FIRST YEAR SYLLABI

I - Semester
&
II - Semester

I Year course structure -ECE

Semester-I

Course Code	Title of the course	CAT	Periods						Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	E	O	Total				
ECE 111	Engineering Mathematics – I	BS	3	0	0	1	6	10	40	60	100	3
ECE 112	Communicative English	HS	3	0	0	1	2	6	40	60	100	3
ECE 113	Basic Electronics Engineering	ES	3	0	0	1	4	8	40	60	100	3
ECE 114	Principles of Electrical Engineering	ES	3	0	0	1	4	8	40	60	100	3
ECE 115	Problem solving with C	ES	3	0	0	1	3	7	50	50	100	3
ECE 116	English Language Lab	HS	0	0	3	0	3	6	50	50	100	1.5
ECE 117	Problem solving with C – lab.	ES	0	0	3	0	3	6	50	-	50	1.5
ECE 118	Environmental Science (Mandatory non-credit course)	MC	3	0	0	0	1	4	40	60	100	-
Total			18	0	6	5	26	55	350	400	750	18

Semester-II

Course Code	Title of the course	CAT	Periods						Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	E	O	Total				
ECE 121	Engineering Mathematics – II	BS	3	0	0	1	6	10	40	60	100	3
ECE 122	Engineering Physics	BS	3	0	0	1	4	8	40	60	100	3
ECE 123	Engineering Chemistry	BS	3	0	0	1	4	8	40	60	100	3
ECE 124	Network Analysis and Synthesis	ES	3	0	0	1	4	8	40	60	100	3
ECE 125	Engineering Drawing	ES	2	0	3	1	2	8	40	60	100	3.5
ECE 126	Engineering Physics Lab.	BS	0	0	3	0	1	4	50	50	100	1.5
ECE 127	Engineering Chemistry Lab.	BS	0	0	3	0	1	4	50	50	100	1.5
ECE 128	Engineering Workshop	ES	0	0	3	0	1	4	50	50	100	1.5
ECE 129	Biology(Mandatory non-credit course)	MC	2	1	0	0	2	5	50	0	50	-
Total			16	1	12	5	25	59	400	450	850	20

Engineering Mathematics-I	
ECE 111	**Credits:3**
Instruction: 3 Periods & 1 E/Week	Sessional Marks:40
End Exam: 3 Hours	End Exam Marks:60

Course Objectives:

To provide the students with sufficient knowledge in calculus and matrix algebra, which can be used in their respective fields.

Course Outcomes:

By the end of the course student should be able to:	
1.	Solve the system of equations using the rank.
2.	Identify the special properties of a matrix such as the eigen values, eigen vectors, diagonal form and nature of the quadratic forms.
3.	Analyze the behavior of functions by using mean value theorems and estimate the maxima and minima of multivariable functions.
4.	Apply double and triple integration techniques in evaluating areas and volumes bounded by a region and evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates.
5.	Use special functions in evaluation of multiple integrals

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	-	-	-	-	-	-	-	-	-	-	-	1	1	1
	2	3	-	-	-	-	-	-	-	-	-	-	-	1	1	1
	3	3	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	4	3	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	5	3	1	-	-	-	-	-	-	-	-	-	-	1	1	1

SYLLABUS

Unit - I: Linear Equations **(10 Hrs)**

Rank of matrix, normal form of a matrix, PAQ form, Gauss Jordan Method of finding the inverse, consistency of linear system of equations. Learning outcome: At the end of this unit, student will be able to solve the system of equations using the rank.

Unit - II: Linear transformations and Quadratic forms **(14 Hrs)**

Linear transformations, orthogonal transformations, vectors (linearly independent & dependent), eigen values, eigen vectors, properties of eigen values, Cayley - Hamilton theorem (without proof), reduction to diagonal form, reduction of Quadratic form to Canonical form, nature of the Quadratic form.

Unit - III: Single and Multivariable Calculus **(12 Hrs)** Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem (All theorems without proof). Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, Taylor's series expansion of two variable function, maxima and minima of functions of two variables, method of Lagrange's multipliers.

Unit - IV: Multiple Integrals **(14 Hrs)**

Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves, evaluation of triple integrals, volumes of solids, change of variables between cartesian, cylindrical and spherical polar coordinates, area of a curved surface.

Unit - V: Special functions **(10 Hrs)**

Beta and Gamma functions and their properties, relation between Beta and Gamma functions, evaluation of double and triple integrals by using Beta and Gamma functions, error function.

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley& Sons, 2011.

References:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.

Communicative English	
ECE 112	**Credits:3**
Instruction: 3 Periods & 1 E/Week	Sessional Marks:40
End Exam: 3 Hours	End Exam Marks:60

Prerequisites:

Basic English language skills- LSRW at (10+2) / Intermediate Level

Course Objectives:

1. To focus on appropriate reading strategies for comprehension of various forms of texts.
2. To instruct effective strategies for good writing and exhibit the same in writing well organized passages, reports and other forms of business communication
3. To provide knowledge of grammatical structures and vocabulary to be used appropriately in their writing.

Course Outcomes:

By the end of the course, the student will be able to:

CO1 Comprehend, interpret and analyze text and answer questions based on passages.

CO2 Demonstrate good writing skills for effective paraphrasing, argumentative essays and formal correspondence.

CO3 Construct grammatically correct sentences and apply proper vocabulary in speech and writing.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-

SYLLABUS

UNIT I **10 hrs**

Reading: 1. Skimming and Scanning to get the main idea of a text and look for specific information**-**On the Conduct of Life: *William Hazlitt* 2. If- *Rudyard Kipling*

Writing: Paragraph writing (specific topics) using suitable cohesive devices – Unity, logical order, coherence, opening and closing statements.

Grammar: Clauses and Sentences: Sentence structures, use of phrases and clauses in sentences

Vocabulary: The concept of word formation, Acquaintance with prefixes and suffixes

UNIT –II **10 hrs**

Reading: 1. Reading a text in detail by making basic inferences - The Brook: *Alfred Tennyson* 2. How I Became a Public Speaker: *George Bernard Shaw*

Writing: Formal letter writing. Letters of complaint, enquiry, report, invite, placing orders, acknowledgment and follow-up letters.

Grammar: Punctuation: importance of proper punctuation in texts, Articles

Vocabulary: Word building using foreign roots

UNIT –III **10 hrs**
Reading: **1.** Identifying author's purpose and tone - The Death Trap: *Saki* 2. On Saving Time: *Seneca*
Writing: Reports (Structure and content of a project report)
Grammar: Noun-Pronoun Agreement, Subject –Verb agreement, Tenses
Vocabulary: Idiomatic expressions

UNIT –IV **10 hrs**
Reading: Recognizing the difference between facts and opinions **–** 1**.**Chindu Yellama
2. Muhammad Yunus
Writing: structured essays (persuasive and argumentative) using suitable claims and evidences
Grammar: Misplaced Modifiers, adjectives, adverbs
Vocabulary: Synonyms & Antonyms

UNIT –V **12 hrs**
Reading: Reading for inferential comprehension - Politics and the English Language: *George Orwell* 2.The Dancer with a White Parasol: *Ranjana Dave*
Writing: Précis writing (Summarizing-identifying main idea and rephrasing the text), Applying for internship/Writing job applications: Resume and C.V with cover letter
Grammar: Prepositions, correction of sentences.
Vocabulary: Phrasal verbs

Text books:
1. Board of Editors, Language and Life, 1st edition, Oriental Black Swan, 2018.

Reference Books:
1. Sanjay Kumar and Pushpa lata, Communication skills. Oxford University Press. 2011
2. Meenakshi Raman and Sangeetha Sharma, Technical communication, Oxford University Press.
3. Kulbushan Kumar, Effective communication skills, Khanna Publishing House, Delhi.

Basic Electronics Engineering	
ECE 113	**Credits:3**
Instruction: 3 Periods & 1 E/Week	Sessional Marks:40
End Exam: 3 Hours	End Exam Marks:60

Prerequisites: Nil

Course Outcomes:

By the end of the course student should be able to:	
1	Understand the behavior of PN diode under different biasing conditions and breakdown mechanisms.
2	Calculate the efficiency and ripple factor of half wave, Full wave center tapped and Bridge rectifiers with and without filters.
3	Obtain input and output characteristics of BJT in different configurations and identify the region of operation of transistor.
4	Devise the characteristics of FET/MOSFET in different modes.
5	Understand the operation of various other two-terminal devices, SCR, TRIAC, and UJT.

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	2											-	-	1
	2	2	1											-	-	1
	3	1	1											-	-	1
	4	1	1											-	-	1
	5	2	2											-	-	1

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

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Unit-I: Semiconductor diodes **9 periods**

Fermi level in Intrinsic & Extrinsic semiconductors. Mass-Action law. Mobility and conductivity, Hall effect, Generation and recombination of charges, Drift and diffusion current, Band structure of open-circuit p-n junction, V-I characteristics, transition and diffusion capacitance, reverse recovery time, Avalanche and zener breakdown zener diodes, Light Emitting Diodes.

Unit-II: Rectifier circuits **9 periods**

Diode resistance levels, diode equivalent circuits: Piecewise-Linear equivalent circuit, simplified equivalent circuit, Ideal equivalent circuit, Load-Line Analysis, Half wave rectifier, Bridge rectifier, Center-tapped FWR, PIV, efficiency, ripple factor, voltage regulation, capacitor filter.

Unit-III: Bipolar Junction Transistors **9 periods**

Transistor operation. Current Components & Characteristics of Common Base, Common Emitter, Common Collector Configurations. Active, Saturation, Cutoff region regions. Transistor amplifying action. Transistor as a switch.

Unit-IV: Field Effect Transistors **9 periods**

Differences between BJT & FET, Classification, Construction, operation and characteristics of JFET, Parameters of FET. Biasing circuits of JFET. Construction, Operation and characteristics of Depletion- Type MOSFET and Enhancement-type MOSFET

Unit-V: Special semiconductor devices **9 periods**

Schottky barrier diode, Varactor diodes, Tunnel diodes, Photodiodes, Photoconductive cells, Solar cells, SCR, TRIAC, and UJT.

Text Books:

1. R.L.Boylestad, "Electronic Devices and Circuit theory", Pearson Education India, 2015.
2. Millman's Integrated Electronics- Jacob Millman, Christos halkias, Chetan D Prakash; Tata McGraw-Hill, 2012

Reference Books:

1. David A Bell , Electronic Devices and Circuits, Oxford
2. Jacob Millman, Arvin Grabel, Micro Electronics –Tata McGraw-Hill.

Principles of Electrical Engineering	
ECE 114	**Credits:3**
Instruction: 3 Periods & 1 E/Week	Sessional Marks:40
End Exam: 3 Hours	End Exam Marks:60

Course Objectives:

1. To understand the basic laws and elements of electrical engineering.
2. To analyze the electrical planar and non planar networks.
3. To understand the concept of magnetic circuit.

Course Outcomes:

By the end of the course, student will able to:

1 Apply basic laws to understand the electrical circuits.
2 Apply circuit theorems and evaluate power and energy quantities in DC circuits.
3 Evaluate instantaneous, average and rms values of periodic function and to develop phasor diagrams for RL, RC, and RLC circuits.
4 Apply circuit theorems and evaluate power and energy quantities in AC circuits.
5 Understand constructional features and operation of DC machines and 3 phase Induction motor.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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UNIT-I: **(10 periods)**

Electric charge, electric current, Voltage, Ohm's law, Resistance, Inductance and Capacitance parameters, series and parallel combinations of Resistances, Inductances and Capacitances, Current and Voltage sources, Source Transformation, Reference directions and symbols, Network reduction by Delta-Star transformation.

UNIT-II: (**10 periods)**

Elementary Network Theory:

Kirchhoff's laws, Mesh analysis, Nodal analysis, Superposition theorem, Thevenin's and Norton's theorems, Maximum Power Transfer theorem for D.C. circuits.

UNIT-III: **(8 periods)**

AC Circuits: Average and effective values of periodic functions, instantaneous, complex, real and reactive powers, Energy, power factor, Phasor diagrams of R, RL, RC and RLC circuits.

UNIT-IV: **(10 periods)**

Analysis of AC Circuits:

Independent & Dependent Sources, Mesh Analysis, Nodal Analysis, Application of Superposition, Thevenin's, Norton's, Maximum power transfer theorems for A.C circuits.

UNIT-V: **(10 periods)**

Electrical machines: Faraday's law of Electromagnetic induction, Lenz's law, Principle of operation and constructional features of DC machines, emf equation of DC generator, torque expression of a DC motor, production of rotating magnetic field, principle of operation and constructional features of 3 phase Induction Motor, types of 3 phase Induction Motors.

Text books:

1. W. H. Hayt Jr & J. E. Kemmerly, Engineering circuit analysis, 7th edition, Mc Graw Hill publications 2006.
2. M. E. Van Valkenburg, Network analysis, 3rd edition, prentice Hall of India 1974.
3. Nagarath & Kothari, Electrical Machines,TMH publications.

Reference books:

1. J. J. Cathey and S. A. Nasar , Schaum's out line of Basic Electrical Engineering,2nd Edition.

Problem Solving With C	
ECE 115	**Credits:3**
Instruction: 3 Periods & 1 E/Week	Sessional Marks:40
End Exam: 3 Hours	End Exam Marks:60

Course Outcomes:

After completion of this course, a student will be able to:	
1.	Gain knowledge in problem solving and steps in Program development.
2.	Apply the basic concepts of C
3.	Implement different operations on arrays and string to solve any given problem.
4	Demonstrate pointers and modularization
5	Apply structures and unions and Implement file Operations in C programming for any given Application

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	2	2	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	3	2	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	4	2	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	5	2	1	-	-	-	-	-	-	-	-	-	-	1	1	1

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

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UNIT I **10 Periods**

Introduction to Computer Problem-solving : Introduction ,The Problem-solving Aspect, Top-Down Design, Implementation of Algorithms, Program Verification (Text Book 3 Page 1-29 or Reference material 1)

Computer Science as a Career Path : Why Computer Science May be the Right Field for You, The College Experience: Computer Disciplines and Majors to Choose From Career Opportunities.

Electronic Computers Then and Now, Computer Hardware, Computer Software, The Software Development Method, Applying the Software Development Method, Professional Ethics for Computer Programmers. **(Text Book 2 Page 1-39)**

Computer Languages, Writing Editing compiling and linking programs, Program Execution, System Development, Flowcharting, Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Coding Constants, Formatted Input /Output.(**Text Book 1)**

UNIT II **10 Periods**

Number systems-Binary, Decimal, Hexadecimal and Transformations, storing integers and floats. Program – expressions, precedence and Associativity, Side effects, evaluating expressions, mixed type expressions, statements.
Selection –Making Decisions – Logical data and operators, Bitwise Operators- logical bitwise operators, shift operators, bitwise use, Two way selection, Multi way selection
Repetition – concept of a loop, pretest and posttest loops, initialization and updating, event controlled and counter controlled loops, loops in C, loop examples, other statements related to looping, looping applications **(Text Book 1)**

UNIT III **10 Periods**

Arrays – Concepts, using arrays in C, array applications, linear search, and Bubble sort, two – dimensional arrays, multidimensional arrays .Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions **(Text Book 1)**

UNIT IV **10 Periods**

Functions-Designing Structured Programs, Functions in C, user defined functions, standard library functions, scope, Recursion Storage classes-auto, register, static, extern

Pointers – Pointer Applications – Arrays and Pointers, pointer arithmetic and arrays, passing an array to a function, understanding complex declarations, memory allocation functions, array of pointers, programming application selection sort. **(Text Book 1)**

UNIT V **10 Periods**

Derived Types Enumerated, Structure and Union Types – The Type Definition (typedef), Enumerated types, Structures, accessing structures, Complex structures, arrays of structures, structures and functions ,unions
Text Files – Concept of a file, files and streams, input / output functions, formatting input/output functions, character input/output functions, character input/output examples
Binary files – classification of files, using binary files, standard library functions for files, converting file type, file program examples. **(Text Book 1)**

Text Books:

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, Third Edition, Cengage Learning
2. Jeri R. Hanly , Elliot B .Koffman , Problem solving and program Design in C , 7th Edition
3. R.G.Dromey , How to solve it by computer, Prentice-Hall International Series in Computer Science, C.A.R. Hoare Series Editor

Reference Books:

1. An Introduction to Computer Science and problem solving - IT Department Material
2. Dietal & Deital , C How to Program 7/E ,PHI Publications
3. Yashavant Kanetkar , Let Us C, 16th Edition
4. Brian W. Kernighan and Dennis M.Ritchie, The C Programming Language, Prentice Hall of India

English language Lab	
ECE 116	**Credits:1.5**
Instruction: 3 Practical & 3 O /Week	Sessional Marks:50
End Exam: 3 Hours	End Exam Marks:50

Course Outcomes:

By the end of the course, the student will be able to:

CO1 Speak English with proper pronunciation and intonation

CO2 Make effective oral presentations by interpreting and analyzing data, pictures and videos and participate in Group Discussion on general topics

CO3 Make meaningful conversations and follow logical flow of thought; answer questions on key concepts after listening to extended passages.

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

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

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Module- I

The sounds of English **CO1**

1. Practicing correct Pronunciation through IPA, Stress, Intonation, Rhythm

Module –II

Group Discussions **CO2**

1. Purpose, Different roles for participants, Etiquette in a structured GD - Practice GDs

Module –III

Interpersonal Skills **CO3 (Role plays)**

1. Introduction of self and others, making announcements
2. Getting Someone's Attention, and Interrupting Conversations
3. Making Requests and Responding to them, asking for directions

Module –IV

Listening Skills **CO3**

1. Listening to unknown passages – for global understanding, identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.

Module –V

Presentation skills **CO2**

1. Oral Presentations (JAMs) 2. Describing and analysing videos and pictures.3. Interpreting and analysing data from graphs and charts

Text books:

1. Board of Editors, Language and Life, 1st edition, Oriental Black Swan, 2018.

Reference Books:

1. J.K. Gangal. A Practical Course in Effective English Speaking Skills. Prentice Hall India Learning Private Limited, 2012.

Problem Solving with C-Lab	
ECE 117	**Credits:1.5**
Instruction: 3 Practical's & 3 O's / Week	Sessional Marks:50
End Exam: 3 Hours	End Exam Marks:50

Course Outcomes:

After completion of this course, a student will be able to:	
1.	Develop C programs using operators
2.	Write C programs using conditional structures
3	Write C programs using iterative structure arrays and strings
4.	Inscribe C programs that use Pointers to and functions
5.	Develop a c program for implementing user defined types and file processing

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	2	3	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	3	3	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	4	3	1	-	-	-	-	-	-	-	-	-	-	1	1	1
	5	3	1	-	-	-	-	-	-	-	-	-	-	1	1	1

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

LIST OF EXPERIMENTS

MINIMUM SET OF SAMPLE PROGRAMS

1. CONVERTING MILES TO KILOMETERS

PROBLEM STATEMENT: Your summer surveying job requires you to study some maps that give distances in kilometers and some that use miles. You and your coworkers prefer to deal in metric measurements. Write a program that performs the necessary conversion.

Problem Input: miles /* the distance in miles*/
Problem Output: kms /* the distance in kilometers */
Relevant Formula: *1 mile = 1.609 kilometers*

Design algorithm , flow chart ,program using the above data requirements for the given problem.
Try the sample test cases given below :

SAMPLE TEST CASES	INPUT	OUPUT
Test case 1	10	16.09
Test case 2	2	3.218

2. SUPERMARKET COIN PROCESSOR

PROBLEM STATEMENT : You are drafting software for the machines placed at the front of supermarkets to convert change to personalized credit slips. In this draft, the user will manually enter the number of each kind of coin in the collection, but in the final version, these counts will be provided by code that interfaces with the counting devices in the machine.

Problem Inputs
char first, middle, last /* a customer's initials */
int dollars /* number of dollars */
int quarters /* number of quarters */
int dimes /* number of dimes */
int nickels /* number of nickels */
int pennies /* number of pennies */
Problem Outputs
int total_dollars /* total dollar value */
int change /* leftover change */
Additional Program Variables
int total_cents /* total value in cents */
Design algorithm, flow chart ,program using the above data requirements for the given problem Try the sample test cases given below :

TESTING TIP :

To test this program, try running it with a combination of coins that yield an exact dollar amount with no leftover change. For example, 1 dollar, 8 quarters, 0 dimes, 35 nickels, and 25 pennies should yield a value of 5 dollars and 0 cents. Then increase and decrease the quantity of pennies by 1 (26 and 24 pennies) to make sure that these cases are also handled properly.

SAMPLE TEST CASES	INPUT	OUPUT
Test case 1	Type in your 3 initials and press return> JRH JRH, please enter your coin information. Number of $ coins > 2 Number of quarters> 14 Number of dimes > 12 Number of nickels > 25 Number of pennies > 131	JRH Coin Credit Dollars: 9 Change: 26 cents
Test case 2	Type in your 3 initials and press return> JRH JRH, please enter your coin information. Number of $ coins > 3 Number of quarters> 12 Number of dimes > 14 Number of nickels > 50 Number of pennies > 175	JRH Coin Credit Dollars: 11 Change: 26 cents

3.WATER BILL PROBLEM

PROBLEM STATEMENT : Write a program that computes a customer's water bill. The bill includes a $35 water demand charge plus a consumption (use) charge of $1.10 for every thousand gallons used. Consumption is figured from meter readings (in thousands of gallons) taken recently and at the end of the previous quarter. If the customer's unpaid balance is greater than zero, a $2 late charge is assessed as well.

Problem Constants
DEMAND_CHG 35.00 /* basic water demand charge */
PER_1000_CHG 1.10 /* charge per thousand gallons used */
LATE_CHG 2.00 /* surcharge on an unpaid balance */
Problem Inputs
int previous /* meter reading from previous quarter in thousands of gallons */
int current /* meter reading from current quarter */
double unpaid /* unpaid balance of previous bill */
Problem Outputs
double bill /* water bill */
double use_charge /* charge for actual water use */
double late_charge /* charge for nonpayment of part of previous balance */
Relevant Formulas
water bill = demand charge + use charge + unpaid balance+ applicable late charge

Design algorithm , flow chart ,program using the above data requirements for the given problem Try the sample test cases given below :

SAMPLE TEST CASES	INPUT	OUPUT
Test case 1	This program figures a water bill based on the demand charge ($35.00) and a $1.10 per 1000 gallons use charge. A $2.00 surcharge is added to accounts with an unpaid balance. Enter unpaid balance, previous and current meter readings on separate lines after the prompts. Press <return> or <enter> after typing each number. Enter unpaid balance> $71.50 Enter previous meter reading> 4198 Enter current meter reading> 4238	Bill includes $2.00 late charge on unpaid balance of $71.50 Total due = $152.50
Test case 2	This program figures a water bill based on the demand charge ($35.00) and a $1.10 per 1000 gallons use charge. A $2.00 surcharge is added to accounts	Bill includes $2.00 late charge on unpaid balance of $71.50 Total due = $102.00

with an unpaid balance.
Enter unpaid balance, previous and current meter readings on separate lines after the prompts. Press <return> or <enter> after typing each number.
Enter unpaid balance> $51
Enter previous meter reading> 4198
Enter current meter reading> 4137

4. PRIME NUMBER

PROBLEM STATEMENT :Given a positive integer **N**, calculate the sum of all prime numbers between **1** and **N** (inclusive).

Input:
The first line of input contains an integer **T** denoting the number of test cases. T testcases follow. Each test case contains one line of input containing **N**.

Output:
For each test case, in a new line, print the sum of all prime numbers between 1 and N.

Constraints:
1 ≤ T ≤ 100
1 ≤ N ≤ 106

Design algorithm , flow chart ,program using the above data requirements for the given problem Try the sample test cases given below :

SAMPLE TEST CASES	INPUT	OUPUT
Test case 1	2 5 10	10 17
Test case 2	2 7 10	17 17

5. BUBBLE SORT

PROBLEM STATEMENT :The task is to complete bubble function which is used to implement Bubble Sort

Input:
First line of the input denotes the number of test cases 'T'. First line of the test case is the size of array and second line consists of array elements.

Output:
Sorted array in increasing order is displayed to the user.

Constraints:
1 <=T<= 100
1 <=N<= 1000
1 <=arr[i]<= 1000

Design algorithm , flow chart ,program using the above data requirements for the given problem Try the sample test cases given below :

SAMPLE TEST CASES	INPUT	OUPUT
Test case 1	2 5 4 1 3 9 7 10 10 9 8 7 6 5 4 3 2 1	1 3 4 7 9 1 2 3 4 5 6 7 8 9 10
Test case 2	1 5 8 9 3 2 0	0 2 3 8 9

6. TEXT EDITOR

PROBLEM STATEMENT: Design and implement a program to perform editing operations on a line of text. Your editor should be able to locate a specified target substring, delete a substring, and insert a substring at a specified location. The editor should expect source strings of less than 80 characters.

Problem Constant MAX_LEN 100 /* maximum size of a string */
Problem Inputs
char source[MAX_LEN] /* source string */
char command /* edit command */
Problem Output
char source[MAX_LEN] /* modified source string */

Design algorithm , flow chart ,program using the above data requirements for the given problem Try the sample test cases given below :

SAMPLE TEST CASES	INPUT	OUPUT
Test case 1	Enter the source string: > Internet use is growing rapidly. Enter D(Delete), I(Insert), F(Find), or Q(Quit)> d String to delete> growing	New source: Internet use is rapidly
Test case 2	Enter D(Delete), I(Insert), F(Find), or Q(Quit)> F String to find> .	'.' found at position 23

7. ARITHMETIC WITH COMMON FRACTIONS

PROBLEM STATEMENT: You are working problems in which you must display your results as integer ratios; therefore, you need to be able to perform computations with common fractions and get results that are common fractions in reduced form. You want to write a program that will allow you to add, subtract, multiply, and divide several pairs of common fractions.

Design algorithm, flow chart, program using the above data requirements for the given problem
Try the sample test cases given below :

SAMPLE TEST CASES	INPUT 1	OUPUT
Test case 1	Enter a common fraction as two integers separated by a slash> 3/-4	Input invalid—denominator must be positive
Test case 2	Enter a common fraction as two integers separated by a slash> 3/4 Enter an arithmetic operator (+,-,*, or /) > + Enter a common fraction as two integers separated by a slash> 5/8 Entering find_gcd with n1 = 44, n2 = 32 Do another problem? (y/n)>n	gcd of 44 and 32?> 4 find_gcd returning 4 3/4 + 5/8 = 11/8

8. FACTORIAL OF A NUMBER
PROBLEM STATEMENT : Find factorial of a given number n.
Design algorithm , flow chart ,program using the above data requirements for the given problem Try the sample test cases given below :

SAMPLE TEST CASES	INPUT 1	OUPUT
Test case 1	Enter a number to find factorial>2	Factorial of 2 is 4
Test case 2	Enter a number to find factorial>3	Factorial of 3 is 6

9. COLLECTING AREA FOR SOLAR-HEATED HOUSE – FILES AND FUNCTIONS
PROBLEM STATEMENT : An architect needs a program that can estimate the appropriate size for the collecting area of a solar-heated house. Determining collecting area size requires consideration of several factors, including the average number of heating degree days for the coldest month of a year (the product of the average difference between inside and outside temperatures and the number of days in the month), the heating requirement per square foot of floor space, the floor space, and the efficiency of the collection method. The program will have access to two data files. File hdd.txt contains numbers representing the average heating degree days in the construction location for each of 12 months. File solar.txt contains the average solar insolation (rate in BTU/day at which solar radiation falls on one square foot of a given location) for each month. The first entry in each file represents data for January, the second, data for February, and so on.

Problem Inputs
Average heating degree days file
Average solar insolation file
heat_deg_days /* average heating degree days for coldest month */
coldest_mon /* coldest month (number 1 .. 12) */
solar_insol /* average daily solar insolation (BTU/ft^2) for coldest month */

heating_req /* BTU/degree day ft^2 for planned type construction*/
efficiency /* % of solar insolation converted to usable heat */
floor_space /* square feet */

Program Variables

energy_resrc /* usable solar energy available in coldest month (BTUs obtained from 1 ft^2 of collecting area) */

Problem Outputs

heat_loss /* BTUs of heat lost by structure in coldest month */
collect_area /* approximate size (ft^2) of collecting area needed*/

The formula for approximating the desired collecting area (A) is :

A= heat loss / energy resource

Design algorithm , flow chart ,program using the above data requirements for the given problem

Try the sample test cases given below :

SAMPLE TEST CASES	INPUT	OUPUT
Test case 1	What is the approximate heating requirement (BTU / degree day ft^2) of this type of construction? =>9 What percent of solar insolation will be converted to usable heat? => 60 What is the floor space (ft^2)? => 1200	To replace heat loss of 11350800 BTU in the coldest month (month 12) with available solar insolation of 500 BTU / ft^2 / day, and an efficiency of 60 percent, use a solar collecting area of 1221 ft^2.
Test case 2	What is the approximate heating requirement (BTU / degree day ft^2) of this type of construction? =>10 What percent of solar insolation will be converted to usable heat? => 60 What is the floor space (ft^2)? => 1200	To replace heat loss of 12612000 BTU in the coldest month (month 12) with available solar insolation of 500 BTU / ft^2 / day, and an efficiency of 60 percent, use a solar collecting area of 1221 ft^2.

Q10. UNIVERSAL MEASUREMENT CONVERSION

PROBLEM STATEMENT: Design a program that takes a measurement in one unit (e.g., 4.5 quarts) and converts it to another unit (e.g., liters). For example, this conversion request 450 km miles would result in this program output Attempting conversion of 450.0000 km to miles . . . 450.0000km = 279.6247 miles . The program should produce an error message if a conversion between two units of different classes (e.g., liquid volume to distance) is requested. The program should take a database of conversion information from an input file before accepting conversion problems entered interactively by the user. The user should be able to specify units either by name (e.g., kilograms) or by abbreviation (e.g., kg).

Structured Data Type

unit_t members :

```
name      /* character string such as "milligrams"          */
abbrev    /* shorter character string such as "mg"          */
class     /* character string "liquid_volume", "distance", or "mass"   */
standard  /* number of standard units that are  equivalent to this unit  */
```

Problem Constants

```
NAME_LEN     30   /* storage allocated for a unit name         */
ABBREV_LEN   15   /* storage allocated for a unit   abbreviation   */
CLASS_LEN    20   /* storage allocated for a      measurement class      */
MAX_UNITS    20   /* maximum number of different units    handled       */
```

Problem Inputs

```
unit_t units[MAX_UNITS]  /* array representing unit conversion factors database      */
double quantity          /* value to convert       */
char old_units[NAME_LEN] /* name or abbreviation of units to be converted      */
char new_units[NAME_LEN] /* name or abbreviation of units to  convert to     */
```

Problem Output

Message giving conversion.

Data file units.txt:

```
miles          mi        distance       1609.3
kilometers     km        distance       1000
yards          yd        distance       0.9144
meters         m         distance       1
quarts         qt        liquid_volume  0.94635
liters         l         liquid_volume  1
gallons        gal       liquid_volume  3.7854
milliliters    ml        liquid_volume  0.001
kilograms      kg        mass           1
grams          g         mass           0.001
slugs          slugs     mass           0.14594
pounds         lb        mass           0.43592
```

Design algorithm , flow chart ,program using the above data requirements for the given problem

Try the sample test cases given below :

SAMPLE TEST CASES	INPUT 1	OUPUT
Test case 1	Enter a conversion problem or q to quit. To convert 25 kilometers to miles, you would enter > 25 kilometers miles or, alternatively,	>450 km miles Attempting conversion of 450.0000 km to miles . . . 450.0000km = 279.6247 miles

	> 25 km mi	
Test case 2	Enter a conversion problem or q to quit. > 2.5 qt l Attempting conversion of 2.5000 qt to l . . . 2.5000qt = 2.3659 l Enter a conversion problem or q to quit.	> 100 meters gallons Attempting conversion of 100.0000 meters to gallons . . . Cannot convert meters (distance) to gallons (liquid_volume)

ADDITIONAL PROGRAMS
Problem solving programs:

1. Chocolate feast : Little Bob loves chocolates, and goes to a store with $N in his pocket. The price of each chocolate is $C. The store offers a discount: for every M wrappers he gives to the store, he gets one chocolate for free. How many chocolates does Bob get to eat? Note : Evaluate the number of wraps after each step. Do this until you have enough wraps to buy new chocolates.
2. Angry Professor : The professor is conducting a course on Discrete Mathematics to a class of N students. He is angry at the lack of their discipline, and he decides to cancel the class if there are less than K students present after the class starts. Given the arrival time of each student, your task is to find out if the class gets cancelled or not.
3. Divisible Sum Pairs : You are given an array of n integers and a positive integer, k. Find and print the number of (i,j) pairs where i < j and ai + aj is evenly divisible by k.
4. Sherlock And Valid String: A "valid" string is a string S such that for all distinct characters in S each such character occurs the same number of times in S. Note :The logic of the solution is as follows: count the character counts for each character. Note : if they are all equal – it means that all characters occur exactly N times and there is no removal needed .if 2 or more have less or more characters – there is no way to fix the string in just 1 removal . if exactly 1 char has a different count than all other characters – remove this char completely and S is fixed.
5. Ice Cream Parlor :Sunny and Johnny together have M dollars they want to spend on ice cream. The parlor offers N flavors, and they want to choose two flavors so that they end up spending the whole amount. You are given the cost of these flavors. The cost of the ith flavor is denoted by ci. You have to display the indices of the two flavors whose sum is M.
6. 'Missing Numbers' : Numeros, the Artist, had two lists A and B, such that B was a permutation of A. Numeros was very proud of these lists. Unfortunately, while transporting them from one exhibition to another, some numbers from A got left out. Can you find the numbers missing?
7. Alternating Characters: John likes strings in which consecutive characters are different. For example, he likes ABABA, while he doesn't like ABAA. Given a string containing characters A and B only, he wants to change it into a string he likes. To do this, he is allowed to delete the characters in the string.
8. Game Of Thrones : I : Dothraki are planning an attack to usurp King Robert's throne. King Robert learns of this conspiracy from Raven and plans to lock the single door through which the enemy can enter his kingdom door. But, to lock the door he needs a key that is an anagram of a palindrome. He starts to go through his box of strings,

checking to see if they can be rearranged into a palindrome.For example, given the string ,s=[aabbccdd] one way it can be arranged into a palindrome is abcddcba .

9. Life and everything : Your program is to use the brute-force approach in order to find the Answer to Life, the Universe, and Everything. More precisely... rewrite small numbers from input to output. Stop processing input after reading in the number 42. All numbers at input are integers of one or two digits.
   input: 1 2 23 22 42
   output: 1 2 23 22
10. Filling Jars : Animesh has N empty candy jars, numbered from 1 to N, with infinite capacity. He performs M operations. Each operation is described by 3 integers a, b and k. Here, a and b are indices of the jars, and k is the number of candies to be added inside each jar whose index lies between a and b (both inclusive). Can you tell the average number of candies after M operations?

Reference Books:

1. Jeri R. Hanly , Elliot B .Koffman , Problem solving and program Design in C , 7th Edition
2. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, Third Edition, Cengage Learning.
3. Dietal & Deital , C How to Program 7/E ,PHI Publications

Web References :

1. https://www.spoj.com/
2. https://projecteuler.net/
3. https://www.hackerearth.com/practice/
4. https://www.codechef.com/
5. https://onlinecourses.nptel.ac.in/

Instructions to the instructor:

This lab course consists of two set of programs
1) Minimum set of sample programs
2) Additional set of programs

Minimum set of sample programs are designed unit wise covering all the topics in the theory .
Additional set of programs are designed basing on problem solving

Sessional marks : 50 marks
1) Daily Evaluation (Includes Record, Observation & regular performance) – 30 marks
2) Attendance – 5 marks
3) Internal Exam – 10 marks
4) Viva Voce – 5 marks

Daily Evaluation (30 marks)

Every Student must execute minimum set of sample programs to secure 60% of marks in Daily Evaluation i.e. 18 Marks and to appear in external examination.
In addition to that if a student finishes the minimum set and 5 programs from additional set of programs would secure 80% of marks in Daily Evaluation i.e. 24 Marks.
If a student finishes all the programs in both the set s will secure 100% of marks in Daily

Evaluation

Internal Exam (10 marks)

- Every student is given 4 questions in the internal exam out of which the difficulty level of 2 questions is easy / medium and 2 questions of difficulty level is high
- Each easy / medium level question carries 20% of marks and difficulty level question carries 30% of marks

External Exam (50 marks)

- Viva voce – 10 marks
- Write up + Execution – 40 marks

Write up + Execution (40 marks)

- Every student is given 4 questions in the external exam out of which the difficulty level of 2 questions is easy / medium and 2 questions of difficulty level is high
- Each easy / medium level question carries 30% of marks and difficulty level question carries 20% of marks

ENGINEERING MATHEMATICS-II	
ECE 121	**Credits:3**
Instruction: 3 Periods & 1 E/Week	Sessional Marks:40
End Exam: 3 Hours	End Exam Marks:60

Course Objectives:

- Create and analyze mathematical models using first and higher order differential equations to solve application problems such as electrical circuits, orthogonal trajectories and Newton's law of cooling
- Familiarization in numerical analysis such as interpolation, numerical differentiation, integration and direct methods for solving linear system of equations.

Course Outcomes:

By the end of the course student should be able to:	
1.	Solve the first order differential equations and solve basic application problems described by first order differential equations.
2.	Solve the complete solution of linear differential equations with constant coefficient and solve basic application problems described by second order linear differential equations with constant coefficients.
3.	Find numerical solution to a system of equations by using different methods.
4.	Find derivate and integration of a function by using different numerical methods.

		PO												**PSO**		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	2	-	-	-	-	-	-	-	-	-	-	1	1	1
	2	3	2	-	-	-	-	-	-	-	-	-	-	1	1	1
	3	3	2	-	-	-	-	-	-	-	-	-	-	1	1	1
	4	3	2	-	-	-	-	-	-	-	-	-	-	1	1	1
	5	3	2	-	-	-	-	-	-	-	-	-	-	1	1	1

5.	Examine the properties of Laplace transformation and evaluate ordinary differential equations by using Laplace transformation technique. Also apply the Laplace and inverse Laplace transformations for different types of functions.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

SYLLABUS

Unit - I: Differential equations of first order and its applications (12 Hrs)

First order linear differential equations, Bernoulli's equations, exact differential equations, equations reducible to exact equations, orthogonal trajectories, simple electric circuits (L –R circuit problems), Newton's law of cooling.

Unit - II: Higher order Linear Differential Equations and its applications (12 Hrs) Definitions, rules for finding the complementary function, rules for finding the particular integral, method of variation of parameters, equations reducible to linear equations with constant coefficient, Cauchy's homogeneous linear equation, Legendre's linear equation. Applications: L – C – R circuit problems.

Unit - III: Numerical solutions of algebraic and transcendental equations (12 Hrs)

Solution of algebraic equation by Bisection method, Newton-Raphson, Regula-Falsi methods. Solution of simultaneous linear algebraic equations, Gauss elimination, Gauss Jordan, Gauss Seidel.

Unit - IV: Interpolation, Numerical Differentiation & Integration (12 Hrs)

Interpolation, Newton forward and backward interpolation formula, Lagrange's formula for unequal intervals. Numerical differentiation - Newton's forward and backward differences to compute first and second derivatives. Numerical integration - Trapezoidal rule, Simpson's one third rule and three eighth rules.

Unit - V: Laplace Transforms and its applications (12 Hrs)

Introduction, definitions, transforms of elementary functions, properties of Laplace transforms, transforms of periodic functions, transforms of derivatives, transforms of integrals, Multiplication by t, division by t, evaluation of integrals by Laplace transforms. Inverse Laplace transforms

– other methods of finding inverse transforms (excluding residue method), Convolution theorem (without proof), application's to differential equations, unit step function (without proof) and unit Impulsive functions (without proof).

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley& Sons, 2011.

Reference books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.

ENGINEERING PHYSICS	
ECE 122	**Credits:3**
Instruction: 3 Periods & 1 E/Week	Sessional Marks:40
End Exam: 3 Hours	End Exam Marks:60

Course Objectives

1. To impart knowledge in basic concepts of physics relevant to engineering applications
2. To introduce advances in technology for engineering applications

Course Outcomes:

By the end of the course, the student will be able to:

CO1	Design and conduct simple experiments as well as analyze and interpret data in engineering applications
CO2	Acquire capability to understand advanced topics in engineering
CO3	Identify formula and solve engineering problems
CO4	Apply quantum physics to electrical phenomena

		PO												**PSO**		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
	2	3	3	-	-	-	-	-	-	-	--	-	-	-	-	1
	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	1
	4	3	1	-	-	-	-	-	-	-	-	-	-	-	-	1

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

SYLLABUS

UNIT - I

Thermodynamics: 10 periods

Heat and work, first law of thermodynamics and its applications, reversible and irreversible processes, heat engine, Carnot cycle and its efficiency, Carnot's theorem, second law of thermodynamics, entropy – entropy change in reversible and irreversible processes, entropy and second law, entropy and disorder, entropy and probability, third law of thermodynamics

Physics Resnick & Halliday Volume I Wiley India Publications
A text book of Engineering Physics -- M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT-II 10 periods

Electromagnetism:

Faraday's law of induction , Lenz's law, Integral and differential forms of Faraday's law , self-inductance, energy stored in electric and magnetic fields, Poynting vector, displacement current, Maxwell's equations in integral form (no derivation), wave equation, propagation of electromagnetic waves in free space

Physics - Resnick & Halliday Volume II Wiley India Publications
Ultrasonics: Properties of ultrasonic waves, production of ultrasonic waves by magnetostriction and piezoelectric methods, applications of ultrasonics

A text book of Engineering Physics -- M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT–III 10 periods

Optics

Interference: Introduction, principle of superposition, coherence, Young's double slit experiment, conditions for interference, interference in thin films by reflection, wedge shaped film and Newton's rings

Diffraction: Introduction, Fresnel and Fraunhofer diffraction, diffraction at a single slit

Polarisation: Introduction, types of polarized light, double refraction in uniaxial crystals, Nicol's prism, quarter and half-wave plate, production and detection of plane, circular and elliptically polarized light

A text book of Engineering Physics M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT–IV 10 periods

Lasers: Introduction, characteristics of a laser beam, spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, semiconductor laser, applications of lasers

Fibre optics: Introduction to optical fibers, principle of propagation of light in optical fibers,, acceptance angle and acceptance cone, numerical aperture, types of optical fibers, modes of propagation and refractive index profiles, attenuation in optical fibers, advantages of optical fibers in communications, fiber optics communication system, applications of optical fibers, fiber optic sensors

Engineering Physics -- S.L.Gupta & Sanjeev Gupta , Dhanpat Rai Publications

UNIT–V 10 periods

Quantum mechanics:

Planck's hypothesis, wave-particle duality, introduction to quantum theory, de-Broglie concept of matter waves, Heisenberg's uncertainty principle, Schrodinger's time independent and time dependent wave equations, physical significance and properties of the wave function ψ , application of Schrodinger wave equation for a particle in one dimensional well – Eigen wave functions and energy Eigen values of the particle

Elements of Statistical mechanics: Elementary concepts of Maxwell-Boltzman , Bose-Einstein and Fermi-Dirac statistics (no derivation)

Engineering Physics -- S.L.Gupta & Sanjeev Gupta , Dhanpat Rai Publications

Reference Books:

1. V. Rajendran, Engineering physics, McGrawHill Education Private Ltd
2. S.O.Pilai , Sivakami, Engineering Physics, New Age International Publishers
3. Young & Freedman, University Physics, Pearson Education

4. A.Marikani, Engineering Physics, PHI Learning Private Limited

NETWORK ANALYSIS AND SYNTHESIS	
ECE 124	**Credits:3**
Instruction: 3 Periods & 1 E/Week	Sessional Marks:40
End Exam: 3 Hours	End Exam Marks:60

Prerequisites: Nil

Course Objectives:

- To understand the basic laws and elements of electrical engineering.
- To analyze the electrical planar and non planar networks .
- To understand the concept of magnetic circuit.

Course Outcomes:

By the end of the course student should be able to:	
1	Identify the parameters of the two port networks and coupled circuits.
2	Analyze the effect of resonance and study of 3 phase circuits.
3	Measure and analyze the transients in DC circuits.
4	Write the Laplace transform equations and apply them to single port and two port networks.
5	Realize a physical network for a given immittance function.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	-	-												
	2	3	-	-												
	3	3	-	-												
	4	3	-	-												
	5	3	-	-												

SYLLABUS

UNIT-I: (10 periods)

Coupled Circuits: Magnetically coupled circuits, dot convention.
Two-port Networks: Z, Y, H, T Parameters of two port networks.

UNIT-II: (10 periods)

Resonance: Series and parallel resonant circuits, bandwidth and Q-factor.
Three phase circuits: 3 phase balanced circuits.

UNIT-III: (10 periods)

DC Transients: Source free RL & RC circuits, Driven RL & RC circuits, Natural and forced response of RL & RC circuits. Source free and driven RLC circuits, Natural and forced response of RLC circuits.

UNIT-IV: **(10 periods)**

Laplace Transform:

Introduction to Laplace transform, Initial and final value theorems, Application of Laplace transforms to electrical circuits.

Network function:

Network function for single port and two port networks, poles and zeros, scaling of network functions, Positive real functions and their properties.

UNIT-V: **(8 periods)**

Network Synthesis: Elementary Synthesis Operation, LC Network Synthesis, Properties of RC Network Functions, Foster and Cauer Forms of RC and RL Networks.

Text books:

1. W. H. Hayt Jr & J. E. Kemmerly, Engineering circuit analysis, 7th edition, Mc Graw Hill publications 2006.
2. M. E. Van Valkenburg, Network analysis, 3rd edition, prentice Hall of India 1974.
3. M.E. Van Valkenburg,Modern network synthesis,Wiley Eastern limited.

Reference books:

1. C. K. Alexander & M. N. O. Sadiku, Fundamentals of Electric Circuits, 5th Edition, McGraw-Hill publishers.
2. Gopal.G. Bhise, Engineering Network Analysis & Filter Design, Umesh Publications.

ENGINEERING PHYSICS LAB	
ECE 126	**Credits:1.5**
Instruction: 3 Practical's /Week	Sessional Marks:50
End Exam: 3 Hours	End Exam Marks:50

Prerequisites: Nil

Course Objectives:

To enable the students to acquire skill, technique and utilization of the Instruments

Course Outcomes:

By the end of the course student should be able to:	
1	Design and conduct experiments as well as to analyze and interpret data.
2	Identify, solve and apply fundamental principles of physics to solve engineering problems

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	-	-	-	3											
	2	3	3	-	-											

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

SYLLABUS

List of experiment (any eight to ten experiments have to be completed)

1. Determination of coefficient of thermal conductivity of a bad conductor- Lee's method.
2. Determination of radius of curvature of a convex lens - Newton's rings.
3. Determination of wavelengths of spectral lines in mercury spectrum-using diffraction grating in normal incidence position.
4. Determination of Cauchy's constants of the material of the prism using spectrometer.
5. Determination of thickness of a thin paper by forming parallel interference fringes-Wedge method.
6. Study of variation of magnetic field along the axis of a current carrying circular coil – Stewart and Gee's apparatus
7. Calibration of a low-range voltmeter using potentiometer.
8. Verification of laws of resistance and determination of specific resistance of wire by using Carey- Foster's bridge.
9. Determination of refractive indices o-ray and e-ray in quartz crystal (double refraction)

10. Determination of the frequency of an electrically maintained tuning fork - Melde's experiment.
11. Determination of Rydberg constant using hydrogen discharge tube.
12. Characteristics of photo cell and determination of Planck's constant –Photoelctric effect.
13. Determination of e/m of an electron by Thomson's method
14. Determination of band gap of semiconductor.

Text Books:

1. Physics Laboratory Manual Prepared by Department of Physics ANITS

Reference books:

1. D.P Siva Ramaiah and V. Krishna Murthy, Practical physics, Maruti book Depot
2. A.R Vegi, Comprehensive practical Physics, Vegi Publishers Pvt.Ltd

ENGINEERING WORKSHOP	
ECE 128	**Credits:1.5**
Instruction: 3 Practical's /Week	Sessional Marks:50
End Exam: 3 Hours	End Exam Marks:50

Prerequisites: Nil

Course Objectives:

To provide training and hands on experience to the students on basic Engineering related skills like carpentry, fitting, tin smithy, house wiring and soldering.

Course Outcomes:

By the end of the course student should be able to:	
1	Make different carpentry joints.
2	Make simple fitting jobs.
3	Make simple jobs like funnel, elbow etc. using sheet metal.
4	Understand and build circuits for different types of applications like stair case wiring, godown wiring.
5	Make simple circuits on bread board using soldering kit

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	-	-	-	1											
	2	-	-	-	1											
	3	-	-	-	1											
	4	-	-	-	1											
	5	-	-	-	1											

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes:

SYLLABUS

LIST OF EXPERIMENTS

Minimum of two exercises has to be conducted from each trade.

Trade:

Carpentry
1. Cross Lap Joint
2. Dovetail Joint
3. Mortise and Tennon Joint
4. Briddle Joint

Fitting
1. V Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Tin Smithy	1. Taper Tray 2. Square Box without lid 3. Elbow 4. Funnel
House Wiring	1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Godown wiring
Soldering	1.LED bulb 2. Dc motor with pot 3. De soldering PCB
PCB design	1.

Reference books

1. S.K.Hajra Choudhury, Elements of Workshop Technology Vol I Manufacturing Processes, ISBN: 8185099146, 2017.