading and listening comprehension. 									
UNIT I	VOCABULARY DEVELOPMENT								
Technical Vocabulary – Formal and Informal Vocabulary - Silent Letters – Avoidance of Jargon - Collocations – Verbal Analogies - Archaisms and Contemporary Synonyms - One Word Substitution - Word Order – Effective Use of Words – Trim Padding Words – Use Concrete and Specific Words – Prepositions – Using Determiners – Linking Words – Fixed and Semi-Fixed Expressions.									
UNIT II	LANGUAGE DEVELOPMENT								
Numerical Adjectives - Embedded Sentences - Subject-Verb Agreement - If Conditionals - Active Voice and Passive Voice – Reporting and Reported Speech – Summarising - Elaboration- Paraphrasing – Phrasal Verbs – Redundancy – Misplaced Modifiers - Dangling Constructions – Avoidance of Cliché.									
UNIT III	LISTENING AND SPEAKING								
Listening to Talks mostly of a Scientific Nature - Listening to Longer Technical Talks – Listening to Classroom Lectures - Listening to TED Talks - Formal and Informal Conversation - Greeting People - Asking for and Giving directions - Asking for and Offering Help – Seeking Clarification – Speaking about a Process.									
UNIT IV	READING								
Skimming and Scanning – Accent Variations - Pronunciation - Reading Short Technical Texts - Reading Longer Texts: General and Technical - Reading for Detailed Comprehension - Reading and Understanding Technical Articles - Reading Advertisements.									
UNIT V	WRITING								
Checklists ,Writing Instructions, Recommendations and Warnings - Interpreting Charts and Graphs - Describing a Process - Extended Definitions - Report Writing - Accident Report – Survey Report - Minutes of Meeting – Discourse markers, Jumbled Sentences – Paragraph Writing – Drafting E-Mails.									
TOTAL HOURS		Hrs							

OUTCOMES: At the end of the course , the students will be able to ;

•	Acquire proficiency in English including reading and listening comprehension, writing and speaking skills.
•	Participate effectively in formal and informal conversations; introduce themselves and express their opinions in English.
•	Present extempore speech on any technical related talks.
•	Draft reports, minutes of meeting and interpretation of charts and graphs effectively.
•	Utilise right word in right context and also to frame right grammatical sentences of their own.

TEXT BOOKS:

1.	A Course in Technical English, D Praveen Sam KN Shoba Cambridge University Press 2020.
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REFERENCES:

1.	<i>Markel, Mike. Technical Communication. New York: Bedford 2007.</i>
2.	<i>Communication Skills in English. Edited by The department Of English, Osmania University, Hyderabad: Oxford University Press 1998.</i>
3.	<i>Laplane, A. Philip. Technical Writing: A Practical guide for Engineers, Scientists and Nano Technical Professionals. CRC Press 2019.</i>
4.	<i>Gerson, Sharon & Steven Gerson. Technical Communication: Process and Product. Pearson 2019.</i>

202BS102

MATRICES AND CALCULUS

L T P C

(Common to all branches)

3 1 0 4

COURSE OBJECTIVES:

- To develop the use of matrix algebra techniques that are needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT I MATRICES

9 + 3

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.

UNIT II DIFFERENTIAL CALCULUS

9 + 3

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications: Maxima and Minima of functions of one variable.

UNIT III FUNCTIONS OF SEVERAL VARIABLES

9 + 3

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

UNIT IV INTEGRAL CALCULUS

9 + 3

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres of mass.

UNIT V MULTIPLE INTEGRALS

9 + 3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals – Applications: Moments and centres of mass, moment of inertia.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- Use the matrix algebra methods for solving practical problems.
- Apply differential calculus tools in solving various application problems.
- Able to use differential calculus ideas on several variable functions.
- Apply different methods of integration in solving practical problems.
- Apply multiple integral ideas in solving areas, volumes and other practical problems.

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. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

REFERENCES:

1. Anton. H, Bivens. I and Davis. S, "Calculus", Wiley, 10th Edition, 2016.
2. Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", FirewallMedia (An imprint of Lakshmi Publications Pvt., Ltd.,) New Delhi, 7th Edition, 2009.
3. Jain. R.K.and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.
4. Narayanan. S. and Manicavachagom Pillai. T. K., "Calculus" Volume I and II,
5. S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
6. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd,New Delhi, 2016.
7. Srimantha Pal and Bhunia. S.C, "Engineering Mathematics" Oxford University Press,2015.
8. Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India,2018.

M Mag
27/12/22

Dr M MAGESWAR

22ZBS103	ENGINEERING PHYSICS	L	T	P	C
	Common for all branches	3	0	0	3
OBJECTIVES:					
	<ul style="list-style-type: none"> • To develop knowledge on basics of mechanics and properties of solids • To understand the thermal properties of materials and their relevant applications. • To apply principles of quantum physics in the engineering field • To know about the fundamentals of LASER and optical fiber • To understand physics of magnetic and dielectric materials. 				
UNIT I	MECHANICS AND PROPERTIES OF MATTER	9			
<p>Mechanics: Center of mass- rotation of rigid bodies (qualitative) - moment of Inertia of circular disc - torsion pendulum (Theory and Experiment).</p> <p>Properties of matter: Elasticity – Hooke's law – Young's Modulus – rigidity Modulus – bulk Modulus – Poisson's ratio, bending moment of a beam - depression of cantilever (Theory and Experiment), determination of Young's modulus: uniform bending (Theory and Experiment) - non-uniform bending (qualitative).</p>					
UNIT II	THERMAL PHYSICS	9			
<p>Review of thermal properties: specific heat capacity- thermal capacity, modes of heat transfer- thermal expansion of solids – bimetallic strip, determination of thermal conductivity - Lee's disc method: theory and experiment, conduction through compound media (series and parallel), thermostat.</p>					
UNIT III	QUANTUM PHYSICS	9			
<p>Blackbody radiation – Planck's theory of radiation - Wien's displacement law – Rayleigh-Jean's law, matter waves – de-Broglie's hypothesis – wave-particle duality – wavefunction and its physical significance – Schrodinger wave equation – time-dependent and time-independent – application of Schrodinger wave equation: particle in a 1 D box.</p>					
UNIT IV	LASERS AND FIBRE OPTICS	9			
<p>LASER: characteristics of LASER – Einstein's A and B coefficient (derivation) - population inversion – pumping actions, Nd-YAG LASER: construction and working, industrial and medical applications of LASER.</p> <p>FIBRE OPTICS: total internal reflection – critical angle – principle and propagation of light in optical fibers –numerical aperture and acceptance angle, types of optical fibers (material, refractive index and mode), applications: Sonogram.</p>					
UNIT V	PHYSICS OF MATERIALS	9			
<p>Magnetic dipole moment - Bohr magneton - magnetic permeability and susceptibility – classification of magnetic materials - domain theory of ferromagnetism - soft and hard magnet, dielectric materials – dipole moment – permittivity –polarization and its types- Langevin- Debye equation – temperature and frequency dependent polarization-dielectric loss mechanism.</p>					
TOTAL: 45 PERIODS					

OUTCOMES:

At the end of the course, the student will be able

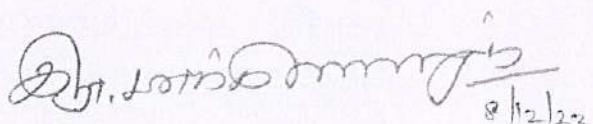
- To explain about center of mass of a system, able to calculate moment of inertia of a circular disc and to calculate Young's modulus for different materials.
- To apply concepts of thermal properties on fabrication of thermal insulators, thermostat and thermistors, able to calculate thermal conductivity.
- To understand the quantum behavior of materials and apply fundamental principles of quantum physics to the tunneling microscope.
- To understand the working principles of LASER and its applications. Able to understand principles and applications of optic fibers.
- To understand the physics behind magnetic and dielectric properties of materials.

TEXTBOOKS:

1. R.K. Gaur & S.L. Gupta. "Engineering physics". Dhanpat Rai Publishers, 2012.
2. D.K. Bhattacharya & T. Poonam. "Engineering Physics". Oxford University Press, 2015.
3. S.O. Pillai, Solid State Physics, New age international publishers, 9th edition, 2020
4. D.S. Mathur, Mechanics, S Chand & Co Ltd 2020
5. R. Murugesan & Kiruthiga Sivaprasath, "Modern Physics", CHAND publication, 18th edition, 2016

REFERENCES:

1. D. Halliday, R. Resnick and J. Walker. "Fundamentals of Physics". Wiley, 2015
2. M. N. Avadhanulu and P. G. Kshirsagar, "A textbook of engineering physics", S. Chand and Company Ltd, New Delhi, 2005.
3. A.B. Gupta, Mechanics and Properties of matter, Books & Allied (P) Ltd, 2021
4. R.A. Serway & J.W. Jewett. "Physics for Scientist and Engineers". Cengage Learning, 2010.
5. M. Arumugam, "Engineering physics", Anuradha publishers
6. John M. Senior, "Optical fiber communication principles and practice", Pearson publication, 3rd edition, 2010
7. N. Subramaniam Brijlal, P. S. Hemne, Heat Thermodynamics and Statistical Physics 1st Edition, 2008.


8/12/22

R-2022 22ZBS104	ENGINEERING CHEMISTRY	L 3	T 0	P 0	C 3
(Common for ECE / EEE / CSE)					
OBJECTIVES:					
<ul style="list-style-type: none"> To make students conversant with water parameters, boilers, need for water treatment and its merits and demerits. Students ought to be aware of fundamental principles behind different electrochemical reactions, corrosion of materials and methods to prevent corrosion. To learn the chemistry behind polymers, synthesis, merits, demerits and its applications in various field. To acquire basic knowledge in renewable, non renewable and alternate energy resources and the chemical reactions involved in cell, batteries and its applications. To learn the working principle of various spectroscopy and its applications. To acquire basic knowledge in Nano materials, synthesis, properties and uses. 					
UNIT I	WATER TECHNOLOGY				
Characteristics – alkalinity and its significance – hardness (problems) - types and estimation by EDTA method – specifications of drinking water (BIS and WHO standards) – potable water treatment – boiler feed water - requirements – disadvantages of using hard water in boilers (Scales & Sludge, Boiler corrosion, Priming & Foaming, Caustic embrittlement) – water treatment – Internal treatment – external treatment – zeolite method - Demineralization process – desalination – reverse osmosis.					
UNIT II	ELECTROCHEMISTRY AND CORROSION				
Electrochemistry: Electrochemical cells – reversible and irreversible cells – EMF – measurement of EMF – single electrode potential – Nernst equation (Problems) – reference electrode – standard hydrogen electrode and calomel electrode – ion selective electrode – glass electrode and measurement of pH – electrochemical series and its applications. Corrosion: Corrosion – Pilling Bedworth rule - dry corrosion and its mechanism - electrochemical corrosion and its mechanism – types (galvanic, pitting, differential aeration) – factors influencing corrosion – corrosion control methods – sacrificial anode method – impressed current method – corrosion inhibitors – protective coatings – paints – constituents – functions – metallic coatings – electroplating (Cu) and electro less plating (Ni).					
UNIT III	POLYMERS AND COMPOSITES				
Polymers: Definition – classification – functionality – polymerization – degree of polymerization – types (addition, condensation, copolymerization) – mechanism (free radical) – plastics – thermoplastics and thermosetting plastics – preparation, properties and uses of individual polymers (PVC, TEFLO, Nylon-6,6, Nylon-6, PET, epoxy resin) – rubber – vulcanization of rubber – applications – Biopolymers – Properties and its applications (Polylactic acid) – Conducting polymers - Properties and its applications (Polyacetylene) Composites: definition – types polymer matrix composites – Fibre Reinforced Polymers – applications – advanced composite materials – physical and chemical properties – applications.					
UNIT IV	NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES				
Nuclear energy – fission fusion reactions – light water nuclear reactor for power generation – breeder reactor – solar energy conversion – solar cells – wind energy – batteries: alkaline batteries – lead –acid, Ni-Cd, and Li-ion batteries – fuel cells – principles and applications – advantages and disadvantages.					

UNIT V	ANALYTICAL TECHNIQUES AND NANOMATERIALS	9
Spectroscopy: Electromagnetic spectrum - Fundamentals of spectroscopy – Instrumentation, working principle and applications of UV-Visible spectrophotometer, Atomic Absorbance Spectrophotometer, Flame photometer.		
Nanomaterials: Introduction to nanotechnology in electronics - nanomaterials – fullerenes carbon nanotubes – nanowires – Electronics and mechanical properties - synthesis of nanomaterials – topdown and bottomup approach – applications of nanomaterials in electronic devices (Semiconductors, LED & OLED) – electronics and telecommunication – medicines.		

TOTAL : 45 PERIODS

COURSE OUTCOMES

On completion of the course the student will be able to,

Apply the knowledge of basic science in identifying, to formulate and to solve the engineering problems.

Analyze water borne problems faced in boilers, need for water treatment and various methods and techniques for treating hard water.

Understand polymerization reactions and electrochemical reactions and its applications.

Acquire Knowledge about energy conversion and chemical reaction taking place in nuclear, solar, wind energy, Batteries, fuel cells and its applications..

Obtain in-depth knowledge on various nanomaterials and its applications in electronic devices. Students get basic knowledge on advanced analytical techniques.

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		2		1			1			1	1			
CO2	2		3		1			1			2	1			
CO3	2		1		1			1			2	1	2		1
CO4	2		3		2			1	1		2	1	1		1
CO5	2		1		2			1	1		2	1	1		1

TEXT BOOKS:

- 1 Jain and Jain , 16th edition, “Engineering Chemistry” Dhanpat Rqai Publishing Co.
- 2 Sivasankar B., “Engineering Chemistry”, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
- 3 S.S.Dara, “A Text book of Engineering Chemistry”, S.Chand Publishing, 12th Edition, 2018.

REFERENCES:

1. Pahari A and Chauhan B., “Engineering Chemistry”, Firewall Media., New Delhi., 2010.
2. ShikhaAgarwal, “Engineering Chemistry-Fundamentals and Applications”, Cambridge University Press, Delhi, Second Edition, 2019.
3. B.S.Murty, P.Shankar, Baldev Raj, B.B.Rath and James Murday, “Text book of nanoscience and nanotechnology”, Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
4. 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.
5. O.G. Palanna, “Engineering Chemistry” McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.

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22ZES105	PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> • To know the basics of algorithmic problem solving and to read and write simple python programs. • To develop python programs with conditionals and loops and to define python functions and call them. • To use python data structures-lists-tuples-dictionaries and to do input/output with files in python. 					
UNIT I	PROBLEM SOLVING	9			
Algorithms, building blocks of algorithms (statements, state, control flow, functions), notations (pseudo code, flowchart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative Problems – Computing Factorial, Generating Fibonacci Series, Checking Prime Number, Armstrong Number, Perfect Number, Strong Number, Find minimum in a list, Insert a card in a list of sorted cards, and guess an integer number in a range, Towers of Hanoi.					
UNIT II	DATA, EXPRESSIONS, STATEMENTS	9			
Introduction - Features of Python - Writing and Executing first Python - Literal Constants - Variables and Identifiers - Data Types - Input Operation - Comments - Reserved Words - Indentation - Operators and Expressions - Operations on Strings - Type Conversion. Decision Control Statements - Introduction - Selection/Conditional Branching - Basic Loop Structures - The Break Statement - The Continue Statement - The Pass Statement. Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.					
UNIT III	LISTS, TUPLES, DICTIONARIES	9			
Sequence – Lists - Functional Programming – Tuple, Creating Tuple, Accessing Values in a Tuple, Deleting Elements in Tuple, Updating Tuple - Sets – Dictionaries, Creating a Dictionary, Accessing Values, Deleting Items, Sorting Items. Illustrative programs: selection sort, insertion sort, mergesort, histogram.					
UNIT IV	CONTROL FLOW, FUNCTIONS	9			
Introduction - Function Definition - Function Call - Variable Scope and Lifetime - The Return Statement - More on Defining Functions - Lambda Functions or Anonymous Functions - Recursive Functions. Modules - Packages in Python - Standard Library Modules - Globals(), Locals(), and Reload() - Function Redefinition. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.					
UNIT V	FILES, MODULES, PACKAGES	9			
Files and exception: text files, reading and writing files, format operator; command line arguments, Errors and exceptions, handling exceptions, Built-in and User-Defined Exceptions - The finally Block. modules, packages; Illustrative programs: word count, Copy file.					
TOTAL : 45 PERIODS					

Sonbhadra SP 2021

OUTCOMES:		On completion of this course, students will be able to												
1.		Develop algorithmic solutions to simple computational problems												
2.		Read, write, execute by hand simple Python programs.												
3.		Represent compound data using Python lists, tuples, dictionaries												
4.		Decompose a Python program into functions												
5.		Read and write data from/to files in python programs												

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1		1	1	1							
CO2	3	3	2	2	1	1	1	1			2				
CO3	3	3	2	2	1	1	1	1			1				
CO4	3	3	2	2		1	1	1			1				
CO5	3	3	2	2	1	1	1	1			2				

(1-Low, 2-Moderate, 3-High)

*PSO Mapping may be done accordingly.

TEXT BOOKS:

1.	Reema Thareja, "Problem Solving and Programming with Python", Oxford University Press 2018.
2.	Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016.

REFERENCES:

1.	Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python", An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
2.	Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015.
3.	John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press , 2013
4.	Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus", Wiley India Edition, 2013.
5.	Paul Gries, Jennifer Campbell and Jason Montojo, "Practical Programming: An Introduction to Computer Science using Python 3", Second edition, Pragmatic Programmers, LLC,2013.
6.	Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.

UNIT V FILES, MODULES, PACKAGES

9

Files and exception: text files, reading and writing files, format operator; command line arguments, 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

COURSE OUTCOMES:

Upon completion of the course, students will be able to

- CO1: Develop algorithmic solutions to simple computational problems.
- CO2: Develop and execute simple Python programs.
- CO3: Write simple Python programs using conditionals and looping for solving problems.
- CO4: Decompose a Python program into functions.
- CO5: Represent compound data using Python lists, tuples, dictionaries etc.
- CO6: Read and write data from/to files in Python programs.

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.

REFERENCES:

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
4. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
5. <https://www.python.org/>
6. Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.

CE3102 2.2 Z MC/06

தமிழர் மரபு

L T P C
1 0 0 1

அலகு 1 மொழி மற்றும் இலக்கியம்:

3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழக் காப்பியங்கள், தமிழகத்தில் சமண பெளத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நல்ல 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 - ஜம்பொன் 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 நாட்டுப்புறத் கலைகள் மற்றும் வீர வினையாட்டுகள்:

3

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

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்:

3

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

அலகு V இந்திய ஜெடிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:

3

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

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

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

22ZES107	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

- To write, test and debug simple python programs
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples and dictionaries.
- To implement python programs with conditionals and loops.
- Read and write data from/to files in Python.

LIST OF EXPERIMENTS:

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton 's method).
3. Exponentiation (power of a number).
4. Find the maximum of a list of numbers.
5. Linear search and Binary search.
6. Selection sort, Insertion sort.
7. Merge sort.
8. First n prime numbers.
9. Multiply matrices.
10. Programs that take command line arguments (word count).
11. Find the most frequent words in a text read from a file.
12. Simulate elliptical orbits in Pygame.
13. Simulate bouncing ball using Pygame.

TOTAL : 45 PERIODS

OUTCOMES: | On completion of this course, students will be able to

1. Write, test, and debug simple Python programs.
2. Implement Python programs with conditionals and loops.
3. Develop Python programs step-wise by defining functions and calling them.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Read and write data from/to files in Python.

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	1	2				1						
CO2	3	2	3	1	2				1						
CO3	3	3	2	2	2				1						
CO4	3	3	3	3	2				1						
CO5	3	3	3	3	3				1						

(1-Low, 2- Moderate, 3-High)

*PSO Mapping may be done accordingly.

REFERENCES:

1. Stephen Brown, Zvonko Vranesic, "Fundamentals of Digital Logic Design With VHDL", Third Edition, McGrawHill India, 2012.

*S. Sankar
8/1/21*

R-2022	CHEMISTRY LABORATORY	L	T	P	C
22ZBS108	Common to ECE / EEE / CSE / MECH	0	0	3	1.5

OBJECTIVES:

- To make students conversant with hands on water parameter analysis.
 - To acquaint the students with the determination of molecular weight of a polymer by Ostwald viscometer.
 - To make the student acquire practical skills in analytical instruments.
1. Determination of total hardness of given water sample by EDTA method.
 2. Determination of alkalinity in given water sample.
 3. Determination of molecular weight of polyvinylalcohol using Ostwald viscometer.
 4. Conductometric titration: Mixture of acids (HCl & CH₃COOH) vs Strong base (NaOH).
 5. Conductometric titration: Strong acid (HCl) vs Strong base (NaOH).
 6. Conductometric titration: BaCl₂ vs Na₂SO₄ (Precipitation Titration).
 7. Determination of strength of in given hydrochloric acid using pH meter.
 8. Estimation of iron content of the given solution using potentiometer meter.
 9. Determination of EMF of an unknown cell by Poggendorff's compensation method.
 10. Estimation of sodium present in water using flame photometer.
 11. Estimation of iron content of the given sample using Spectro photometer (thiocyanate method).

COURSE OUTCOMES

On completion of the course the student will be able to,

- a. The students will be outfitted with hands-on knowledge in the qualitative and quantitative chemical analysis of water quality related parameters, molecular weight of polymer.

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO	1	2	1		1			2	1		1	1	1	1	1

REFERENCES:

1. J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbook of Quantitative Chemical Analysis (2009).
2. A Textbook on Experiments and Calculations in Engineering Chemistry by S.S.Dara; 9th Edition, ISBN-13, 978-8121908641; published by S.Chand & Co, 2015.
3. Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, Inc., New York 2001.
4. D.P.Shoemaker, C.W.Garland and Joseph W.Nibler, Experiments in Physical Chemistry, 5th Edition, McGraw Hill, London.

(Note: A minimum of SEVEN experiments shall be offered)

List of equipments for a batch of 30 students

1. Flame photometer - 2 nos
2. Weighing balance - 2 nos
3. Conductivity meter ; Potentiometer; pH meter- 9 nos each.
4. Ostwald viscometer - 30 nos
5. Potentiometric bridge setup - 2 nos.

Common apparatus: Pipette, Burette, Burette stand, Standard volumetric flask, funnel, Conical flask, porcelain tiles, dropper, reagent bottles, glass rod, beaker, wash bottle, test tube (30 nos each).

Dr. S. S. Dara
Head of Department
(HOD/Chemistry)

22ZBS109	PHYSICS LABORATORY	L	T	P	C
	Common to ECE and CSE	0	0	3	1.5

OBJECTIVES:

- To introduce different experiments to understand basic physics by doing experiments

LIST OF EXPERIMENTS: PHYSICS LABORATORY (ANY 5 EXPERIMENTS)

1	Determination of moment of inertia of a disc and rigidity modulus of the given wire – torsion pendulum
2	Determination of Young's modulus of a beam using pin and microscope – uniform bending
3	Study of I-V Characteristics of PN junction diode
4	Determination of thermal conductivity of poor conductor – Lee's disc method
5	(a) Determination of wavelength of LASER using grating, (b) Determination of numerical aperture and acceptance angle in an optical fibre
6	Determination of band gap of the given semiconductor
7	Determination of dielectric constant of the given material using LCR meter
8	Study of I-V Characteristics of Zener diode

Course outcomes:

After the course, the student will be able to apply principles of experimental physics in engineering applications.

Text Book:

1. A text book of practical physics by M.N. Srinivasan, S. Balasubramanian and R. Ranganathan, Sultan Chand and sons' publication, 2019.
2. A text book of engineering physics practicals by A. Ruby Dass, C.S. Robinson, Rajesh Kumar and Prasanth kumar sahu, Laxmi publications pvt ltd., 2016.

Reference:

R. Bakkiyaraj, A. Anandakumar and S. Santhosh, Physics Laboratory Manual, 2022.

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R-2022 22ZHS110	COMMUNICATION ENGLISH LABORATORY	L	T	P	C
ECE & EEE SEM / I	22ZHS110	0	0	2	1

OBJECTIVES:

- To develop their communicative competency in English with specific reference to their speaking and listening.
- To enhance their ability to communicate effectively in interviews.
- To strengthen their prospects of success in competitive examinations.
- To Strengthen a good command over of the language proficiency.
- To comprehend a different types of accent and use them in their communication

UNIT I	PHONETICS & LISTENING COMPREHENSION	6
Verbal Ability, Articulation of sounds- Intonation-Stress and Rhythm-Conversation practice-listening Various lectures		
UNIT II	COMMUNICATION AT WORKPLACE	6
Writing job applications - cover letter- resume- e-mails- memos- reports - interpreting visual texts – Summarising the text.		
UNIT III	ENGLISH FOR NATIONAL AND INTERNATIONAL EXAMINATIONS AND PLACEMENTS	6
International English Language Testing System (IELTS)- Test of English as a Foreign Language (TOEFL)- Civil Service(Language related part) –English for competitive examinations – Practice for On-line examination.		
UNIT IV	INTERVIEW SKILLS	6
Different types of Interview format- answering questions- offering information- mock interviews- Body languages – Role Plays – Telephone Conversation.		

UNIT V	SOFT SKILLS	6
Motivation- emotional intelligence-Multiple intelligences- managing changes- time management-leadership straits- team work- career planning- creative and critical thinking		
	TOTAL HOURS	30 Hrs
OUTCOMES: At the end of the course, the students will be able to		
<ul style="list-style-type: none"> • Face interviews, group discussions and other language parameters in the job market • Write any competitive examinations which cover language part in it. • Take part in any English conversations of any kind in English. Flawlessly without fear and shyness. • Write articles for newspapers and magazines or any write-up in English without grammar mistakes. • Come out with leadership qualities, team work and career planning and will also possess critical and creative thinking. 		
TEXT BOOKS:		
1.	Communication Skills for Engineers and Scientists, PHI Learning PVT.LTD, Delhi, 2014.	
2.	Communication Skills and Soft Skills An Integrated Approach, Dorling Kindersley (INDIA) PVT.LTD, New Delhi, 2012.	
3.	Soft Skills, MJP Publishers, Chennai, 2010.	
REFERENCES:		
5.	<i>Craven, Miles. Listening Extra-A resource book of multi-level skills activities. Cambridge University Press, 2004.</i>	
6.	<i>Seely, John. The Oxford guide to writing & Speaking. New Delhi: Oxford University Press, 20</i>	
7.	<i>Comfort, Jeremy, et al. Speaking Effectively: Developing speaking skills for Business English. Cambridge University Press, Cambridge: Reprint 2011.</i>	
8.	<i>Dutt P. Kiranmai and RajeevanGeetha. Basic Communication Skills, Foundation Books:2013</i>	

REGULATION 2022

FULL TIME - B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER II

SYLLABI

(W.e.f. the AY 2022-2023 onwards)

R-2022 22ZHS201	ENGLISH FOR ENGINEERS - II Common for all Branches	L	T	P	C
		3	0	0	3

OBJECTIVES:

- Learn to use right engineering Terminologies and impersonal way of communication in Technical writing.
- Able to draft any Technical Varied documents, following the techniques of effective writing.
- Able to write introduction and conclusion of any given document.
- Aware of accent change according to function and meaning of the word.
- Able to develop different types of presentations, role-play and taking part in virtual interview.

UNIT I	Infinitives – Split Infinitive – Plain Infinitive – Participle – Gerund – Tenses – Portmanteau Words or Blends – Borrowed words – Difference in British and American English – Engineering Terminology – Impersonal Passive Voice – Prepositional Phrases – Idioms and Phrases	9
UNIT II	Errors Analysis - Announcements – Airline/Train Announcement – Weather Forecast Report – Product Description – Advertisement Preparation – Posture Making – Slogan Making- Writing Responses to Complaints – Enquiring about a course over phone.	9
UNIT III	Technical Essay writing – Features of an Essay – Thesis Statement – Organisation of the Material – Writing Introduction and Conclusion – Historical and Technical Background – Letter Writing (Formal and Informal) – Job / Internship Application - Resume Writing	9
UNIT IV	Writing Vision and Mission Statement, Short Report on An Event (Field Trip, Internship Report etc.) – Writing Articles in Technical Blogs – News Paper Articles – Letter to Editor – Writing Proposal – Case Studies – Film Review – Note Making.	9

UNIT V	Making Effective Speech – Accent Change according to Meaning – Intonation – Oral Presentation – Difference between Lecture and Public Speech and Presentation- Participating in a Role Play (Interview/ Telephone Interview/ Virtual Interview) – Making Presentations with Visual Aids	9
	TOTAL HOURS	45 Hrs

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

- Apply conventional patterns of organising technical texts.
- Gain knowledge to rectify common errors and incorrect usages of words in a meaningful context.
- Develop competence in writing descriptive essays or articles in technical blogs.
- Acquire the skill of making announcements, writing film reviews, case studies and proposal writing.
- Demonstrate the skill of oral presentation on technical and general context.

TEXT BOOKS:

1. English Language Skills for Engineers, Aruna Koneru, McGraw Hill Education (India) Private Ltd 2020.

REFERENCES:

13. Bailey, Stephen. *Academic Writing: A Practical guide for students*. New York: Rutledge, 2018.
14. Sudarshana, N.P. and Savitha, C. (2018). *English for Engineers*. Cambridge University Press.
15. Zinsser, William. (2001). *On Writing Well*. Harper Resource Book.
16. Hamp-Lyons, L. (2006). *Study writing*. Cambridge University Press.

D.J.S.J.Y.R
11252023

**22ZBS202 ORDINARY DIFFERENTIAL EQUATIONS AND ANALYTIC
FUNCTIONS**

II Semester EEE

**L T P C
3 1 0 4**

COURSE OBJECTIVES:

To equip students with the knowledge of

- vector calculus and their uses in various field theoretic subjects.
- higher order and special type of linear differential equations and methods to find solutions.
- Laplace transforms and properties and their applications in engineering.
- construction of analytic functions and concepts of conformal mapping, complex integration and series solutions.

UNIT- I VECTOR CALCULUS

9+3

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 parallelopipeds.

UNIT- II ORDINARY DIFFERENTIAL EQUATIONS

9+3

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT- III LAPLACE TRANSFORMS

9+3

Laplace transform – Sufficient condition for existence – Transform of elementary functions – Basic properties – Transforms of derivatives and integrals of functions - Derivatives and integrals of transforms - Transforms of unit step function and impulse functions – Transform of periodic functions. Inverse Laplace transform -Statement of Convolution theorem – Initial and final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

UNIT- IV ANALYTIC FUNCTIONS

9+3

Functions of a complex variable – Analytic functions: Necessary conditions – Cauchy-Riemann equations and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: $w = z+k$, kz , $1/z$, z^2 , e^z and bilinear transformation.

UNIT- V COMPLEX INTEGRATION

9+3

Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula – Taylor's and Laurent's series expansions – Singular points – Residues – Cauchy's residue theorem – Evaluation of real definite integrals as contour integrals around unit circle and semi-circle (excluding poles on the real axis).

TOTAL (L : 45 + T : 15): 60 PERIODS

COURSE OUTCOMES:

After completing the course the students will be able to

- solve problems on vector calculus and to apply them in any other field theory related subjects.
- solve differential equations and will be exposed to their applications in various fields of engineering.
- solve problems on Laplace transforms and will be able to use Laplace transform in finding solutions of differential and integral equations and other engineering applications.
- solve complex integration problems and will be exposed to various applications of analytic functions and conformal mapping in engineering.

- Apply integration of functions of complex variables in engineering problems

TEXTBOOKS:

- 1 Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", Eighth Edition, Laxmi Publications Pvt Ltd., 2011.
- 2 Grewal. B.S, "Higher Engineering Mathematics", 44st Edition, Khanna Publications, Delhi, 2017.

REFERENCE BOOKS:

1. Dass, H.K., and Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand Private Ltd., 2011.
2. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2012.
3. Peter V. O'Neil, "Advanced Engineering Mathematics", 7th Edition, Cengage learning, 2012.
4. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2008.
5. Sivarama Krishna Das P. and Rukmangadachari E., "Engineering Mathematics", Volume II, Second Edition, PEARSON Publishing, 2011.

22ZBS203	PHYSICS OF SEMICONDUCTOR DEVICES	L	T	P	C				
Common to ECE,EEE and CSE Branches					3 0 0 3				
OBJECTIVES:									
<ul style="list-style-type: none"> • To learn about the fundamentals of electronic materials and their properties • To understand how to calculate charge carriers in semiconducting materials • To learn about transport phenomenon and optical excitation in semiconducting materials • To know characteristics of p-n junction and its applications • To understand about principle and working of semiconducting devices 									
UNIT I	ELECTRONIC MATERIALS				9				
Classical free electron theory: expression for electrical conductivity-thermal conductivity-Wiedemann – Franz law - Lorenz number- success and failures, quantum free electron theory: Fermi-Dirac statistics- Density of energy states, zone theory- electron in periodic potential-energy bands in solids.									
UNIT II	CARRIER CONCENTRATION IN SEMICONDUCTOR				9				
Types of semiconductors-Intrinsic semiconductor - electron concentration-hole concentration-intrinsic carrier concentration-determination of electrical conductivity, extrinsic semiconductor – types- carrier concentration, variation of Fermi level with temperature and doping concentration, determination of band gap.									
UNIT III	CARRIER TRANSPORT AND OPTICAL EXCITATION IN SEMICONDUCTOR				9				
Carrier transport: Drift transport: drift current density, mobility effect and velocity - electric field relations. Diffusion transport: diffusion current density – Einstein relation, continuity equation, carrier injection and diffusion length. Optical excitation: optical absorption, carrier generation, carrier life time, photoconductivity, direct and indirect recombination, trapping, excitons, photoconductive devices.									
UNIT IV	THE P-N JUNCTION DIODE				9				
Basic structure of p-n junction, forward and reverse characteristics of p-n junction, breakdowns types, Zener diode: characteristics and its application: voltage regulator, Schottky diode- tunnel diode-light emitting diode.									
UNIT V	TRANSISTORS				9				
BJT: Structure - principle of operation - input and output characteristics of CE, CB and CC configuration, FET: types-JFET – construction, working and characteristics of n-channel JFET, MOSFET: types - structure – principle - working and characteristics, SCR: Structure- principle- working and characteristics									
TOTAL:45 PERIODS									

OUTCOMES:

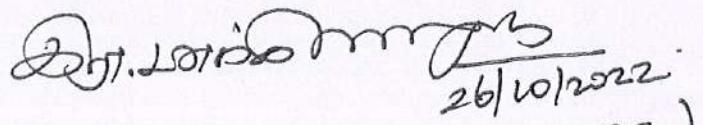
•	Students will understand the electronic properties of materials
•	Students will be able to realise the semiconducting materials and its carrier concentration
•	Students will also acquire knowledge on carrier transport mechanism and optical properties of materials
•	Students will understand different types of diodes and its applications
•	Students will also get an exposure to the function of various transistors in engineering aspects

TEXTBOOKS:

1.	V.K. Mehta and Rohit Mehta, <i>Principles of electronics</i> , S. Chand publication, 2020
2.	S. Mani Naidu, "Applied Physics", Pearson Publisher, India, 2010.
3.	Uma Mukherji, "Engineering Physics", Alpha Science International Ltd., Oxford, U.K.
4.	K. Rajagopal, "Engineering Physics", PHI, New Delhi, 2011.
5.	P. Mani, "Engineering physics", Dhanam Publications, 2017

REFERENCES:

1.	<i>Concepts of Modern Physics</i> . Arthur Beiser, Tata McGraw-Hill, New Delhi (2010)
2.	<i>Introduction to Nanotechnology</i> , C.P. Poole and F.J. Owens, Wiley, New Delhi (2007).
3.	<i>Fundamentals of Physics II</i> , R. Shankar, Yale University Press, New Haven and London (2016).
4.	<i>Fundamentals of Physics</i> , 6th Edition, D. Halliday, R. Resnick and J. Walker, John Wiley and Sons, New York (2001).
5.	<i>Callister's materials Science and Engineering</i> , R. Balasubramaniam, Wiley India Pvt. Ltd., 2014
6.	<i>Semiconductor physics and devices</i> , Donald A Neaman, Dhruves Biswas, McGraw Hill Education India, 4 th edition.


 26/10/2022
 (Dr. R. Bakkyaraj)
 AP/PHY

22LPC204	CIRCUIT THEORY	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To introduce the basic concepts of DC/ AC circuits and analyze them using network Theorems & Topology.
- To study the transient response of the circuits and the concepts of resonance and coupled circuits.
- To learn about the two port networks and characterize them using parameters

UNIT I	DC CIRCUIT ANALYSIS	9
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Basic Components of electric Circuits, Charge, current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff's Current Law, Kirchoff's voltage law, The single Node – Pair Circuit, series and Parallel Connected Independent Sources, Resistors in Series and Parallel, voltage and current division, Nodal analysis, Mesh analysis, Duality and dual networks.

UNIT II	NETWORK THEOREMS	9
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Network theorems -Superposition theorem, Thevenin's theorem, Norton's theorem, Reciprocity theorem, Millman's theorem, and Maximum power transfer theorem, application of Network theorems- Network reduction: voltage and current division, source transformation – star delta conversion.

UNIT III	RESONANCE AND COUPLED CIRCUITS	9
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Resonance - Series resonance - Parallel resonance - Variation of impedance with frequency -Variation in current through and voltage across L and C with frequency – Bandwidth - Q factor -Selectivity. Self-inductance - Mutual inductance - Dot rule - Coefficient of coupling - Analysis of coupled circuits - Series, Parallel connection of coupled inductors.

UNIT IV	TRANSIENT ANALYSIS	9
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Natural response-Forced response - Transient response of RC, RL and RLC circuits to excitation by Step Signal, Impulse Signal and exponential sources - Complete response of RC, RL and RLC Circuits to sinusoidal excitation.

UNIT V	TWO PORT NETWORKS	9
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Introduction to two port networks, Introduction to two port network parameters – Z, Y, Transmission (ABCD) and Hybrid (H) Parameters, Analysis of two port network using Z and Y parameters, Interconnection of two port networks, Symmetrical properties of T and π networks.

TOTAL:45 PERIODS

COURSE OUTCOMES	Upon the completion of the course students will have the
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1.	Ability to analyse the DC/AC circuits using network topology.
2.	Ability to analyse the DC/AC circuits using network theorems.
3.	an understanding of the concepts of resonance and coupled circuits.
4.	exposure to transient and steady state response of electric circuits.
5.	knowledge on two port networks and their parameter characterization.

TEXT BOOKS:

1.	William H. Hayt, Jr. Jack E. Kemmerly and Steven M. Durbin, —"Engineering Circuit Analysis" , McGraw Hill Science Engineering, Eighth Edition, 11th Reprint 2016.
2.	Joseph Edminister and Mahmood Nahvi, —"Electric Circuits", Schaum's Outline Series, Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016.
3.	Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Tata McGraw Hill, 2007.

REFERENCES:

1.	Charles K. Alexander, Mathew N.O. Sadiku, —Fundamentals of Electric Circuits, Fifth Edition, McGraw Hill, 9th Reprint 2015
2.	A.Bruce Carlson, —Circuits: Engineering Concepts and Analysis of Linear Electric Circuits", Cengage Learning, India Edition 2nd Indian Reprint 2009
3.	Allan H.Robbins, Wilhelm C.Miller, —Circuit Analysis Theory and Practice, Cengage Learning, Fifth Edition, 1st Indian Reprint 2013.
4.	Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 1999.

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO															
CO1	2	3	3	1	-	-	-	-	-	-	-	-	3	2	-
CO2	2	3	3	1	-	-	-	-	-	-	-	-	3	2	-
CO3	2	3	3	1	-	-	-	-	-	-	-	-	3	2	-
CO4	2	3	3	1	-	-	-	-	-	-	-	-	3	2	-
CO5	2	3	3	1	-	-	-	-	-	-	-	-	3	2	-
	2	3	3	1	-	-	-	-	-	-	-	-	3	2	-

Dr. Omprakash
14/12/22

22ZES205	PROGRAMMING IN C (Common to CSE & ECE)	L	T	P	C
		3	0	0	3

OBJECTIVES:

- Learn the organization of a digital computer and get exposed to the number systems
- Learn to think logically and write pseudo code or draw flow charts for problems and get exposed to the syntax of C.
- Learn to use arrays, strings, functions, pointers, structures and unions in C.

UNIT I	INTRODUCTION	8
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Generation and Classification of Computers- Basic Organization of a Computer –Number System – Binary – Decimal – Conversion – Problems. Need for logical analysis and thinking – Algorithm –Pseudo code – Flow Chart.

UNIT II	C PROGRAMMING BASICS	10
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Problem formulation – Problem Solving - Introduction to ‘C’ programming –fundamentals – structureofa‘C’program–compilationandlinkingprocesses–Constants,Variables–Data Types – Expressions using operators in ‘C’ – Managing Input and Output operations – Decision Making and Branching – Looping statements – solving simple scientific and statistical problems.

UNIT III	ARRAYS AND STRINGS	9
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Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

UNIT IV	FUNCTIONS AND POINTERS	9
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Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays- Example Problems.

UNIT V	STRUCTURES AND UNION	9
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Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre processor directives.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

On completion of this course, students will be able to

1.	Know the various number systems and their conversion.
2.	Write simple programs in C.
3.	Design programs based on arrays.
4.	Construct programs using functions and pointers concepts
5.	Formulate simple Structures and Files program.

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	1								3	2	1
CO2	3	2	3	3	1								3	2	1
CO3	3	2	3	3	1								3	2	1
CO4	3	2	3	3	1						1		3	1	
CO5	3	2	3	3	1						1		3	1	

(1-Low, 2- Moderate, 3-High)

TEXT BOOKS:

1. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
2. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009.

REFERENCES:

1. Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.
2. Dromey R.G., "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007.
3. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006.
4. Yashavant P. Kanetkar. "Let Us C", BPB Publications, 2011.
5. Herbert Schildt, "C The Complete Reference", Tata McGraw Hill Publishing Company, New Delhi, 2010.

22LES206	BASIC ELECTRICAL AND INSTRUMENTATION ENGINEERING	L	T	P	C
		3	0	0	3

OBJECTIVES

- To introduce DC Machines
- To study the Basics of Transformer
- To introduce Induction Machines
- To understand the concepts of Alternators and Special machines
- To introduce different Electrical Measuring Instruments.

UNIT I	DC MACHINES	9
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Introduction –DC generators- Constructional Features–Principle of operation- EMF Equation – Types and Characteristics of DC generators –DC motors - Principle of Operation–Types and Characteristics of DC motors –Starting and Speed Control – Losses and Efficiency – Applications.

UNIT II	TRANSFORMERS	9
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Introduction - Single phase transformer construction and principle of operation –Types-EMF equation–No load and Load characteristics – Equivalent Circuit –Voltage Regulation – Losses-Efficiency –OC and SC tests –Autotransformers –Three Phase Transformers – Applications.

UNIT III	INDUCTION MACHINES	9
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Principle of operation of three-phase induction motors – Construction –Types – Torque Slip Characteristics –Equivalent circuit– Starting and Speed Control–Single phase Induction motors: Construction– Double revolving field theory –Types– Applications.

UNIT IV	SYNCHRONOUS AND SPECIAL MACHINES	9
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Alternator-Constructional details–working principle–EMF Equation – Voltage regulation by EMF and MMF methods. Synchronous motor: Working principle - Starting methods – Torque equation – Characteristics. Special Machines: Stepper Motor – Brushless DC Motor - Reluctance Motor – Universal Motor.

UNIT V	ELECTRICAL INSTRUMENTS AND MEASUREMENTS	9
Absolute and Secondary Instruments-Electrical Principle of operation-Standards and errors-Essentials of indicating instruments- Moving Coil and Moving Iron Ammeters and Voltmeters- Wattmeter and Energy meter-Measurement of R, L and C parameters: Wheatstone, Anderson, Schering and Wien bridges -Transducers – Classification of Transducers: Resistive, Inductive, Capacitive, piezoelectric, photoelectric and Hall effect.		
		TOTAL: 45 PERIODS
COURSE OUTCOMES	At the end of the course, students able to	
1.	Choose the appropriate DC motor and generator based on their performance characteristics.	
2.	Understand the functions and operations of transformer	
3.	Choose an appropriate induction motor based on their performance characteristics.	
4.	Select appropriately a special machine for an Industrial application.	
5.	Choose an appropriate measuring instruments for a given application to measure the unknown parameter.	
TEXT BOOKS:		
1.	D.P. Kothari and I.J.Nagarath, —"Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, Third Reprint, 2016.	
2.	B.L.Theraja and A.K.Theraja,"A Text Book of Electrical Technology", Vol-I and II, S. Chand &Co. 2014.	
3.	Toro,"Electrical Engineering Fundamental", Pearson Education, New Delhi, 2015.	
REFERENCES:		
1.	<i>Rajendra Prasad , "Fundamentals of Electrical engineering", Prentice Hall of India, 2006</i>	
2.	<i>S.K.Bhattacharya —"Basic Electrical and Electronics Engineering", Pearson India, 2011.</i>	
3.	<i>E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.</i>	
4.	<i>A.K. Sawhney, "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai and Co, 2010.</i>	

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

GE3252 222 MC201 தமிழ்ரும் தொழில்நுட்பமும்

L T P C
1 0 0 1

அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்:

3

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

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:

3

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

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 - கலமணிகள், 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 குழுழித் தூம்பின் முக்கியத்துவம் - காலநடை பராமரிப்பு - காலநடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

அலகு V அறிவியல் தமிழ் மற்றும் கணிததமிழ்:

3

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

GE3252

TAMILS AND TECHNOLOGY

L T P C

1 0 0 1

UNIT I WEAVING AND CERAMIC TECHNOLOGY

3

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

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY

3

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

22ZES209	PROGRAMMING IN C LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

- Be familiar with the use of Office software and presentation and visualization tools.
- Be familiar with programming in C and basics of Decision making, Looping constructs.
- Learn to use Arrays, strings, functions and implement the concepts of structure, Union and file organization.

LIST OF EXPERIMENTS:

1. Search, generate, manipulate data using MS office/ OpenOffice
2. Presentation and Visualization – graphs, charts, 2D,3D
3. Problem formulation, Problem Solving and Flowcharts
4. C Programming using Simple statements and expressions
5. Scientific problem solving using decision making and looping.
6. Simple programming for one dimensional and two dimensional arrays.
7. Solving problems using String functions
8. Programs with user defined functions – Includes Parameter Passing
9. Programs with Pointers.
9. Program using Recursive Function.
10. Program using structures and unions.

TOTAL :45 PERIODS

COURSE OUTCOMES:

On completion of this course, students will be able to

1. Apply good programming design methods for program development.
2. Design and implement C programs for simple applications.
3. Write C programs, which involve decision making and arrays and strings.
4. Develop programs using functions and pointers.
5. Develop programs using structures and unions.

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1							1		3	3	
CO2	3	2	2	1							1		3	3	
CO3	3	2	2	1							2		2	1	
CO4	3	2	2	2							2		2	1	
CO5	3	2	2	2							2		3	1	

(L- Low, M- Moderate, H-High)

REFERENCES:

1. *Herbert Schildt, "C - The Complete Reference", Tata McGraw Hill Publishing Company, New Delhi, 2010.*

22LPC210	CIRCUITS AND DEVICES LABORATORY	L	T	P	C
		0	0	2	1

OBJECTIVES:

- To analyze experimentally the characteristics of diodes, BJT 's and FET 's.
- To verify practically the response of various special purpose electron devices.
- To construct and simulate various electronic circuits using PSPICE/MULTISIM.

LIST OF EXPERIMENTS

Design, Simulation & implementation of the below using discrete components

1. Characteristics of PN Junction Diode.
2. Characteristics of Zener diode & its application as regulator.
3. Input-output Characteristics of common emitter configuration.
4. Input-output Characteristics of common base configuration.
5. FET Characteristics.
6. Verification of Thevenin 's & Norton 's theorem.
7. Verification of KVL &KCL.
8. Verification of Super Position Theorem.
9. Verification of Maximum Power Transfer & Reciprocity theorem.
10. Determination of Resonance Frequency of Series & Parallel RLC Circuits.

TOTAL: 30 PERIODS

COURSE OUTCOMES		Upon completion of the course, the students will have the ability to
1.	Analyze the characteristics of various diodes.	
2.	Analyze the characteristics of BJT and FET transistors.	
3.	Verify Thevenin, Norton, KVL, KCL, Maximum Power Transfer and Super Position Theorems.	
4.	Determine and verify resonant frequency of tuning circuits.	
5.	Analyze various electronic circuits usingPSPICE/multisim simulator.	

Ramamurthy

*Dr. G. Venkateswara
14/12/2022*

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	3	-	-	-	2	-	-	2	3	2	1
CO2	2	2	2	1	3	-	-	-	2	-	-	2	2	3	2
CO3	2	2	1	1	3	-	-	-	2	-	-	2	3	2	2
CO4	3	2	2	1	3	-	-	-	2	-	-	2	2	3	1
CO5	3	2	2	1	3	-	-	-	2	-	-	2	2	3	1
	3	2	2	1	3	-	-	-	2	-	-	2	2	3	1

1-LOW

2-MODERATE (MEDIUM)

3-HIGH

22MES111 / 22ZES211	ENGINEERING PRACTICES LAB	L	T	P	C
	(Common to All Branches)	0	0	4	1.5

COURSE OBJECTIVES:

- To make various basic prototypes in the carpentry trade such as Lap joint, Lap Tee joint, Dove tail joint and various welding joints such as lap joint, butt joint and T-joint.
- To know about the simple house wiring, Demonstration of mobile and laptop and troubleshooting of personal computer.

LIST OF EXPERIMENTS:

1. Introduction to use of tools and equipment in Carpentry, Welding, Foundry and Sheet metal
2. Safety aspects in Welding and Carpentry
3. Half lap Joint and Dovetail Joint in Carpentry
4. Welding of Lap joint, Butt joint and T-joint
5. Fabrication of parts like tray, frustum of cone and square box in sheet metal
6. Plumbing
7. Electrical wiring for domestic equipment, MCB 2/3/4 pole, Light and Fan connections and Circuit breakers.
8. Dismantling and assembly of Computer/Laptops, Changing HDD, RAM and Mother Board etc.
9. Basic IOT experiments, controlling devices with mobile applications using Arduino and Raspberry pi.

Lecture: 0 Periods Tutorial: 0 Periods Practical: 60 Periods Total: 60 Periods

COURSE OUTCOMES:	on completion of this course, students will be able to
1	Use of tools and equipment for Carpentry, Welding and Sheet metal.
2.	Make half lap joint, dovetail joint in carpentry and welded lap joint, butt joint and T-joint
3	Fabricate parts like tray, frustum of cone and square box in sheet metal.
4	Carry out minor works/repair related to electrical wiring and plumbing.
5	Demonstration on mobile or laptop and troubleshooting of personal computer.

