COURSE CURRICULUM R-19
CSE (4 Year B.Tech Programme) - Total Credits:160

I Year Course structure												
Semester - I												
Course Code	**Title of the course**	**Category**	**Periods**						**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**E**	**O**	**Total**				
CSE111	Engineering Mathematics – I	BS	3	0	0	1	6	10	40	60	100	3
CSE112	Communicative English	HS	3	0	0	1	3	7	40	60	100	3
CSE113	Basic Electronics Engineering	ES	3	0	0	1	3	7	40	60	100	3
CSE114	Digital Logic Design	ES	3	0	0	1	3	7	40	60	100	3
CSE115	Problem Solving With C	ES	3	0	0	1	3	7	40	60	100	3
CSE116	English Language Lab	HS	0	0	3	0	1	4	50	50	100	1.5
CSE117	Problem solving with C – lab.	ES	0	0	3	0	3	6	50	50	100	1.5
CSE118	Environmental Science (Mandatory non-credit course)	BS	3	0	0	0	1	4	50	-	50	-
Total			**18**	**0**	**6**	**5**	**23**	**52**	**350**	**400**	**750**	**18**

Semester - II												
Course Code	**Title of the course**	**Category**	**Periods**						**Sessional Marks**	**Semester end Exam marks**	**Total Marks**	**Credits**
			L	**T**	**P**	**E**	**O**	**Total**				
CSE121	Engineering Mathematics – II	BS	3	0	0	1	6	10	40	60	100	3
CSE122	Engineering Physics	BS	3	0	0	1	4	8	40	60	100	3
CSE123	Engineering Chemistry	BS	3	0	0	1	4	8	40	60	100	3
CSE124	Elements Of Elecrical Engineering	ES	3	0	0	1	4	8	40	60	100	3
CSE125	Engineering Drawing	ES	2	0	3	1	4	10	40	60	100	3.5
CSE126	Engineering Physics Lab.	BS	0	0	3	0	1	4	50	50	100	1.5
CSE127	Engineering Chemistry Lab.	BS	0	0	3	0	1	4	50	50	100	1.5
CSE128	Engineering Workshop	ES	0	0	3	0	1	4	50	50	100	1.5
CSE129	Human Values and Professional Ethics(Mandatory non-credit course)	HS	3	0	0		1	4	50	-	50	-
Total			**17**	**0**	**12**	**5**	**26**	**60**	**400**	**450**	**850**	**20**

II Year Course structure

Semester - I

CODE	SUBJECT NAME	Category	Periods						Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	E	O	Total				
CSE 211	DATA STRUCTURES&ALGORITHMS	PC	2	1	0	1	4	8	40	60	100	3
CSE 212	COMPUTER ORGANIZATION	PC	3	0	0	1	4	8	40	60	100	3
CSE 213	JAVA PROGRAMMING	PC	3	0	0	1	4	8	40	60	100	3
CSE 214	DATA COMMUNICATION	PC	3	0	0	1	4	8	40	60	100	3
CSE 215	DISCRETE MATHEMATICAL STRUCTURES	BS	3	0	0	1	4	8	40	60	100	3
CSE 216	DESIGN THINKING & PRODUCT INNOVATION	ES	2	0	2	1	3	8	40	60	100	3
CSE 217	JAVA PROGRAMMING LAB	PC	0	0	3	0	2	5	50	50	100	1.5
CSE 218	DATA STRUCTURES LAB USING C	PC	0	0	3	0	2	5	50	50	100	1.5
Total			**16**	**1**	**8**	**6**	**27**	**58**	**340**	**460**	**800**	**21**

Semester - II

CODE	SUBJECT NAME	Category	Periods						Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	E	O	Total				
CSE 221	PROBABILITY , STATISTICS AND QUEUING THEORY	BS	3	0	0	1	6	10	40	60	100	3
CSE 222	MICROPROCESSOR & INTERFACING	PC	2	1	0	2	4	9	40	60	100	3
CSE 223	OPERATING SYSTEMS	PC	3	0	0	1	4	8	40	60	100	3
CSE 224	COMPUTER NETWORKS	PC	3	0	0	1	4	8	40	60	100	3
CSE 225	COMPUTER GRAPHICS	PC	2	1	0	1	4	8	40	60	100	3
CSE 226	FORMAL LANGUAGES AND AUTOMETA THEORY	PC	2	1	0	1	2	6	40	60	100	3
CSE 227	MICRO PROCESSOR INTERFACING LAB	***PC***	0	0	**3**	**0**	**1**	4	**50**	**50**	**100**	1.5
CSE 228	OPERATING SYSTEM LAB	***PC***	0	0	**3**	**0**	**1**	4	**50**	**50**	**100**	1.5
Total			**15**	**3**	**6**	**7**	**26**	**57**	**340**	**460**	**800**	**21**

III Year Course structure

Semester - I

CODE	SUBJECT NAME	Category	Periods						Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	E	O	Total				
CSE 311	OPEN ELECTIVE-I*	OE	3	0	0	1	2	6	40	60	100	3
CSE 312	PROFESSIONAL ELECTIVE -I	PE	3	0	0	1	2	6	40	60	100	3
CSE 313	COMPETITIVE PROGRAMMING	PC	2	1	0	1	5	9	40	60	100	3
CSE 314	COMPILER DESIGN	PC	2	1	0	1	4	8	40	60	100	3
CSE 315	DATA BASE MANAGEMENT SYSTEMS	PC	3	0	0	1	4	8	40	60	100	3
CSE 316	DESIGN & ANALYSIS OF ALGORITHMS	PC	2	1	0	1	4	8	40	60	100	3
CSE 317	QUANTITATIVE &VERBAL APTITUDE-I	HS	0	0	3	1	3	7	100	0	100	1.5
CSE 318	DATA BASE MANAGEMENT SYSTEMS LAB	PC	0	0	3	0	1	4	50	50	100	1.5
CSE 319	COMPETITIVE PROGRAMMING LAB	PC	0	0	3	0	1	4	50	50	100	1.5
Total			**15**	**3**	**9**	**7**	**26**	**60**	**390**	**410**	**800**	**22.5**

Semester - II

CODE	SUBJECT NAME	Category	Periods						Sessionals Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	E	O	Total				
CSE 321	OPEN ELECTIVE -II*	OE	3	0	0	1	2	6	40	60	100	3
CSE 322	PROFESSIONAL ELECTIVE -II	PE	3	0	0	1	2	6	40	60	100	3
CSE 323	PROFESSIONAL ELECTIVE -III	PE	3	0	0	1	2	6	40	60	100	3
CSE 324	OBJECT ORIENTED SOFTWARE ENGINEERING	PC	3	0	0	1	4	8	40	60	100	3
CSE 325	WEB TECHNOLOGIES	PC	2	1	0	1	4	8	40	60	100	3
CSE 326	CRYPTOGRAPHY AND NETWORK SECURITY	PC	3	0	0	1	4	8	40	60	100	3
CSE 327	Quantitative Aptitude-II& SoftSkills	HS	0	0	3	2	3	8	100	0	100	1.5
CSE 328	WEB TECHNOLOGIES LAB	PC	0	0	3	0	1	4	50	50	100	1.5
CSE 329	OBJECT ORIENTED SOFTWARE ENGINEERING LAB	PC	0	0	3	0	1	4	50	50	100	1.5
Total			**17**	**1**	**9**	**8**	**23**	**58**	**390**	**410**	**800**	**22.5**

*Open Elective can be Inter Department Disciplinary Course, Emerging Courses or MOOC. Final decision will be taken by the department.

IV Year Course structure

Semester - I

CODE	SUBJECT NAME	Category	Periods						Sessionals Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	E	O	Total				
CSE 411	OPEN ELECTIVE -III*	OE	3	0	0	1	2	6	40	60	100	3
CSE 412	PROFESSIONAL ELECTIVE -IV	PE	3	0	0	1	2	6	40	60	100	3
CSE 413	PROFESSIONAL ELECTIVE -V	PE	3	0	0	1	2	6	40	60	100	3
CSE 414	MANAGEMENT PRINCIPLES	HS	3	0	0	0	2	5	40	60	100	3
CSE 415	DATA ANALYTICS	PC	2	1	0	1	4	8	40	60	100	3
CSE 416	CRYPTOGRAPHY & NETWORK SECURITY LAB	PC	0	0	3	0	1	4	50	50	100	1.5
CSE 417	DATA ANALYTICS LAB	PC	0	0	3	0	1	4	50	50	100	1.5
CSE 418	PROJECT -I	PR	0	0	3	0	3	6	100	0	100	2
CSE 419	SUMMER INTERNSHIP-INDUSTRY	PR	0	0	0	0	1	1	100	0	100	1
Total			14	1	9	4	18	46	500	400	900	21

Semester - II

CODE	SUBJECT NAME	Category	Periods						Sessionals Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	E	O	Total				
CSE 421	OPEN ELECTIVE -IV*	OE	3	0	0	1	3	7	40	60	100	3
CSE 422	PROFESSIONAL ELECTIVE -VI/MOOC	PE	3	0	0	1	3	7	40	60	100	3
CSE 423	PROJECT -II	PR	0	0	9	0	9	18	100	100	200	8
Total			**6**	**0**	**9**	**2**	**15**	**32**	**180**	**220**	**400**	**14**

Total Credits 160

*Open Elective can be Inter Department Disciplinary Course, Emerging Courses or MOOC. Final decision will be taken by the department.

		PE1	PE2	PE3	PE4	PE5	PE6
Track 1	Programming and Application Development	Mobile Application Development	Full Stack Web Development	Cloud Application Development and Deployment	Microservices	Principles of Programming Languages	User Experience Design
Track 2	Artificial Intelligence	Artificial Intelligence	Machine Learning & Deep Learning	Data warehousing and Data mining	Intelligent Agents	Bussiness Intelligence	Social Network Analysis
Track 3	Computer Networks and Engineering	Parallel Computing	Embedded Systems	Mobile and Cellular Networks	Embedded Control Systems Design	Microprocessor Design	IOT
Track 4	Systems Engineering	Parallel and Distributed Systems	Virtual Machine essentials	Real-time Systems	Cyber Security and Digital Forensics essentials	Block chain Fundamentals	Edge Computing
Track 5	Virtual and Augmented Reality	Image Processing	Computer Graphics and 3D Design & Printing	Multimedia & Animation	Human Computer Interaction	Virtual, Augmented and Mixed Reality	Gamification
Track 6	Data Processing	Data warehousing and Data mining	Information Modelling and Database Design	Advanced Databases (Parallel, Multimedia, Distributed)	(Left blank for future choice)		

ENGINEERING MATHEMATICS-I

MATRIX ALGEBRA & MULTIVARIABLE CALCULUS

Common to all branches

Course Code - Category: CSE 111 - BS **Credits:3**

L	T	P	E	O
3	0	0	1	6

Sessional Marks:40

End Exam: 3 Hours End Exam Marks:60

Course Objective:

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

Course outcomes:

By the end of the semester, the student will be able to:	
CO1	Apply elementary transformations to reduce the matrix into the echelon form and normal form to determine its rank and interpret the various solutions of system of linear equations
CO2	Identify the special properties of a matrix such as the eigen value, eigen vector, employ orthogonal transformations to express the matrix into diagonal form, quadratic form and canonical form
CO3	Equip themselves familiar with the functions of several variables and mean value theorems
CO4	Evaluatedoubleandtripleintegralstechniquesoveraregion in twodimensionalandthree dimensional geometry
CO5	Familiarize with special functions to evaluate some proper and improper integrals using beta and gamma functions

SYLLABUS

Unit - I: Linear Equations **10 Periods**

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: Lineartransformations and Quadratic forms **14 Periods**

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.

Learning outcome: At the end of this unit, student will be able to

- Identify the special properties of a matrix such as the eigen values, eigen vectors, diagonal form

and nature of the quadratic forms.

Unit - III: Single and Multivariable Calculus **12 Periods**

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 expansionoftwovariable function, maxima and minimaof functionsoftwovariables, methodofLagrange's multipliers.

Learning outcome: At the end of the unit, student will be able to

- Analyze the behavior of functions by using mean value theorems.
- Estimate the maxima and minima of multivariable functions.

Unit - IV: Multiple Integrals **14 Periods**

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 cartesia cylindrical and spherical polar coordinates, calculation of mass, center of gravity.

Learning outcome: At the end of the unit, the student will be able to

- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates.
- Apply double and triple integration techniques in evaluating areas and volumes bounded by a region.

Unit - V: Special functions **10 Periods**

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, errorfunction.

Learning outcome: At the end of this unit, the student will be able to

- conclude the use of special functions in multiple integrals.

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. **N. P. Bali**, –*Engineering Mathematics”*, Lakshmi Publications.
2. **George B. Thomas, Maurice D. Weir and Joel Hass**, –*Thomas Calculus”*, 13/e, Pearson Publishers, 2013.
3. **H. K. Dass**, –Advanced Engineering Mathematics‖, S. Chand and complany Pvt. Ltd.
4. **Michael Greenberg**, –*Advanced Engineering Mathematics”*, Pearson, Second Edition.

COMMUNICATIVE ENGLISH

Common for all branches

Course Code - Category: CSE 112 - HS

L	T	P	E	O
3	0	0	1	3

Credits:3

Sessional Marks:40

End Exam: 3 Hours

End Exam Marks:60

Prerequisites:

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

Course Objectives

- To focus on appropriate reading strategies for comprehension of various forms of texts.
- To instruct effectives strategies for good writing and exhibit the same in writing well organized passages, reports and other forms of business communication
- 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.

UNIT- I **10 Periods**

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* –**CO1**

Writing: Paragraph writing (specific topics) using suitable cohesive devices – Unity, logical order, coherence, opening and closing statements. **CO2**

Grammar: Clauses and Sentences: Sentence structures, use of phrases and clauses in sentences **CO3**

Vocabulary: The concept of word formation, Acquaintance with prefixesand suffixes **CO3**

UNIT –II **10 Periods**

Reading: 1. Reading for inferential comprehension- The Brook: *Alfred Tennyson* 2. How I Became a Public Speaker: *George Bernard Shaw* **CO1**

Writing: Formal letter writing. Letters of complaint, enquiry, report, invite, placingorders, acknowledgment and follow-up letters. **CO2**

Grammar: Punctuation: importance of proper punctuation in texts, Articles **CO3**

Vocabulary: Word building using foreign roots **CO3**

UNIT –III **10 Periods**

Reading: 1. Comprehend complex texts identifying the author"s purpose-
The Death Trap: *Saki* 2. On Saving Time: *Seneca* **CO1**
Writing :: Reports (Structure and content of a project report) **CO2**
Grammar : Noun-Pronoun Agreement, Subject –Verb agreement,Tenses **CO3**
Vocabulary: Idiomatic expressions **CO3**

UNIT –IV **10 Periods**

Reading: 1. Identifying claims, evidences, views, opinions and stance/position.-
Chindu Yellama 2. Muhammad Yunus **CO1**
Writing Skills: 1.Writing structured essays (persuasive and argumentative) using suitable claims and evidences CO2
Grammar: Misplaced Modifiers, adjectives, adverbs **CO3**
Vocabulary: Synonyms & Antonyms **CO3**

UNIT –V **12 Periods**

Reading: Developing advanced reading skills for deeper understanding of the text
Politics and the English Language: *George Orwell* 2.The Dancer with a
White Parasol: *Ranjana Dave* **CO1**
Writing : Précis writing (Summarizing-identifying main idea and rephrasing the text), Applying for internship/Writing job applications: Resume and C.V with cover letter **CO2**
Grammar: Prepositions, correction of sentences. **CO3**
Vocabulary: Phrasal verbs **CO3**

Prescribed book:
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

Course Code - Category: CSE 113 - ES **Credits:3**

L	T	P	E	O
3	0	0	1	3

End Exam: 3 Hours

Sessional Marks:40

End Exam Marks:60

Prerequisites: Nil

Course Outcomes:

After completion of the course the student will be able to	
CO1	nderstand the behavior of PN diode under different biasing conditions.
CO2	Calculate the efficiency and ripple factor of half wave, Full wave center tapped and Bridge rectifiers with and without filters
CO3	Obtain input and output characteristics of BJT in different configurations and identify the region of operation of transistor
CO4	Design the transistor biasing and compensation circuits for better stability
CO5	Device the characteristics of FET/MOSFET in different modes

SYLLABUS

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

Intrinsic Semiconductors, Fermi energy level, Mass action law, Extrinsic semiconductors, Conductivity of semiconductor materials, Diffusion current, Drift current, Mean life time and diffusion length of charge carriers, Hall effect, Unbiased PN Junction, Energy levels of PN Junction diode, PN Junction diode Forward and reverse biases, Diode current equation, Junction capacitances, Avalanche and Zener Break down, Varactor diode and Photo diode.

Unit-II: Rectifiers and Filters **9 periods**

Half wave rectifier, Full wave center tapped and Bridge rectifiers, Rectifier- DC components, AC Components, Ripple factor, Transformer Utilization factor, Efficiency, PIV, and Regulation
Filters: Inductor, Capacitor, LC, CLC filters, Ripple factor

Unit-III: Transistor Characteristics **9 periods**

Common Base, Common Emitter, Common Collector Configurations, Transistor current components, Input and Output Characteristics, Punch through effect, Active region, Saturation region, Cutoff region, Transistor as switch.

Unit-IV: Transistor biasing and Stabilization **9 periods**

Biasing of transistor, DC load line, Operating point, fixed bias, Collector –Base bias, Self bias or Voltage divider bias, Diode Compensation, Thermistor compensation, Sensistor Compensation, Small signal CE amplifier.

Unit-V: FET/MOSFET Characteristics **9 periods**

Classification of FET, Construction of n-JFET and p-JFET, Transfer and Drain characteristics, Construction of MOSFET, Characteristics of enhancement and depletion mode MOSFETs, Common source FET amplifier.

Text Books:

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

Reference Books:

1. **David A Bell –***Electronic Devices and Circuits*‖ -; Oxford
2. **K Venkata Rao, K Rama –***Sudha Electronic Devices and Circuits*‖ –; McGraw Hill Education – 2015
3. **Jacob Millman, Arvin Grabel –***Micro Electronics"* –; Tata McGraw-Hill

DIGITAL LOGIC DESIGN

Course Code - Category: CSE 114 - ES **Credits:3**

L	T	P	E	O
3	0	0	1	3

Sessional Marks:40

End Exam: 3 Hours End Exam Marks:60

Course Outcomes:

By the end of the course student should be able to:	
CO1	Perform number conversions between different number systems and codes and apply Boolean algebra to minimize logic expressions up to three variables.
CO2	Apply K-map method, tabulation method to minimize logic expressions up to four variables and design a combination logic circuit like decoders, encoders, multiplexers, and de-multiplexers etc. for a given specification and verify the correctness of the design.
CO3	Implement the given Boolean functions (upto four variable) using Programmable logic devices.
CO4	Analyze the operation of sequential circuits built with various flip-flops by finding the Boolean function or truth table and design various sequential circuits like registers, counters etc.
CO5	Design and Analyze synchronous and asynchronous sequential circuits as per given specifications.

SYLLABUS

UNIT-I **9 periods**

Digital Systems, Boolean Algebra and Logic Gates

Digital Systems, Binary Numbers, Number Base Conversions, Complements of numbers, Signed Binary Numbers, Binary Codes, Binary Logic. Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Different Logic Operations, Digital Logic Gates.

UNIT-II **9 periods**

Gate-Level Minimization

The Map Method, Four variable K-map, POS simplification, Don't-Care Conditions, NAND and NOR Implementation.

Combinational Logic

Combinational Circuits, Analysis Procedure, Design Procedure, Binary adder-subtractor circuit, Decimal adder circuit, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

UNIT-III **9 periods**

Programmable Logic Devices

Programmable Logic Devices : PROM, PLA, PAL, realization of switching functions using PROM, PLA and PAL; comparison of PROM, PLA and PAL, Programming tables of PROM, PLA and PAL.

UNIT-IV **9 periods**

Sequential logic circuits

Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, Flip-Flop Conversions.

Registers and Counters

Registers, Shift Registers, Ripple Counters, Synchronous Counters, Johnson and Ring counters.

UNIT V **9 periods**

Synchronous Sequential Logic

Basic Design Steps, Serial Adder Example, State Reduction & Assignment Problem. **Asynchronous Sequential Logic**

Introduction, Analysis Procedure, Design Procedure, reduction of state and flow table.

Text Books:

1. **M. Morris Mano** *"Digital Design"* 3rd Edition, Pearson Publishers, 2001.
2. **Z Kohavi** *"Switching and Finite Automata Theory"* 2nd edition, TMH, 1978

Reference Books:

1. **William I. Fletcher –***An Engineering Approach to Digital Design"* PHI, 1980.
2. **John F. Wakerly –***Digital Design Principles and Practices*| 3rd Edition,Prentice Hall, 1999.
3. **Charles H Roth Jr and Larry L. Kinney** *"Fundamentals of Logic Design"* Cengage learning, 7th Edition, 2013
4. **R.P Jain –***Modern Digital Electronics*| 3rd Edition, TMH, 2003.

Problem Solving With C

(Common to all branches)

Course Code - Category : CSE 115 - ES

L	T	P	E	O	Credits: 3
3	0	0	1	3	

Sessional Marks:40

End Exam: 3 Hours — End Exam Marks:60

Prerequisite: No specific prerequisites are needed

Course Objectives:

- This course aims to provide exposure to problem-solving through programming in C. It aims to train the student, the concepts of C-Programming Language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

Course Outcomes:

After completion of this course, a student will be able to:	
CO 1	Gain knowledge in problem solving and steps in Program development.
CO2	Apply the basic concepts of C
CO 3	Implement different operations on arrays and string to solve any given problem.
CO 4	Demonstrate pointers and modularization
CO 5	Apply structures and unions and Implement file Operations in C programming for any given application

SYLLABUS

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)**

Learning Outcomes: At the end of this Unit the student will be able

- To gain knowledge in the concepts of problem solving
- Identify the steps in Program development
- Learn number system.

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)**

Learning Outcomes : At the end of this Unit the student will be able to

- Apply decision making in c programming for problem solving
- Apply controlled structures in c programming for problem solving

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)**

Learning Outcomes : At the end of this Unit the student will be able to

- Implement different operations on arrays
- Use string functions
- Apply string manipulation operations for problem solving.

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)**

Learning Outcome : At the end of this Unit the student will be able to

- Know what a pointer is
- How to modularize a program
- Parameter passing techniques
- Write a recursive functions

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)**

Learning Outcome : At the end of this Unit the student will be able to

- Write a structure and union
- Create and manage a file
- Use structure and union in files

Text Books:

(1) **B. A. Forouzan and R. F. Gilberg** –*Cengage Learning , Computer Science: A Structured Programming Approach Using C*‖ Third Edition.

(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

Course Code - Category: CSE 116 – HS **Credits:1.5**

L	T	P	E	O
0	0	3	0	1

Sessional Marks:50

End Exam: 3 Hours End Exam Marks:50

Prerequisites:

Basic English language skills- LSRW at Intermediate Level

Course Objectives

1. To improve fluency in spoken English and to practice correct pronunciation.
2. To introduce the techniques of presentation skills
3. Help improve speaking skills through participation in activities such as role plays, discussions, and structured talks/ oral presentations

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 analysing 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.

Syllabus

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

Prescribed book:

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

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

(Common to all branches)

Course Code - Category: CSE 117 - ES **Credits:1.5**

L	T	P	E	O
0	0	3	0	3

Sessional Marks:50

End Exam: 3 Hours End Exam Marks:50

Pre requisite: Concepts of Problem Solving & Computer Programming in C

Course Objective:

- The course aims at translating given algorithms to a working and valid program

Course Outcomes:

After completion of this course, a student will be able to:	
CO1	Develop C programs using operators
CO2	Write C programs using conditional structures
CO3	Write C programs using iterative structure arrays and strings
CO4	Inscribe C programs that use Pointers toand functions
CO5	Develop a c program for implementing user defined types and file processing

SYLLABUS

MINIMUM SET OF SAMPLE PROGRAMS

1. CONVERTING MILES TO KILOMETERS

PROBLEMSTATEMENT: 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
inttotal_dollars /* total dollar value */
int change /* leftover change */
Additional Program Variables inttotal_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 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	Bill includes $2.00 late charge on unpaid balance of $71.50 Total due = $102.00

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 test cases 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:

$1 \leq T \leq 100$
$1 \leq N \leq 10^6$

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 lessthan 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 thatwill 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 forcoldest 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?	To replace heat loss of11350800 BTU in the coldest month (month 12) with available solar insolation of 500 BTU / ft^2 / day, and an

	=>9 What percent of solar insolation will be converted to usable heat? => 60 What is the floor space (ft^2)? => 1200	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_tmembers :

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 conversionfactors database */
double quantity /* value to convert */
charold_units[NAME_LEN] /* name or abbreviation of units tobe converted */
charnew_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
quartsqtliquid_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
slugsslugs     mass        0.14594
poundslb       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, > 25 km mi	>450 km miles Attempting conversion of 450.0000 km to miles . . . 450.0000km = 279.6247 miles
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 newchocolates.
2. **Angry Professor :**The professor is. Given the arrival time of each student, your task is to find out if the class gets cancelled or conducting a course on Discrete Mathematics to a class of N students. Heis

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 startsnot.

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 betweena and b (both inclusive). Can you tell the average number of candies after M operations?

Reference Books:

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

Web References :

- https://www.spoj.com/
- https://projecteuler.net/
- https://www.hackerearth.com/practice/
- https://www.codechef.com/
- 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.

ENVIRONMENTAL SCIENCE

Mandatory (Non Credit) course for all branches

Course Code - Category: CSE 118 - BS **Credits:0**

L	T	P	E	O
3	0	0	0	1

Sessional Marks:50

COURSE OBJECTIVE:

- To Make the students get awareness on environment
- To understand the importance of protecting natural resources, ecosystems for future generations
- To know about the causes of pollution due to the day to day activities of human life
- To get an idea about the measures for sustainable development

Course Outcomes:

By the end of the semester, the student will be able to:	
CO1	entify the characteristics of various natural resources and can implement the conservation practices
CO2	ealize the importance of Ecosystem and Biodiversity for maintaining ecological balance
CO3	lassify, analyze various pollutants and can develop methods for solving problems related to environment
CO4	et awareness on various environmental laws and methods for sustainable development of environment
CO5	Understand the impact of population growth on human health and environment

SYLLABUS

UNIT I

INTRODUCTION TO ENVIRONMENT AND NATURAL RESOURCES 8 Periods

Introduction: Definition, Multidisciplinary nature of environmental studies, Scope and Importance of Environmental Sciences, Need for public awareness.

Natural Resources: Renewable and Non-Renewable resources- Forest resources-use and overexploitation, deforestation, Water resources- aquifers, dams and benefits, conflicts over water; Food resources- effects of modern agriculture practices, Energy resources-conventional and non conventional energyresources.

LEARNING OUTCOMES

- Students will be able to know the scope and importance of environment.
- Students will be able to explain natural resources and their associated problems.
- Students will be able to articulate basic understanding of effects of modern agriculture practices on environment.
- Students will be able to recognise the importance of alternative sources of energy.

UNIT- II

ECOSYSTEM & BIO DIVERSITY **8 Periods**

Ecosystem: Concept of an ecosystem-structure and function of an ecosystem Food chains, food webs and ecological pyramids, Energy flow in an ecosystem, Ecosystem regulation, Ecological succession.

Biodiversity: Definition, types, India as a Mega diversity Nation, Values of biodiversity, Hot spots of biodiversity, Threats to biodiversity, Endangered and endemic species, Conservation of biodiversity.

LEARNING OUTCOMES

- Students will get a clear picture on structure and functions ofecosystems.
- Students will be able to explain the energy and matter flow in ecosytems.
- Students will be able to identify the threats to biodiversity and conservation methods to protect biodiversity.
- Students will be able to understand the importance of endemic species.

UNIT -III

ENVIRONMETAL POLLUTION AND WASTE MANAGEMENT **8 Periods**

Pollution: Sources, effects and control measures of Air pollution, Noise Pollution, Water Pollution, Soil Pollution, Radio Active Pollution; Climate Change, Ozone depletion, Acid rains –causes and adverse effects.

Solid waste management: Sources and effects of municipal waste, bio-medical waste, Industrial waste, e-waste, Process of waste management-composting, sanitary landfills, incineration. Green Chemistry concepts,

LEARNING OUTCOMES

- Students will be able to understand sources, effects and control measures of various types of pollutions.
- Students will be able to understand about solid waste management.
- Students will explain the ill effects of climatic change.

UNIT- IV

SOCIAL ISSUES AND ENVIRONMENTAL LEGISLATIONS **8 Periods**

Social Issues and the Environment: Sustainable development, Environmental Impact Assessment, Rain water harvesting, water shed management. Resettlement and rehabilitation of people, Environmental ethics.

Legislational Acts: Importance of Environmental legislation, Air (Prevention and Control of Pollution) act, Water (Prevention and control of Pollution) act, Wildlife Protection act, Forest Conservation act

LEARNING OUTCOMES

- Students will be able to know the mesures to achieve sustainable development.
- Students will have knowledge about watershed management and environmental ethics
- Students will be able to explain the enforcement of Environmental legislations.

UNIT- V

HUMAN POPULATION AND THE ENVIRONMENT **5 Periods**

Human population and environment- Population growth, Population explosion; Family Welfare Programmes; Role of information technology on environment and human health; Value Education – HIV/AIDS – Women and Child Welfare

FIELD WORK/PROJECT: Visit to a local area to document environmental problem;

LEARNING OUTCOMES

- Students will know the impacts of population on human health and environment.
- Students will understand the role of IT on Environment.
- Students will be able to prepare a detailed report on a particular environmental issue.

AWARENESS AND OTHER ACTIVITIES

1. Planting trees
2. Listing out water bodies and discuss the problems associated with it
3. Poster making of ecological pyramids and food chain and food web of different ecosystems like forest, grassland and aquatic system
4. Prepare list of endangered endemic and extinct species
5. Preparation of models
6. Cleanliness drive (Swatch Bharath)
7. Group discussion about waste management
8. Slogan making

Prescribed Book

1. **Anubha Kaushik & C.P.Kaushik**, –*Perspertives of Environmental Studies"* by 5th edition New Age International Publications, 2015.
2. **Erach Bharucha** *Text book of "Environmental Studies for Undergraduate Courses*‖, universities Press Commission, 2013.
3. **Palaniswamy**- –*Environmental Studies"*, 2nd edition, Pearson education 2015.

Reference Books

1. **S. Deswal, A. Deswal**, –*Basic course in Environmental studies"*, 2nd edition, Dhanpatrai Publications, 2008.

ENGINEERING MATHEMATICS-II
Ordinary Differential Equations & Numerical Methods
Common to all branches

Course Code - Category: CSE 121 - BS **Credits:3**

L	T	P	E	O
3	0	0	1	6

Sessional Marks:40

End Exam: 3 Hours End Exam Marks:60

Course Objective:
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 and also familiarize the student in various topics in numerical analysis such as interpolation, numerical differentiation, integration and direct methods for solving linear system of equations**.**

Course outcome:

By the end of the semester, the student will be able to:	
CO1	Demonstrate solutions to first order differential equations by various methods and solve basic application problem related to electrical circuits, orthogonal trajectors and Newton‟s law of cooling.
CO2	Discriminate among the structure and procedure of solving a higher order differential equations with constant coefficients and variable coefficients
CO3	Apply various numerical methods to solve linear and non-linear equations
CO4	Familiar with numerical integration and differentiation
CO5	Understand Laplace transforms and its properties and finding the solution of ordinary differential equations

Unit - I: Ordinary Differential equations of ftrst orderand its applications 12 Periods
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.

Learning outcome: At the end of this unit, the student will be able to

- Solve the first order differential equations and solve basic application problems described by first order differential equations.

Unit - II: Higher order Linear Differential Equations and its applications 10 Periods
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.

Learning outcome: At the end of this unit, the student will be able to

- Solve the complete solution of linear differential equations with constant coefficient
- Solve basic application problems described by second order linear differential equations with constant coefficients.

Unit - III: Numerical solutions of algebraic and transcendental equations **10 Periods**

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

Learning outcome: At the end of this unit, the student will be able to

- Find numerical solution to a system of equations by using different methods.

Unit - IV: Interpolation, Numerical Differentiation & Integration **12 Periods**

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.

Learning outcome: At the end of this unit, the student will be able to

- Find derivative and integral of a function by using different numerical methods.

Unit - V: Laplace Transforms and its application **16 Periods**

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).

Learning outcome: At the end of this unit, the student will be able to

- Examine the properties of Laplace transformation.
- Apply the Laplace and inverse Laplace transformations for different types of functions.
- Evaluate ordinary differential equations by using Laplace transformation technique.

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.

ENGINEERING PHYSICS

(Common to all branches)

Course Code - Category: CSE 122 - BS **Credits:3**

L	T	P	E	O
3	0	0	1	4

Sessional Marks:40

End Exam: 3 Hours End Exam Marks:60

Course Objectives

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

Course Outcomes

The students will be able to

CO1	terpret the relation between heat, work and entropy with thermodynamic laws.
CO2	xplain and analyze the relation between electric current and magnetic fields, production and applications of ultrasonics.
CO3	pply the optical phenomena like Interference, Diffraction and Polarization to various fields.
CO4	xplain the working principle and applications of lasers and fiber optics.
CO5	terpret the microscopic behavior of matter with quantum mechanics.

SYLLABUS

UNIT – I **10 periods**

Thermodynamics:

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.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the relation between heat and work.
- Recognize how much heat is converted into work.
- Identify the relation between entropy and different thermodynamic phenomena.

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.

Ultrasonics: Properties of ultrasonic waves, production of ultrasonic waves by magnetostriction and piezoelectric methods, applications of ultrasonics.

Learning Outcomes:

At the end of this unit the student will be able to

- Explain how to generate electric current by electromagnetic induction Phenomena.
- Evaluate Maxwell‟s displacement current and correction in ampere‟s law.

- Assess electromagnetic wave propagation in free space and its power.
- Recognize the properties and production of ultrasonics.
- Identify the use of ultrasonics in different fields

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.

Learning Outcomes:

At the end of this unit the student will be able to

- Explain various types of coherent sources.
- Outline the conditions for sustained interference.
- Analyze the differences between interference and diffraction.
- Illustrate the concept of polarization of light and its applications.
- Classify the production and detection of different polarized light.

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

Learning Outcomes:

At the end of this unit the student will be able to

- Explain the working principle and properties of lasers
- Analyze the production and applications of lasers.
- Explain the working principle of optical fibers and its classification based on refractive index profile and mode of propagation.
- Identify the applications of optical fibers in medical, communication and other fields.

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)

Learning Outcomes:

At the end of this unit the student will be able to

- Explain the dual nature of radiation and matter.
- Realize de Broglie concept of matter waves and Heisenberg uncertain principle.

- Identify Schrodinger wave equation to solve the problems.
- Explain the importance of fundamentals of statistical mechanics

Text Books :

1. **M.N.Avadhanulu & P.G.Kshirasagar**, –*A Text Book of Engineering Physics*| – IX Edition, S.Chand Publications, 2014.
2. **S.L.Gupta & Sanjeev Gupta**, –*Modern Engineering Physics*| -- Dhanpat Rai Publications, 2011.

Reference Books:

1. **V. Rajendran**, –*Engineering Physics*|, McGrawHill Education Private Ltd, 2011.
2. **S.O.Pilai, Sivakami** , –*Engineering Physics*| – IV Edition, New Age International Publishers , 2011.
3. **Young & Freedman**, –*University Physics*| – XI Edition, Pearson Education, 2004.
4. **A.Marikani**, –*Engineering Physics*| - PHI Learning Private Limited, 2009.
5. **Resnick & Halliday**, –*Physics Volume II"* – VI Edition, Wiley India Publications 2001.
6. **R K Gaur, S L Gupta**, –*Engineering Physics*| – VIII Edtion, Dhanpat Rai Publications, 2001.
7. **D.K.Bhattacharya,Poonam Tandon**, –*Engineering Physics*| – Oxford University Press, 2010.

ENGINEERING CHEMISTRY

Common for all branches

Course Code - Category: CSE 123 - BS **Credits:3**

L	**T**	**P**	**E**	**O**
3	**0**	**0**	**1**	**4**

End Exam: 3 Hours

Sessional Marks:40

End Exam Marks:60

Course Objectives:

- To familiarize Engineering Chemistry and its applications
- To provide knowledge on problem associated with impure water and various treatment technologies
- To train the students on the principles and applications of electrochemistry,
- To introduce nano, smart and composite materials

Course Outcomes:

By the end of the semester, the student will be able to:	
CO1	**entify** the problems associated with raw water in various applications and can **adopt** suitable technologies for domestic and industrial feed waters.
CO2	**nderstand** the concepts of electro chemistry for **design** of suitable batteries and solar energy in view of environmental protection.
CO3	**elect and design** of suitable materials to prevent corrosion and to protect various parts from corrosion.
CO4	**eneralize** the properties of semiconducting and ceramic materials, can **select** suitable materials for specific applications.
CO5	**Analyze** the importance of nano, composite and smart materials.

SYLLABUS

UNIT I 12 Periods

Water Chemistry: Introduction- Impurities in water; Hardness of water – types of Hardness, units and calcium carbonate equivalents, problems, disadvantages of hard water; Boiler troubles- Scale & Sludge formation, prevention- Internal treatment - (Phosphate, Carbonate and Calgon conditioning) ,Caustic embrittlement

Water treatment techniques: Softening of water by ion exchange method- Principle, Process, advantages; Desalination of water – Reverse Osmosis and Eelectrodialysis; WHO standards for drinking water, Municipal water treatment - Sedimentation, Coagulation, Chlorination-Break point chlorination.

Learning Outcomes:

At the end of this unit the student will be able to

- **List** the differences between temporary and permanent hardness of water (L1)
- **Illustrate** the problems associated with hard water (L2)
- **Explain** the principles of reverse osmosis, electrodialysis and municipal water treatment processes (L2)
- **Solve** problems associated with hard water - scale and sludge (L3)

UNIT-II **10 Periods**

Electrochemical cells: Electrode potential, Nernst equation, reference electrodes-SHE and Calomel electrode, Electrochemical series, Electrochemical cell, Cell potential; Primary cells – Dry cell, alkaline battery, hydrogen-oxygen, methanol fuel cells – working of the cells; Secondary cells – lead acid, lithium ion batteries- working of the batteries including cell reactions.

Solar Energy: Photovoltaic cell -Working & applications, Photo galvanic cells with specific examples

Learning Outcomes:

At the end of this unit the student will be able to

- **Apply** Nernst equation for calculating electrode and cell potentials (L3)
- **Explain** the theory and construction of battery and fuel cells (L2)
- **Identify** the applications of solar energy (L2)
- **Construct** different cells (L3)

UNIT – III **10 Periods**

Corrosion Chemistry: Definition, Theories of corrosion-Chemical corrosion, metal oxide formation, Pilling Bedworth rule, Electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion; Factors affecting corrosion

Prevention and control: Protection- cathodic protection, Corrosion inhibitors, electroplating of Copper and electroless plating of Nickel, organic coatings-paint and varnish

Learning Outcome:

At the end of this unit the student will be able to

- **Apply** Pilling Bedworth rule for corrosion and corrosion prevention (L3)
- **Demonstrate** the corrosion prevention methods and factors affecting corrosion(L2)
- **Develop** the corrosion resistant materials for industrial and marine applications(L5)
- **Identify** different organic coatings (L3)

UNIT IV **10 Periods**

Semiconducting Materials: Band theory of solids – band diagrams for conductors, semiconductors and insulators, Role of doping on band structures. Organic semiconductors and applications.

Ceramic Materials: Cement – raw materials, Manufacturing process, Setting and hardening of cement (hydration and hydrolysis equations); Refractories- classification; engineering applications of ceramics

Learning Outcome:

At the end of this unit the student will be able to

- **Explain** the manufacturing of portland cement (L2)
- **Enumerate** the reactions at different temperatures in the manufacture of cement (L2)
- **Describe** the mechanism of conduction in conducting polymers (L2)
- **List out** the applications of ceramics (L2)

UNIT V **10 Periods**

Nanomaterials: Introduction to Nanomaterial- nanoparticles, nanocluster, carbon nanotube (CNT); Chemical synthesis of nanomaterials- sol-gel method; Characterization- Principle and applications of Scanning electron microscope (SEM) and Transmission electron microscope (TEM).

Polymer Composites: Definition, constituents of composites, types - Fiber Reinforced Plastics, Particulate composites, Layer composites, engineering applications of composites;

Smart polymers: Introduction, types of smart polymers and applications

Learning Outcome:
At the end of this unit the student will be able to

- **Classify** nanomaterials (L2)
- **Explain** the synthesis and characterisation of nanomaterials (L2)
- **Explain** the different types of composites and their applications (L2)
- **Identify** different types of smart materials (L2)

Prescribed Text Book

1. P.C. Jain and M. Jain –Engineering Chemistry‖ 16th edition, - DhanapathiRai& Sons, Delhi. 2015.
2. S.S. Dara –A text book of Engineering Chemistry‖ 15 th edition, S. Chand& Co. New Delhi, 2014.

Reference books

1. O.G.Palanna –Engineering Chemistry‖ Tata McGraw Hill Education pvt ltd, New Delhi, 2009.
2. V.Raghavan ―A Material Science and Engineering‖ 5th edition, Printice Hall India Ltd, 2011.

ELEMENTS OF ELECTRICAL ENGINEERING

Course Code - Category: CSE124 - ES **Credits:3**

L	T	P	E	O
3	0	0	1	4

Sessional Marks:40

End Exam: 3 Hours End Exam Marks:60

Prerequisites:

Course Objectives:

- Analysis of circuits by using KCL and KVL
- Finding equivalent circuits by using circuit theorems
- Analysis of magnetic circuits
- Principle of operation and behavior of electrical machines

Course Outcomes:

By the end of the course, the student will be able to:	
1.	Calculate voltage a cross, current through and power supplied / absorbed by an electrical element.
2.	Obtain the performance characteristics of D.C. Machines.
3.	Obtain the voltage regulation characteristics of a Transformer.
4.	Obtain the performance characteristics of Induction Motor.

SYLLABUS

UNIT I

Electric Circuits : Circuit Elements, Basic Law‟s, KVL, KCL, Linearity Principle (Super Position), Mesh and Nodal analysis, Thevenin‟s and Norton‟s theorems.

UNIT II

Magnetic Circuits : Definitions of magnetic circuit, Reluctance, Magneto-motive force, magnetic flux, Simple problems on magnetic circuits. Faraday‟s laws of Electromagnetic Induction, Induced E.M.F., Dynamically induced E.M.F.

UNIT III

D.C. Generators : D.C. Generator principle, construction of D.C. generator, E.M.F equation of D.C. generator, Types of D.C. generators, Efficiency, Applications.

UNIT IV

D.C. Motors : principle, working of D.C. Motors, significance of back E.M.F., Torque equation of D.C. Motors, Types of D.C. Motors, Special Motors (Stepper Motor and Servo Motor) and Applications.

UNIT V

AC Machines : Transformer working Principle, EMF equation of transformer, Voltage regulation of

Transformer. Three-phase Induction Motor working principle, Construction of 3 Phase Induction Motor, Principle of operation, Types of 3 phase induction Motors, Applications.

TEXT BOOKS:

1. **V.K. MEHTA &ROHIT MEHTA** *"Principles of Electrical Engineering"* 2nd edition, S. Chand Publications.
2. **V.K. MEHTA & ROHIT MEHTA** *"Principles of Electrical Machines"* 2nd edition, S. Chand Publications.

REFERENCE BOOK:

1. **J.B. Gupta** *"A Text book of Electrical Engineering"* S.K. Kataria& Sons Publications.

ENGINERING DRAWING
(Common for all branches)

Course Code - Category: CSE 125 - ES **Credits:3.5**

L	T	P	E	O
2	0	3	1	4

Sessional Marks:40

End Exam: 3 Hours End Exam Marks:60

Course Objectives

- The course is designed to introduce fundamentals of engineering drawing and apply theprinciples to draw engineering curves, orthographic projections and isometric projections.

Course Outcomes:

By the end of the course, the student will be able to:	
CO 1	Draw conic sections by different methods and construct cycloidal and involute curves.
CO 2	Project orthographically the points and lines in various positions.
CO 3	Produce orthographic projections of plane surfaces
CO 4	Draw orthographic projections of solids in various orientations.
CO 5	Construct isometric views and isometric projections of simple solids.

SYLLABUS

UNIT I

Introduction to Engineering drawing & basics of geometrical construction. General Construction of conic sections, Ellipse - concentric circle and arcs of circle method, Parabola- rectangle and tangential method Hyperbola - Rectangle hyperbola, Construction of cycloidal curves (cycloid, epicycloid, and hypocycloid), Involute(thread length equal to circumference/ perimeter) - circle and regular polygon.

UNIT II

Orthographic projections – projections of points – projections of straight lines (lines parallel to both HP&VP, lines parallel to one and inclined to other, lines inclined to both theplanes)

UNIT III

Projections of regular polygon planes – inclined to one plane, inclined to both the planes.

UNIT IV

Projection of solids: Prisms – Cylinder– Pyramids &Cones –simple positions & axis inclined to one plane, inclined to both the planes.

UNIT V

Isometric projections –Isometric scale, Isometric view & projection of prisms, pyramids, cone, cylinder, sphere, and their combination.

TEXT BOOK:

1. **N. D. Bhatt –***Engineering Drawing"* Charotar PublishingHouse Pvt.Ltd, 53rd Edition : 2014

REFERENCE BOOKS:

1. **K. L. Narayana& P. Kanniah –***Engineering Drawing"*

2. **R. B. Choudary –***Engineering Graphics* with Auto CAD

3. **TrymbakaMurty –***Computer Aided Engineering Drawing"*

ENGINEERING PHYSICS LAB

Common for all branches

Course Code - Category: CSE 126 - BS **Credits:1.5**

L	T	P	E	O
0	**0**	**3**	**0**	**1**

Sessional Marks:50

End Exam: 3 Hours End Exam Marks:50

Course Objectives

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

Course Outcomes

At the end of this course, the students will be able to	
CO1	Design and conduct experiments as well as to analyze and interpet data
CO2	Apply experimental skills to determine the physical quantities related to heat, electromagnetism and optics

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‟srings.
3. Determination of wavelengths of spectral lines in mercury spectrum-using diffraction grating innormal 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-Wedgemethod.
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 inquartz 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 –Photoelctriceffect.
13. Determination of e/m of an electron by Thomson‟smethod
14. Determination of band gap of semiconductor.

Learning Outcomes:

The students will be able to

- **Handle** optical instruments like microscope and spectrometer
- **Determine** thickness of a hair/paper with the concept of interference

- **Estimate** the wavelength and resolving power of different colors usingdiffraction grating
- **Plot** the intensity of the magnetic field of circular coil carrying current with varying distance
- **Determine** the band gap of a given semiconductor
- **Determine** thermal conductivity of good and bad conductors
- **Determine** resistance and resistivity of the given material
- **Determine** the accuracy of low range voltmeter using potentiometer
- **Evaluate** the refractive index using double refraction phenomena
- **Determine** frequency of electrical tuning fork

Prescribed Book

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 Physic"s* by Vegi Publishers Pvt.Ltd.

ENGINEERING CHEMISTRY LAB

Common for all branches

Course Code - Category: CSE 127 – BS **Credits:1.5**

L	T	P	E	O
0	**0**	**3**	**0**	**1**

Sessional Marks:50

End Exam: 3 Hours End Exam Marks:50

Course Objectives:

- To improve skills in analyzing samples through titration procedures
- To get an idea over instrumental methods of analysis for more accuracy

At the end of this course, the students will be able to	
CO1	Apply experimental skills in analysing samples through titration procedures
CO2	Select and use a suitable instrumental technique for the quantitative analysis for more accuracy

List of Experiments (any ten experiments)

1. i) Preperation of primary standard solution.

   ii) Preparation and Standardization of Hydrochloric acid solution.
2. Determination of total Hardness present in the given water sample.
3. Estimation of Iron(II) by permonganate.
4. Estimation of amount of calcium present in the Portland cement by titrimetrically.
5. Estimation of amount of Zinc by EDTA.
6. Estimation of amount of Copper by using Sodium thiosulphate.
7. Determine the strength of acid (lead acid battery) by titrating with strong base using **pHmeter**.
8. Estimate the individual strength of acids present in the acid mixture bytitrating with strong base using **conductivity meter.**
9. Estimate the amount of Mohr's salt present in the given solution by titrating with potassium dichromate using **potentiometer.**
10. To determine the viscosity of liquid by Ostwald viscometre
11. **Spectrophotometric** estimation of Fe(III) by Potassium thiocyanate.

Demo Experiments

1. Thin layer chromotography and Gas chromatography
2. Preperation of Bakelite
3. Particle size distribution by PSD analyser(Demo-Outsource)
4. Elemental analysis by ICPMS (Demo-Outsource)
5. Introduction of Reaction colourimetry (for Chemical Engineering)

Learning Outcomes:

1. Measure the strength of an acid present in secondary batteries
2. Calculate the hardness of water sample
3. Determine the Potential and conductance of solutions
4. Analyse the cement for Iron and Calcium contents
5. Prepare polymer materials

Prescribed Books

1. **S.K. Bhasin and SudhaRani –***Laboratory manual on Engineering chemistry*‖ third edition; DhanpatRai Publishing Company.

Reference Books

1. **S.S. Dara "***Experiments and calculations in Engineering chemistry*‖ 9th edition; S. Chand & Company ltd.

ENGINEERING WORKSHOP
(Common for all branches except for ECE)

Course Code - Category: CSE 128 - ES **Credits:1.5**

L	T	P	E	O
0	0	3	0	1

Sessional Marks:50

End Exam: 3 Hours End Exam Marks:50

Course Objectives:

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

Course Outcomes:

By the end of the course, student will be able to:	
CO1	Make different carpentry joints.
CO2	Make simple fitting jobs.
CO3	Make simple jobs like funnel, elbow etc. using sheet metal.
CO4	Understand and build circuits for different types of applications like stair case wiring, godown wiring.
CO5	Make simple circuits on bread board using soldering kit

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

Reference book:

1. **S.K.Hajra Choudhury –***Elements of Workshop Technology" Vol I Manufacturing Processes,* ISBN: 8185099146(2017)

Human Values & Professional Ethics

Common to all branches

Course Code - Category: CSE 129 - HS **Credits: 0**

L	T	P	E	O
3	0	0	0	1

Sessional Marks:50

Course Objectives:

- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty
- To appreciate the rights of others.
- To create awareness on assessment of safety and risk

Course outcomes:

By the end of the semester, the student will be able to:	
CO1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
CO2	Identify the multiple ethical interests at stake in a real-world situation or practice
CO3	Articulate what makes a particular course of action ethically defensible
CO4	Assess their own ethical values and the social context of problems
CO5	Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human
CO6	Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

Unit I: HUMAN VALUES:

Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others – Living Peacefully –Caring –Sharing –Honesty -Courage-Cooperation–Commitment – Empathy –Self Confidence Character –Spirituality-Case Study.

LEARNING OUTCOMES:

1. learn about morals, values & work ethics.
2. learn to respect others and develop civic virtue.
3. develop commitment
4. learn how to live peacefully

Unit II: ENGINEERING ETHICS:

Senses of „Engineering Ethics-Variety of moral issued –Types of inquiry –Moral dilemmas –Moral autonomy –Kohlberg‟s theory-Gilligan‟s theory-Consensus and controversy –Models of professional roles-Theories about right action-Self interest -Customs and religion –Uses of Ethical theories –Valuing time –Co operation –Commitment-Case Study

LEARNING OUTCOMES:

1. learn about the ethical responsibilities of the engineers.
2. create awareness about the customs and religions.
3. learn time management
4. learn about the different professional roles.

Unit III: ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering As Social Experimentation –Framing the problem –Determining the facts –Codes of Ethics – Clarifying Concepts –Application issues –Common Ground -General Principles –Utilitarian thinking respect for persons-Case study

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LEARNING OUTCOMES:

1. demonstrate knowledge to become a social experimenter.
2. provide depth knowledge on framing of the problem and determining the facts.
3. provide depth knowledge on codes of ethics.
4. develop utilitarian thinking

UNIT IV: ENGINEERS RESPONSIBILITY FOR SAFETY AND RISK:

Safety and risk –Assessment of safety and risk –Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety-Intellectual Property rights(IPR)-.

LEARNING OUTCOMES:

1. create awareness about safety, risk & risk benefit analysis.
2. engineer‟s design practices for providing safety.
3. provide knowledge on Intellectual Property Rights.

UINIT V: GLOBAL ISSUES

Globalization –Cross culture issues-Environmental Ethics –Computer Ethics –Computers as the instrument of Unethical behavior –Computers as the object of Unethical acts –Autonomous Computers-Computer codes of Ethics –Weapons Development -Ethics and Research –Analyzing Ethical Problems in research- Case Study

LEARNING OUTCOMES:

1. Develop knowledge about global issues.
2. Create awareness on computer and environmental ethics
3. Analyze ethical problems in research.
4. Give a picture on weapons development.

Text Books:

1. **M.Govindarajan, S.Natarajananad, V.S.SenthilKumar –***Engineering Ethics includes Human Values*‖ -PHI Learning Pvt. Ltd-2009
2. **Harris, Pritchard and Rabins –***Engineering Ethics*|, CENGAGE Learning, India Edition, 2009.
3. **Mike W. Martin and Roland Schinzinger –***Ethics in Engineering*| Tata McGraw-Hill–2003.
4. **Prof.A.R.Aryasri, DharanikotaSuyodhana –***Professional Ethics and Morals*| Maruthi Publications.
5. **A.Alavudeen, R.KalilRahman and M.Jayakumaran –***Professional Ethics and Human Values*| - LaxmiPublications.
6. **Prof.D.R.Kiran –***Professional Ethics and Human Values*|
7. **PSR Murthy –***Indian Culture, Values and Professional Ethics*| BS Publication