

J. B. INSTITUTE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

Bhaskar Nagar, Moinabad (M), RR Dist, Telangana-500075

ELECTRONICS AND COMPUTER ENGINEERING**R18 COURSE STRUCTURE****Semester – wise structure of Curriculum (I Year I & II)****I B. Tech – I Semester**

Sl. No	Code	Subject	L	T	P	C
1	F110A	Mathematics-I	3	1	0	4
2	F110B	English	2	0	0	2
3	F115A	Programming for Problem Solving	3	0	0	3
4	F110D	Engineering Chemistry	3	1	0	4
5	F1101	English Language and Communication Skills Lab	0	0	2	1
6	F1107	Programming for Problem Solving Lab	0	0	4	2
7	F1102	Chemistry Lab	0	0	3	1.5
8	F1190	Life Skills & Professional Skills	0	0	2	0
		Induction Program				
		Total Credits	11	2	9	17.5

I B.Tech – II Semester

Sl. No	Code	Subject	L	T	P/D	C
1	F120A	Mathematics-II	3	1	0	4
2	F122A	Basic Electrical Engineering	3	1	0	4
3	F120C	Applied Physics	3	1	0	4
4	F123A	Engineering Drawing and Computer Graphics	1	0	4	3
5	F1204	Basic Electrical Engineering Lab	0	0	2	1
6	F1202	Applied Physics Lab	0	0	3	1.5
7	F1205	Workshop and Manufacturing Practices	1	0	4	3
8	F1290	Life Skills & Professional Skills				
		Total Credits	11	3	13	20.5

R18 COURSE STRUCTURE

**Semester – wise structure of Curriculum
(II Year Onwards i.e. from III – VIII Semester)**

II B.Tech – I Semester

Sl. No	Code	Subject	L	T	P	C
1	F214A	Electronic Devices and Circuits	3	0	0	3
2	F215A	Data Structures	3	0	0	3
3	F217A	Computer Organization and Architecture	3	1	0	4
4	F214B	Digital Electronics	3	0	0	3
5	F210A	Mathematics – III	3	1	0	4
6	F210E	Professional Ethics	3	0	0	3
7	F2141	Electronic Devices and Circuits Lab.	0	0	2	1
8	F2151	Data Structures Lab.	0	0	3	1.5
9	F2143	Digital Electronics Lab	0	0	2	1
10	F210C	Gender Sensitization	2	0	0	0
		Total Credits	20	2	7	23.5

II B.Tech – II Semester

Sl. No	Code	Subject	L	T	P	C
1	F222C	Control Systems	3	1	0	4
2	F224E	Analog Electronics	3	0	0	3
3	F225A	Object Oriented Programming through Java	3	0	0	3
4	F220B	Managerial Economics and Financial Analysis	3	0	0	3
5	F220E	Environmental Sciences	2	0	0	0
6	F220D	Biological Sciences	2	0	0	2
7	F2251	Object Oriented Programming through Java Lab.	0	0	4	2
8	F2241	Analog Electronics Lab.	0	0	3	1.5
		Total Credits	16	1	7	18.5

III B.Tech – I Semester

Sl. No	Code	Subject	L	T	P	C
1		Pulse and Digital Circuits	3	0	0	3
2		Data Base Management Systems	3	0	0	3
3		Operating Systems	3	1	0	3
4		Design and Analysis of Algorithms	3	0	0	3
5		Management Science	3	0	0	3
6		Pulse and Digital Circuits Lab.	0	0	4	2
7		Data Base Management Systems Lab.	0	0	4	2
8		Operating Systems Lab.	0	0	4	2
9		Summer Internship	0	0	2	1
10		Constitution of India/ Essence of Indian Traditional Knowledge	2	0	0	0
		Total Credits	17	1	14	22

III B.Tech – II Semester

Sl. No	Code	Subject	L	T	P	C
1		Compiler Design	3	1	0	3
2		Computer Networks	3	0	0	3
3		Elective – I	3	0	0	3
4		Elective – II	3	0	0	3
5		Open Elective – I (Humanities)	3	0	0	3
6		Compiler Design Lab.	0	0	3	1.5
7		Computer Networks Lab.	0	0	3	1.5
8		Elective – II Lab	0	0	4	2
		Total Credits	15	1	10	20

IV B. Tech – I Semester

Sl. No	Code	Subject	L	T	P	C
1	PEC	Elective – III	3	0	0	3
2	PEC	Elective – IV	3	0	0	3
3	OEC	Open Elective – II	3	0	0	3
4	HS	Open Elective – III	3	0	0	3
5	HS	Life Skills and Professional Skills	0	0	4	2
6	PROJ	Industry Oriented Mini Project – II	0	0	4	2
7	PROJ	Project Stage - 1	0	0	8	4
		Total Credits	12	0	16	20

IV B. Tech – II Semester

Sl. No	Code	Subject	L	T	P	C
1	PEC	Elective – V	3	0	0	3
2	PEC	Elective – VI	3	0	0	3
3	OEC	Open Elective – IV	3	0	0	3
4	PROJ	Project stage – II	0	0	16	8
5	PROJ	Seminar - I	0	0	2	1
		Total Credits	9	0	18	18

Sem I : 17.5

Sem II : 20.5

Sem III : 23.5

Sem IV : 18.5

Sem V : 22

Sem VI : 20

Sem VII : 20

Sem VIII : 18

Total Number of credits: 160

Professional Core Courses (ES)

Sl. No	Code	Course Title	Hours per week			Total Credits	Semester
			L	T	P		
1	PCC	Electronic Devices					
2	PCC	Data Structures and Algorithms					
3	PCC	Computer Organization and Architecture					
4	PCC	Digital Electronics					
5	PCC	IT Workshop (SciLab/ Matlab)					
6	PCC	Signals and Systems/Control Systems					
7	PCC	Analog Electronics					
8	PCC	Object Oriented Programming					
9	PCC	Pulse and Digital Circuits					
10	PCC	Data Base Management Systems					
11	PCC	Operating Systems					
12	PCC	Design and Analysis of Algorithms					
13	PCC	Compiler Design					
14	PCC	Computer Networks					
		Total Credits					

Professional Elective Courses (PEC)

Sl. No	Code	Course Title	Hours per week			Total Credits	Semester
			L	T	P		
1	PEC	Elective – I	3	0	0	3	V
2	PEC	Elective – II	3	0	0	3	VI
3	PEC	Elective – III	3	0	0	3	VI
4	PEC	Elective – IV	3	0	0	3	VII
5	PEC	Elective – V	3	0	0	3	VII
6	PEC	Elective – VI	3	0	0	3	VIII
		Total Credits	18	0	0	18	-

CSE & IT Related Professional electives:

Stream	Elective i	Elective ii	Elective iii	Elective iv	Elective v	Elective vi
Networks	Network security	Adhoc sensor networks	Wireless sensor networks	Telecommunication switching system networks	Cellular mobile communications	Wireless and Cellular communications
Machine learning	machine learning	Advanced Databases	Big data analytics	Neural networks	Data Mining	Image processing and pattern reorganization

ECE Related Professional electives:

Stream	Elective i	Elective ii	Elective iii	Elective iv	Elective v	Elective vi
Embedded systems	Microprocessors and Microcontrollers	Embedded systems	Internet of things	Nano electronics	Digital system Design	VLSI
Communications	Principles of communications	Digital communications	Optical communications	Wireless and Cellular communications	Radar engineering	Satellite communication

Open Elective Courses (OEC)

Sl. No	Code	Course Title	Hours per week			Total Credits	Semester
			L	T	P		
1	OEC	Open Elective – I	3	0	0	2	VI
2	OEC	Open Elective – II	3	0	0	3	VII
3	OEC	Open Elective – III	3	0	0	3	VIII
4	OEC	Open Elective – IV	3	0	0	3	VIII
		Total Credits	12	0	0	11	-

Open Elective Courses

Soft skills and Interpersonal Communication

ICT for Development

Human Resource Development and Organizational Behavior
--

Cyber Law & Ethics

Introduction to Philosophical Thoughts
--

Comparative Study of Literature

Indian Music System

History of Science & Engineering

Introduction to Art & Aesthetics

Economic Policies in India

Metro Systems and Engineering

J. B. INSTITUTE OF ENGINEERING & TECHNOLOGY
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B.Tech. ECM	L	T-P-D	C
I Year - I Semester	3	1-0-0	4

(F110A) MATHEMATICS-I
(LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS)
(COMMON TO CE, EEE,ME,ECE,CSE,IT & ECM)

Course Objectives To learn

1. To study matrix algebra and its use in solving system of linear equations and in solving Eigen value problems.
2. To provide an over view of Ordinary differential equations in First order & Higher order.
3. Concept of Sequence & nature of series.

Course Outcomes After the completing the course the students will able to

1. Solve system of linear equations and eigen value problems.
2. Identify whether the given differential equation of first order is exact or not
3. Solve higher differential equation and apply the concept of differential equation to real world problems
4. Find the nature of sequences & series

Unit-1 MATRICES: (10L)

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

Unit-2 EIGEN VALUES and EIGEN VECTORS: (10L)

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

Unit-3 SEQUENCES and SERIES: (10L)

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.

Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence

Unit-4 FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS: (8L)

Exact, linear and Bernoulli's equations; Applications : Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Unit-5 ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER : (10L)

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$ and $xV(x)$; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. R.K.Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 4th Edition, 2014.

REFERENCE BOOKS:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

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B.Tech. ECM	L	T-P-D	C
I Year -II Semester	2	0-0-0	2

(F110B) ENGLISH
(COMMON TO EEE,ME,ECE,CSE,IT&MIE)

Course Objectives:

- To improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- To equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- To develop study skills and communication skills in formal and informal situations.

Course outcomes: Students should be able to

- To use English Language effectively in spoken and written forms.
- To comprehend the given texts and respond appropriately.
- To communicate confidently in various contexts and different cultures.
- To acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

UNIT –I:

‘The Raman Effect’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions. **Reading:** Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a

Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT – II:

‘Ancient Architecture in India’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms, Homophones, Homonyms, and Homographs.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Improving Comprehension Skills – Techniques for Good Comprehension

Writing: Format of a Formal Letter-**Writing Formal Letters** E.g., Letter of Complaint, Letter of Requisition, and Job Application with Resume.

UNIT – III:

‘Blue Jeans’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying-** Providing Examples or Evidence and Essay Writing

UNIT – IV:

‘What Should You Be Eating’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: **Writing Practices**--Writing Introduction and Conclusion -Précis Writing.

UNIT – V :

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage

Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports

TEXT BOOKS:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

REFERENCES:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

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**(F115A) PROGRAMMING FOR
PROBLEM SOLVING**

(Common to EEE, ECE&ECM)

B.Tech ECM	L	T	P	C
I Year I Semester	3	0	0	3

Course Objectives:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student will learn

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems.

Unit - 1: Introduction to Programming

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems.

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming.

Introduction to C Programming Language: variables (with data types and

space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do- while loops.

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

Unit - II: Arrays, Strings, Structures and Preprocessor:

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays.

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures.

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef.

Unit - III: Pointers and File handling in C:

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type.

Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

Unit - IV: Function and Dynamic Memory Allocation:

Functions: Designing structured programs, Declaring a function, Signature

of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries.

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions.

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types.

Unit - V: Introduction to Algorithms:

Basic searching algorithms (linear and binary search techniques),

Basic sorting algorithms (Bubble, Insertion, Quick, Merge and Selection sort algorithms) Basic concept of order of complexity through the example programs.

TEXT BOOKS:

1. Programming in C, Reema Thareja. Oxford university press.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
5. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

J. B. INSTITUTE OF ENGINEERING & TECHNOLOGY (UGC AUTONOMOUS)

B.Tech. ECM	L	T-P-D	C
I Year - I Semester	3	1-0-0	4

(F110D) ENGINEERING CHEMISTRY (Common to ECE, EEE & ECM)

Course Objectives:

- To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
- To include the importance of spectroscopic techniques and molecular energy levels.
- To acquire knowledge of chemical reactions those are used in the synthesis of molecules.

Course outcomes: The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels; one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

- Students can analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Students can rationalize bulk properties and processes using thermodynamic considerations.
- Students can distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- Students can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

Unit-1 ATOMIC STRUCTURE AND THEORIES OF BONDING:

Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy

level diagrams of N_2 , O_2 , F_2 , CO and NO.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

Unit-2 WATER AND ITS TREATMENT:

Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems..

Unit-3 ELECTROCHEMISTRY AND CORROSION:

Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation, determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery).

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – techniques of coating-hot dipping, cementation and electroplating of Copper.

Unit-4 SPECTROSCOPIC TECHNIQUES AND APPLICATIONS:

Principles of spectroscopy, selection rules and applications of electronic spectroscopy. Vibrational and rotational spectroscopy. Basic concepts of

Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

Unit-5 REACTION MECHANISM AND SYNTHESIS OF DRUG MOLECULES:

Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N1 , S_N2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$ and chromic acid. Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$ & $NaBH_4$. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

TEXT BOOKS:

1. Engineering Chemistry by P. C. Jain & M. Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
3. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N. E. Schore, 5th Edition.
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. Physical Chemistry, by P.W. Atkins
6. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan

REFERENCE BOOKS:

1. Engineering Chemistry(NPTEL web book) by B. L. Tembe, Kamaluddin and M.S.Krishnan
2. Stereochemistry of organic compounds by D.Narsipuri published by New age international publishers

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B.Tech. ECM	L	T-P-D	C
I Year -II Semester	0	0-2-0	1

(F1101) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB
(COMMON TO EEE,ME,ECE,CSE,IT&MIE)

Course Objectives:

To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning

- To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking and interviews

Course outcomes: The students will be able to attain

- Better understanding of nuances of English language through audio- visual experience and group activities
- Speaking skills with clarity and confidence which in turn enhances their employability skills
- Neutralization of accent for intelligibility

The following course content is prescribed for the English for the English Language and Communication Skills Lab based on Unit -6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the lab.

SYLABUS:

English Language and Communication Skills Lab (ELCS) will have two parts:

- a) **Computer Assisted Language Learning (CALL) Lab:**
- b) **Interactive Communication Skills (ICS) Lab:**

Exercise – I: CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. **Practice:** Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language. **Practice:** Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II:CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette

Exercise – III: CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: How to make Formal Presentations.

Practice: Formal Presentations.

Exercise – IV:CALL Lab:

Understand: Listening for General Details

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.

Practice: Making a Short Speech – Extempore.

Exercise – V:

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills.

Practice: Mock Interviews.

Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students. **System**

Requirement (Hardware component): *Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*

- i) Computers with Suitable Configuration
- ii) High Fidelity Headphones

Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

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I Year - I Semester	0	0-4-0	2

(F1107) PROGRAMMING FOR PROBLEM SOLVING LAB

(Common to EEE, ECE&ECM)

Course Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

Course Outcomes: The student is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files
- modularize the code with functions so that they can be reused

1.Simple numeric problems:

- a) Write a program for find the max and min from the three numbers.

- b) Write the program for the simple, compound interest.
- c) Write program that declares Class awarded for a given percentage of marks, where mark $<40\%$ = Failed, 40% to $<60\%$ = Second class, 60% to $<70\%$ = First class, $\geq 70\%$ = Distinction. Read percentage from standard input.

2. Expression Evaluation:

- a) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)
- b) Write a program that finds if a given number is a prime number
- c) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- d) Write a C program to find the roots of a Quadratic equation.

3. Arrays and Pointers and Functions:

- a) Write a C program to find the minimum, maximum and average in an array of integers.
- b) Write a C program to find Addition of Two Matrices
- c) Write a C program to find Multiplication of Two Matrices
- d) Write C programs that use both recursive and non-recursive functions
- e) Write a program for reading elements using pointer into array and display the values using array.

4. Files:

- a) Write a C program to display the contents of a file to standard output device.
- b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
- c) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.

5.Strings:

a)Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

b)Write a C program to count the lines, words and characters in a given text.

6. Sorting and Searching:

- a) Write a C program for using binary search method.
- b) Write a C program for linear search.
- c) Write a C program that implements the Bubble sort method .
- d) Write a C program that implements the Insertion sort method .
- e) Write a C program that implements the Quick sort method .
- f) Write a C program that implements the Merge sort method .

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B.Tech. ECM	L	T-P-D	C
I Year - I Semester	0	0-2-0	1.5

(F1102) CHEMISTRY LABORATORY
(COMMON TO ECE, EEE & ECM)

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- To determine the rate constant of reactions from concentrations as a function of time.
- The measurement of physical properties like adsorption and viscosity.
- To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes The experiments will make the student gain skills on:

- a) Determination of parameters like hardness and chloride content in water.
- b) Estimation of rate constant of a reaction from concentration – time relationships.
- c) Determination of physical properties like adsorption and viscosity.
- d) Calculation of R_f values of some organic molecules by TLC technique.
 1. Determination of total hardness of water by complexometric method using EDTA
 2. Determination of chloride content of water by Argentometry
 3. Estimation of an HCl by Conductometric titrations
 4. Estimation of Acetic acid by Conductometric titrations
 5. Estimation of HCl by Potentiometric titrations

6. Estimation of Fe^{2+} by Potentiometry using KMnO_4
7. Estimation of amount of Cu^{+2} by Colorimetry
8. Estimation of amount of KMnO_4 by Colorimetry
9. Synthesis of Aspirin and Paracetamol
10. Determination of acid value of coconut oil
11. Thin layer chromatography calculation of R_f values. eg ortho and para nitro phenols
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.

REFERENCES:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in engineering chemistry – S.S. Dara

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B.Tech. ECM	L	T-P-D	C
I Year - II Semester	3	1-0-0	4

(F120A) MATHEMATICS-II
(ADVANCED CALCULUS)
(COMMON TO CE, EEE,ME,ECE,CSE,IT & ECM)

Course Objectives: To learn

1. Geometrical approach to the mean value theorems and their application to the mathematical problems
2. Evaluation of improper integrals using Beta and Gamma functions.
3. Finding maxima and minima of function of two and three variables
4. Evaluation of multiple integrals and their applications
5. The physical quantities involved in engineering field related to vector valued functions.
6. The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course outcomes: After the completing the course the students will able to

- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions.
- Find the extreme values of functions of two variables with/ without constraints.
- Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped.

Evaluate the line, surface and volume integrals and converting them from one to another

Unit-1 CALCULUS: (10L)

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series.

Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

Unit-2 MULTIVARIABLE CALCULUS (PARTIAL DIFFERENTIATION AND APPLICATIONS): (8L)

Definitions of Limit and continuity.

Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

Unit-3 MULTIVARIABLE CALCULUS (INTEGRATION): (10L)

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelepiped).

Unit-4 VECTOR DIFFERENTIATION: (10L)

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

Unit-5 VECTOR INTEGRATION:**(10L)**

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. R.K.Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 4th Edition, 2014.

REFERENCE BOOKS:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint, 2008.
G.B.Thomas and R.L.Finney, Calculus and Analytic Geometry, 9th Edition, Pearson, Reprint, 2010.

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B.Tech. ECM	L	T-P-D	C
I Year -II Semester	3	1-0-0	4

(F122A) BASIC ELECTRICAL ENGINEERING
(COMMON TO EEE,ECE & ECM)

Course objectives:

1. To introduce the concepts of electrical circuits and its components.
2. To understand magnetic circuits, DC circuits and AC single phase and three phase circuits.
3. To study and understand the different types of DC/AC machines and transformers.
4. To import the knowledge of various electrical installations.

Course Outcomes:

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic electric and magnetic circuits.
3. To get an exposure of working principles of electrical machines.
4. To introduce components of low voltage electrical installations.

UNIT-I: DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws, analysis of simple circuits with DC excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT –II: AC Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC and RLC series combinations, resonance in series RLC circuit. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III: Transformers: Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV: Rotating Electrical Machines: D.C Motors - principle of operation, characteristics, speed control and application of series and shunt motor. Three-phase induction motor - construction, generation of rotating magnetic fields, principle of operation, torque-slip characteristics. Single-phase induction motor - construction, working, torque-speed characteristic.

UNIT –V: Electrical Installations: Components of LT switchgear: Switch fuse unit (SFU), MCB, ELCB, MCCB, types of wires and cables, earthing. Types of batteries, important characteristics for batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXT BOOKS :

1. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
3. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.

REFERENCES:

1. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
2. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.

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B.Tech. ECM	L	T-P-D	C
I Year - II Semester	3	1-0-0	4

(F120C) APPLIED PHYSICS
(Common to EEE,ECE,CSE,IT&ECM)

Course Objectives: The student will

- demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
- demonstrate competency and understanding of the concepts found in Quantum Mechanics, Semiconductor physics, Fiber optics and lasers and Electromagnetic theory and a broad base of knowledge in physics.
- solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
- study applications in engineering like memory devices, transformer core and electromagnetic machinery.

Course Outcomes: The student will be able to

- learn the fundamental concepts on Quantum behaviour of matter in its micro state.
- get the knowledge of fundamentals of Semiconductor physics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
- design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
- be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.

UNIT-I: Quantum Mechanics:

Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT-II: Electronic Materials:

Classical Free electron theory, Quantum free electron theory, Fermi energy level, Occupation probability, Density of States, Bloch Theorem, Kronig-Penny model, E-K Diagram, Effective mass of Electron, Band Theory of solids, Classification of materials.

UNIT-III: Semiconductor Physics:

Intrinsic and Extrinsic semiconductors, Carrier Concentration in intrinsic and extrinsic Semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction diode, V-I Characteristic, Diode equation(qualitative treatment), Zener diode, Hall effect, LED, Photo diode and Solar cell.

UNIT-IV: Lasers and Fibre Optics :

Lasers: Introduction, absorption, spontaneous emission, Stimulated emission, calculation of Einstein co-efficient, Population inversion, Pumping, Lasing action, Types of Lasers: Ruby laser, He-Ne laser, Semiconductor laser, Applications of laser.

Fibre Optics: Introduction, Construction and working principle of Optical fibre, Acceptance angle, Acceptance cone and Numerical aperture, Types of optical fibres, Applications of optical fibres.

UNIT-V: Electromagnetism:

Laws of electrostatics, Electric current and the continuity equation, Ampere's and Faraday's laws, Maxwell's equations, The wave equation: Plane Electromagnetic waves in vacuum, their Transverse nature, Polarisation, Permittivity and Dielectric constant, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectric.

TEXT BOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. Physics, Halliday and Resnick, - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - Chand

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. Semiconductor Optoelectronics: Physics and Technology, J.Singh, Mc Graw-Hill inc. (1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL.
4. P.K.Palanisamy, "Engineering Physics", Scitech Publications, Fourth edition.

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B.Tech. ECM	L	T-P-D	C
I Year -I Semester	1	0-0-4	3

**(F123A) ENGINEERING DRAWING & COMPUTER GRAPHICS
(Theory and Lab)**

(COMMON TO ME & ECE)

Pre-requisites: None

Course objectives: The student will

- Learn a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- Prepare to communicate effectively
- Learn to use the techniques, skills, and modern engineering tools necessary for engineering practice

Course Outcomes: After completing this course, the students will be

- Able to understand engineering drawing and its place in society
- Exposed to the visual aspects of engineering drawing and graphics
- Exposed to engineering graphics standards
- Exposed to solid modelling
- Exposed to computer-aided geometric design
- Exposed to creating working drawings
- Exposed to engineering communication

UNIT – I: INTRODUCTION TO ENGINEERING DRAWING (2 Lecture classes and 8 Practical's): Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloids,

Hypocycloid and involute.

UNIT – II: ORTHOGRAPHIC PROJECTIONS AND PROJECTIONS OF POINTS, LINES AND PLANES (2 Lecture classes and 12 Practical's): Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined to both the Planes- Draw simple annotation, dimensioning and scale.

UNIT – III: PROJECTIONS OF REGULAR SOLIDS AND SECTIONAL VIEWS OF RIGHT REGULAR SOLIDS (2 Lecture Classes And 12 Practical's): Projections of regular solids - Prism, Cylinder, Pyramid, Cone – Auxiliary Views; , Draw the sectional views of geometrical solids.

UNIT – IV: ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS (2 Lecture classes and 12 Practical's): Principles of Isometric projection – Isometric Scale, Isometric Views, Conversion of Isometric Views to Orthographic Views and Vice-versa.

UNIT – V: OVERVIEW OF COMPUTER GRAPHICS (2 Lecture classes and 16 Practical's): *Drafting Software:* Computer Aided Drafting (CAD) – Drafting Software – Manual Drafting vs Auto CAD Drafting. *Auto CAD commands:* Starting Auto CAD - Auto CAD commands – (Generation of Points, Lines, Curves and Polygons) - Editing and Modifications - Drafting Settings - Dimensioning and Text - Geometrical Constructions. Projection of Points - Straight Lines - Plane surfaces – Solids - Isometric projections

Note: CAD Lab facility is required for this unit.

(Only theory Question to be set from this Unit for Examinations)

TEXT BOOKS:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. K. Venugopal & V. Prabhu Raja (2011), Engineering Drawing + Auto CAD, New Age International Publishers. Fifth Edition.
3. CAD Software Theory and User Manuals

REFERENCES:

1. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
2. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication..

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B.Tech. ECM	L	T-P-D	C
I Year -II Semester	0	0-2-0	1

(F1204) BASIC ELECTRICAL ENGINEERING LAB
(COMMON TO EEE,ECE & ECM)

Course Objectives:

1. To analyze a given network by applying various electrical laws and network theorems.
2. To know the response of electrical circuits for different excitations.
3. To calculate, measure and know the relation between basic electrical parameters.
4. To analyze the performance characteristics of DC and AC electrical machines.

Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Relate the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters
4. Inspect the basic characteristics of transformers and electrical machines.

Choice of 10-12 experiments from the following

List of Experiments

1. Verification of Ohms Law.
2. Verification of KVL and KCL.
3. Transient response of series RL and RC circuits using DC excitation.
4. Transient response of RLC series circuit using DC excitation.
5. Resonance in series RLC circuit.
6. Calculations and verification of impedance and current of RL, RC

and RLC series circuits.

7. B-H loop for single phase transformers.
8. Measurement of voltage, current and real power in primary and secondary circuits of a single phase transformer.
9. Load test on single phase transformer (Calculate Efficiency and Regulation).
10. Three phase transformer: Verification of relationship between voltages and currents (Star-Delta, Delta-Delta, Delta-star, Star-Star).
11. Measurement of active and reactive power in a balanced three-phase circuit.
12. Performance Characteristics of a DC Shunt Motor.
13. Torque-Speed Characteristics of a DC Shunt Motor.
14. Performance Characteristics of a Three-phase Induction Motor.
15. Torque-speed Characteristics of a Three-phase Induction Motor.

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B.Tech. ECM	L	T-P-D	C
I Year -II Semester	0	0-3-0	1.5

(F1202) APPLIED PHYSICS LAB
(Common to EEE,ECE,CSE,IT&ECM)

Course Objectives: The student will

1. Demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
2. Demonstrate competency and understanding of the concepts found in LED, Electric and Electronic materials a broad base of knowledge in physics.
3. Solve Experimental problems that potentially draw on experimental knowledge in multiple areas of physics.
4. study applications in engineering like Hall effect, Optical fibre, LASER, Photodiode and Solar cell.

Course Outcomes: The student will be able to

1. Learn the experimental concepts on in LED, Electric and Electronic materials.
2. Get the knowledge of fundamentals of Semiconductor physics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
3. Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
4. Be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.

List of Experiments:

1. Energy gap of P-N junction diode:
To determine the energy gap of a semiconductor diode.
2. Solar Cell:
To study the V-I Characteristics of solar cell.
3. Light emitting diode:
Plot V-I and P-I characteristics of light emitting diode.
4. Optical fiber:
Determination of Numerical Aperture.
5. Hall effect:
To determine Hall co-efficient of a given semiconductor.
6. Photoelectric effect:
To determine work function of a given material.
7. LASER:
To study the Wave length of LASER Source.
8. Dielectric constant:
To determine the Dielectric constant of the given material.
9. LCR Circuit:
To determine the Quality factor of LCR Circuit (Series & Parallel).
10. R-C Circuit:
To determine the time constant of R-C circuit (Growth and Decay).

Text Books:

1. "Experiments in Applied Physics" (Physics Lab Manual 4th edition)
, Dr. Narendra, L. Mathakari
2. " Engineering Physics Lab Manual" By Department of Physics
JBIET

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B.Tech. ECM	L	T-P-D	C
I Year -II Semester	1	0-4-0	3

(F1205) WORKSHOP AND MANUFACTURING PRACTICES
(COMMON TO CE, ME,ECE & ECM)

Pre-requisites: None

Course objectives: The student will

1. Learn fabricating small components using engineering tools and machines
2. Understand the working principles of maintaining dimensional accuracies and dimensional tolerances in different manufacturing processes
3. Understand assembly of various components.

Course Outcomes: After completing this course, the students will able to

1. Fabricate components with their own hands.
2. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.

Produce small components of their interest by assembly

(I)WORKSHOP AND MANUFACTURING PRACTICES – 10 Lecture hours

1. Brief introduction to Manufacturing processes : –
 - a. machining on lathe, milling and drilling machines,
 - b. basic process involved in the casting,
 - c. brief process of forging , forming,
 - d. metal joining , brief process of gas welding **(3 hours)**
2. Demo of working of CNC machine **(2 hours)**
3. Fitting operations & power tools **(1 hour)**
4. Electric house wiring **(1 hour)**
5. Carpentry **(1 hour)**
6. Metal casting **(1hour)**
7. Welding (arc welding & gas welding), brazing **(1hour)**

(II) WORKSHOP PRACTICE: 60 hours

1. Machine shop **(12 hours)** - on Lathe , Milling and drilling
2. Fitting shop **(8 hours)**
3. Carpentry **(8 hours)**
4. Electrical house wiring **(8 hours)**
5. Welding shop **(8 hours (Arc welding 4 hrs + gas welding 4 hrs)**
6. Foundry practices – mould preparation **(8 hours)**
7. Smithy – Black smithy and Tin smithy **(8 hours)**

TEXT BOOKS :

- 1 Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- 2.Kalpakjian S. And Steven S. Schmid, “Manufacturing Engineering and Technology”, 4th edition, Pearson Education India Edition, 2002.
- 3.Gowri P. Hariharan and A. Suresh Babu, “Manufacturing Technology – I” Pearson Education, 2008.

REFERENCES:

1. Roy A. Lindberg, “Processes and Materials of Manufacture”, 4th edition, Prentice Hall India, 1998.
2. Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	3	0-0-0	3

(F214A) ELECTRONIC DEVICES AND CIRCUITS
 (Common to ECM, ECE, EEE)

Course Objectives:

To learn

1. PN junction diode operation, characteristics and applications
2. Transistor characteristics in various configurations
3. FET & MOSFET operations & Characteristics
4. Biasing of BJT & FET and various models
5. Fabrication of integrated circuits

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Construct different circuits using PN-Junction diode
2. Analyze working of transistor in different configurations
3. Operate MOSFET in Enhancement and Depletion Mode
4. Apply BJT & MOSFET for biasing and small signal models
5. Analyze the fabrication process of Integrated circuits.

UNIT-I: Applications of P-N Junction diode

V-I characteristics of P-N Junction as a diode, the PN- Junction as a Rectifier, Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Harmonic Components in a Rectifier circuit, Inductor Filters, Capacitor filters, L-section filters, π - Section filters, comparison of filters, DC-power supply circuit design,

Special Diodes: Zener Diode, Avalanche and Zener Breakdown, V-I characteristics of Zener Diode, voltage regulator using Zener diode, Tunnel diode construction and working (using Energy Band diagram), Schottky diode, Photo diode, UJT, SCR their construction and V-I characteristics.

UNIT-II: Transistor (BJT) Characteristics

Introduction to Bi- polar Junction Transistor, Different configurations, current components in a junction Transistor, V-I characteristics in CE and CB configurations. Eber Molls model for a transistor Small Signal Model for BJT.

UNIT–III: Field Effect Transistors (FET)

Comparison of BJT & FET, Construction & Operation of JFET, V-I characteristics of JFET, Determination of FET Parameters from the V-I characteristics. MOSFET Construction & Operation in Enhancement and Depletion modes, V-I characteristics of MOSFET.

UNIT–IV: Biasing & Small Signal Models for Transistors (BJT & FET)

Need for Biasing of transistors, Determination of Quiescent point from the CE characteristics, stability factors S , Introduction to fixed bias, Self-bias, collector to base bias. Transistor circuits for Quiescent point and stability factor S . H-Parameter equivalent circuit for BJT Definition & Determination of h-Parameters from CE V-I Characteristics, Small Signal Models for FET Transistors Biasing of FET, Self-Bias.

UNIT-V: Integrated circuit fabrication process

Basic Monolithic Integrated Circuits, Integrated Resistors, Capacitors & inductors Epitaxial Growth Masking and Etching oxidation, diffusion, ion implantation, photolithography, Monolithic circuit layout, chemical vapor deposition, sputtering, twin-tub CMOS process.

Text Books:

1. Electronic Devices and Circuits Millman & Halkias McGraw Hill (Mandatory)
2. Integrated Electronics Millman & Halkias McGraw Hill

References:

1. G. Streetman, and S. K. Banerjee, "Solid State Electronic Devices," 7th edition, Pearson, 2014.
2. D. Neamen, D. Biswas "Semiconductor Physics and Devices," McGraw-Hill Education
3. S. M. Sze and K. N. Kwok, "Physics of Semiconductor Devices," 3rd edition, John Wiley & Sons, 2006.
4. C.T. Sah, "Fundamentals of solid state electronics," World Scientific Publishing Co. Inc, 1991.
5. Y. Tsididis and M. Colin, "Operation and Modeling of the MOS Transistor," Oxford Univ. Press, 2011.
6. Electronic Devices and Circuits, BOYLESTAD

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	3	0-0-0	3

(F215A) DATA STRUCTURES

(Common to ECM, CSE & IT)

Course Objectives:

At the end of the course, students will learn:

1. Define the basic data structures like linked list.
2. Understand the fundamentals and applications of linked list, stacks and queues.
3. Classify different types of tree data structures.
4. Understand the concepts of graph data structures.
5. Know the fundamentals of basic searching, sorting and pattern matching algorithms.

Course Outcomes:

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

1. Demonstrate operations like searching, insertion, deletion, traversing mechanism using linked list.
2. Use linear and non-linear data structures like stacks, queues etc.
3. Implement different types of tree data structures.
4. Implement the concepts of graph data structures.
5. Apply the basic searching, sorting and pattern matching Techniques.

UNIT-I:

Basic concepts – Algorithm Specification, Data Abstraction, Performance analysis – time complexity and space complexity, Asymptotic Notation – Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures.

Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, doubly linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT-II:

Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation, recursion implementation.

Queues-operations, array and linked representations. Circular Queue operations, Dequeue, applications of queue.

UNIT-III:

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Binary Heap-Properties, Max and Min Heap, Operations-Insertion and Deletion.

Search Trees – Binary Search tree, Tree traversals, AVL tree – operations, B-tree – operations, B+ trees, Red Black tree.

UNIT-IV:

Graphs – Terminology, sequential and linked representation, graph traversals: Depth First Search & Breadth First Search implementation. Spanning trees, Prims and Kruskals method.

Searching and Sorting– Linear Search, Binary Search, Insertion Sort, Selection Sort, Merge Sort, Quick sort, Heap Sort.

UNIT-V:

Hashing – Hash table, Hash table representations, hash functions, collision resolution techniques-separate chaining, open addressing-linear probing, quadratic probing, double hashing, Re hashing, Extendible hashing,

Pattern matching: Introduction, Brute force, the Boyer –Moore algorithm, Knuth-Morris-Pratt algorithm.

Text Books:

1. Data Structures Using C, Reema Thareja, Oxford University Press, 2011 Learning.
2. Introduction to Algorithms, TH Cormen, PHI

References:

1. Data Structures & Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education.
2. Design methods and analysis of Algorithms, SK Basu, PHI.
3. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Universities Press.

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UGC AUTONOMOUS

B.Tech. ECM	L	T-P-D	C
II Year - I Semester	3	1-0-0	4

(F217A) COMPUTER ORGANIZATION AND ARCHITECTURE

Course Objectives:

At the end of the course, students will learn to:

1. Understand basic components of computers.
2. Know the architecture of 8086 processors.
3. Learn the instruction sets, instruction formats and various addressing modes of 8086.
4. Analyse the representation of data at the machine level and how computations are performed at machine level.
5. Identify and analyse the memory organization and I/O organization.
6. Understand the parallelism both in terms of single and multiple processors

Course Outcomes:

After learning the contents of this paper the student must be able to:

1. Understand the basic components and the design of CPU, ALU and Control Unit.
2. Analyse memory hierarchy and its impact on computer cost/performance.
3. Identify the advantage of instruction level parallelism and pipelining for high performance Processor design.
4. Understand the instruction set, instruction formats and addressing modes of 8086.
5. Write assembly language programs to solve problems.

UNIT-I:

Basic Computer Organization

Functions of CPU, I/O units, Memory, Instructions: instruction formats- One Address, Two Addresses, Zero Addresses & Three Addresses & comparison. Addressing modes with numeric examples: program control-status bit conditions, conditional branch instructions, Program interrupts: Types of interrupts.

UNIT-II:

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Input –Output Processor (IOP), Intel 8089 IOP

UNIT-III:**Input-Output Organization**

Input-Output Interface, I/O bus & modules, I/O Vs memory bus, Isolated Vs memory mapped I/O, Asynchronous data transfer Modes of Transfer-Strobe control.

Handshaking; Asynchronous serial transfer- Asynchronous communication interface, Modes of transfer-Programmed I/O, Interrupt driven I/O, DMA, DMA controller, DMA transfer.

UNIT-IV:**Memory****Organizations**

Memory hierarchy, memories, RAM, ROM chips, Memory Address map, Memory connection to CPU, Associate memory, Cache memory.

data cache, instruction cache, miss & hit ratio, Access time, associative, set associative mapping, waiting into cache, introduction to virtual memory.

UNIT-V:

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter processor arbitration, Inter processor communication, and synchronization.

Text Books:

1. Computer Organization–Carl Hamacher, Zvonks Vranesic, Safea Zaky, Edition, McGrawHill.
2. Computer Systems Architecture–M.Moris Mano, IIIrd Edition, Pearson/PH

References:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals of Computer Organization and Design, Sivarama Dandamudi Springer Int. Edition.

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	3	0-0-0	3

(F214B) DIGITAL ELECTRONICS

Course Objectives:

At the end of the course, students will learn to:

1. Understand Boolean Algebra and simplify Boolean functions using K-Maps
2. Emphasize on the concepts of designing combinational circuits
3. Learn how to use memory elements in FSM designs
4. Know about different logic families like CMOS, TTL and ECL
5. Gain knowledge of different PLDs and RAM organization.

Course Outcomes:

After learning the contents of this paper the student must be able to:

1. Apply Boolean Algebra and K-Maps to minimize Boolean functions
2. Design different combinational circuits
3. Design different synchronous FSMs
4. Analyze different logic families and interfacing
5. Design digital systems using different PLDs

UNIT–I: Logic Simplification

Introduction to number system, Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms.

Canonical forms, Karnaugh maps up to 5 variables, Binary codes, Code Conversion.

UNIT–II: Combinational Logic Design

MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display.

Half and Full Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter and ALU.

UNIT–III: Sequential Logic Design

Building blocks like S-R, D, T, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers.

Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits

UNIT–IV: Logic Families

TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL.

CMOS families and their interfacing, TTL logic family (7400, 74S00, 74LS00), ECL Logic family, comparison of logic families.

UNIT-V: Programmable logic Devices & Memories

Digital system design using ROM, PLA & PAL, comparison of ROM, PLA & PAL, RAM Memory, read and write operation timing diagram.

Memory Decoding, memory Cell, Address Multiplexing, Bipolar RAM, SRAM, DRAM, Memory organization, Internal Structure, RAM Matrix at transistor level and Gate level.

Text Books:

1. R.P. Jain, “Modern digital Electronics”, Tata McGraw Hill, 4th edition, 2009.
2. Douglas Perry, “VHDL”, Tata McGraw Hill, 4th edition, 2002.

References:

1. W.H. Gothmann, “Digital Electronics- An introduction to theory and practice”, PHI, 2nd edition, 2006.
2. D.V. Hall, “Digital Circuits and Systems”, Tata McGraw Hill, 1989
3. Charles Roth, “Digital System Design using VHDL”, Tata McGraw Hill 2nd edition 2012.

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	3	1-0-0	4

(F210A) MATHEMATICS – III
(Common to EEE, ECE, ECM)

Course Objectives:

To learn

1. Importance of Fourier series
2. Basic properties of complex functions and analytic functions
3. Taylor's series, Maclauren's and Laurent's series expansions of complex function
4. Evaluation of integrals using residue theorem.
5. The mapping by general analytic functions $W=f(z)$.

Course Outcomes:

After learning the contents of this paper the student must be able to:

1. Find the series expansions of periodic functions
2. construct the analytic function
3. construct Laurent's series about the singular points
4. use residue theorem to compute several kinds of real integrals
5. construct conformal mappings between many kinds of domains

UNIT-I:

FOURIER SERIES

Determination of Fourier coefficients – Fourier series – even and odd functions

Fourier series in an arbitrary interval- even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

UNIT-II:

FUNCTIONS OF A COMPLEX VARIABLE

Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann conditions,

Maxima – Minima principle, Harmonic and conjugate harmonic functions – Milne – Thompson method.

UNIT-III:**COMPLEX INTEGRATION & POWER SERIES**

Line integral – evaluation along a path and by indefinite integration – Cauchy’s integral theorem – Cauchy’s integral formula –

Generalized integral formula. Radius of convergence – Expansion in Taylor’s series, Maclaurin’s series and Laurent series.

UNIT-IV:**CONTOUR INTEGRATION**

Singular point – Isolated singular point – pole of order m – essential singularity. (Distinction between the real analyticity and complex analyticity)

Residue – Evaluation of residue by formula and by Laurent series - Residue theorem, Evaluation of integrals of the type

$$(a) \text{ Improper real integrals } \int_{-\infty}^{\infty} f(x) dx \quad (b) \int_c^{c+2\pi} f(\cos\theta, \sin\theta) d\theta$$

UNIT-V:**CONFORMAL MAPPING**

Transformation by e^z , $\text{Im}z$, z^2 , z^n (n positive integer), $\text{Sin } z$, $\text{cos } z$, $z + a/z$. Translation, rotation, inversion and bilinear transformation – fixed point. Cross ratio properties – invariance of circles and cross ratio – determination of bilinear transformation mapping 3 given points.

Text Books:

1. Grewal B.S, “Higher Engineering Mathematics”, Khanna publications, 42nd edition 2012
2. Advanced Engineering Mathematics by Jain and S.R.K. Iyengar, Narosa Publications.
3. Engineering Mathematics by B.V.Ramana, Tata McGrawhill Publishing company Ltd New Delhi, 5th edition, 2011

References:

1. Engineering Mathematics-III by T.K.V. Iyengar & B.Krishna Gandhi & Others, S.Chand
2. Engineering Mathematics-III by G.Shankar Rao, I.K.International Publications.
3. KREYSZIG. E, "Advanced Engineering Mathematics" JohnWiley & Sons Singapore, 10th edition, 2012.
4. Veerarajan.T " Engineering Mathematics-I", Tata McGrawhill Publishing Co.New Delhi, 5th edition, 2006.

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	3	0-0-0	3

(F210E) PROFESSIONAL ETHICS

(Common to Civil, EEE, ME, ECE,CSE, IT, ECM)

Course Objectives:

To learn this introductory course input is intended to help the students in understanding of ethics, values and holistic approach towards ethical living.

Course Outcomes:

After learning the contents of this paper the student must be able to:

1. Understand essentials of human values and ethical living through basic ethical and moral theories.
2. Understand and recognize professionalism, professional responsibilities, professional etiquettes.
3. Understand ethical codes and audit.
4. Formulate strong foundations in human values through domains of learning, ethical living through case studies.
5. Develop various solutions in solving of global issues and for its safety and sustainability.

UNIT-I:

Introduction to Ethics

Corporate Governance – importance of Corporate Governance, Ethics & CSR (Corporate Social Responsibility) Indian and western thoughts on ethics.

Value education, dimensions of ethics, goal setting importance of morality and ethics, basic ethical principles, moral developments theories, classification of ethical theories.

UNIT-II:

Professional and professionalism:

Introduction to profession, professional associations, professional's roles and professional risks. Professional accountability, successful professional, ethics and profession.

Engineering as social experimentation, engineering ethics, roles of engineers, professional responsibilities, professional rights. Professional etiquettes- Dress code, Telephone call, Email writing.

UNIT-III:

Ethical codes and audits

Introduction, need for ethical codes, sample codes, corporate codes, limitations of the codes.

Need for Ethical Audit, Sustainability, Ethical standards, Ethical audit.

UNIT-IV:

Human values and ethical living

Introduction, terminology, domains of learning, human values, attitudes, behavior values, attitudes and professionals.

Needs of life, harmony in life, what is ethical living, case studies.

UNIT-V:

Global issues and safety

Introduction, current scenario, business ethics, environmental ethics, computer ethics, media ethics, war ethics, bio-ethics, research ethics, intellectual property right.

Safety and risk, assessment of risk, risk and cost, engineers responsibility for safety, risk benefit, analysis, risk cause and management, case studies, providing for safe exit, ethical issues of safety.

References:

1. Professional ethics by R. Subramanian, Oxford press.
2. Text book on Professional ethics and human values by R.S.Nagarajan, New age international.
3. Professional ethics and human value by D.R.Kiran, Tata McGraw Hills education.
4. Ethics in engineering by Mike W. Martin and Roland Schinzinger, Tata McGraw Hills education.
5. Fundamental of Ethics by Edmund G Seebauer and Robert L.Barry, Oxford university press.

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	0	0-2-0	1

(F2141) ELECTRONIC DEVICES AND CIRCUITS LAB.
(Common to EEE, ECE, ECM)

Course Objectives:

The Students will :

1. Study the basic electronic components and Applications.
2. Observe the characteristics of different electronic devices.

Course Outcomes:

The student will be able to:

1. Measure the voltage, frequency and phase of any waveform using CRO.
2. Generate sine, square and triangular waveforms with required frequency and amplitude using function generator.
3. Analyze the characteristics of different electronic devices such as diodes, transistors etc., and simple circuits like rectifiers, amplifiers , etc.,

Minimum Twelve experiments to be conducted

1. Forward & Reverse Bias Characteristics of a PN Junction Diode
2. Zener diode Characteristics and Zener diode as a voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration.
4. Input & Output Characteristics of Transistor in CE Configuration.
5. Half Wave Rectifier with & without filters
6. Full Wave Rectifier with & without filters
7. Bridge Rectifier with & without filters
8. FET characteristics
9. Measurement of h parameters of transistor in CE configuration
10. Frequency Response of CE Amplifier
11. Frequency Response of CC Amplifier
12. Frequency Response of Common Source FET amplifier
13. SCR characteristics
14. UJT Characteristics

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	0	0-3-0	1.5

**(F2151) DATA STRUCTURES LAB.
(Common to CSE, IT, ECM)**

Course Objectives:

At the end of the course, students will:

1. Define the basic data structures like linked list.
2. Understand the fundamentals and applications of linked list, stacks and queues.
3. Classify different types of tree data structures
4. Understand the concepts of graph data structures.
5. Know the fundamentals of basic searching, sorting and pattern matching algorithms.

Course Outcomes:

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

1. Demonstrate operations like searching, insertion, deletion, traversing mechanism using linked list.
2. Use linear and non-linear data structures like stacks, queues etc.
3. Implement different types of tree data structures.
4. Implement the concepts of graph data structures.
5. Apply the basic searching, sorting and pattern matching Techniques.

Experiment 1:

Write a C program that uses functions to perform the following operations on singly linked list: I) Creation II) Insertion III) Deletion IV) Traversal V) merge two single linked lists.

Experiment 2:

Write a C program that uses functions to perform the following operations on doubly linked list. I) Creation II) Insertion III) Deletion IV) Traversal

Experiment 3:

Write a C program that implement stack operations using: I) Arrays II) Linked Lists

Experiment 4:

- I) Write a C program to convert infix expression to postfix expression using stack
- II) Write a C program to evaluate postfix expression

Experiment 5:

- I) Programs using recursion
- II) Write a C program to convert infix expression to prefix expression using stack

Experiment 6:

Write a C program to implement Linear queue using I) Arrays II) Linked Lists

Experiment 7:

Write a C program to perform following operations on a circular Queue
I) insertion II) deletion III) search and count

Experiment 8:

Write a C program to perform following operations on a circular DeQueue
I) insertion II) deletion III) search and count

Experiment 9:

- I) Write a C Program to implement binary tree traversals
- II) Write a C Program to implement AVL tree operations

Experiment 10:

- I) Implementation of a Graph representation using Adjacency Matrix
- II) Write a C program to implement graph traversals.

Experiment 11:

- I) Write a C program to implement Linear search
- II) Write a C program to implement Binary Search

Experiment 12:

Write C programs that implement the following sorting methods to sort a

given list of integers in ascending order: I) Bubble sort II) Selection sort III) Insertion Sort

Experiment 13:

Write C programs that implement the following sorting methods to sort a given list of

integers in ascending order:

I) Merge sort II) Quick sort

Experiment 14:

I) Write a C Program to Implement the Hashing technique

II) Write a C Program to Implement the KMP Pattern Searching Algorithm

Text Books:

1. **C Programming & Data Structures**, B.A.Forouzan and R.F. Gilberg, ThirdEdition, Cengage Learning.
2. **Data Structures Using C** (Paperback) by Aaron M. Tenenbaum

References:

1. **C& Data structures** – P. Padmanabham, Third Edition, B.S. Publications.
2. **Data Structures using C** – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI.
3. **C Programming & Data Structures**, E. Balagurusamy, TMH.

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	0	0-2-0	1

(F2143) DIGITAL ELECTRONICS LAB.
(Common to ECE, ECM)

Course Objectives:

The student will

1. Learn to verify the functionality of combinational circuits
2. Analyze the RAM operations
3. Learn VHDL/Verilog simulation language
4. Verify the operations of the Digital IC's using VHDL/Verilog

Course Outcomes:

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

1. Design different combinational circuits using ICs
2. Analyze sequential circuits behavior using ICs
3. Simulate combinational circuits using VHDL/Verilog

List of Experiments:

To Verify the Functionality of the following 74 series TTL ICs.

1. D Flip -Flop (74LS74) and JK Master-Slave Flip-Flop (74 LS73}.
2. Decade counter (74LS90) and UP-Down Counter (74 LS192).
3. Universal Shift registers- 74LS194/ 195.
4. 3-8 decoder-74LS138.
5. 4-bit comparator 74LS 85.
6. 8X1 Multiplexer-74151 and 2X4 demultiplexer-74155.
7. RAM (16X4) - 74189 (read and write operations).
8. Stack and queue implementation using RAM, 74189.

Simulate the internal structure of the following Digital IC's using VHDL / VERILOG and verify the operations of the Digital IC's (Hardware) in the Laboratory

1. Logic Gates- 74XX.
2. Half Adder, Full Adder
3. 3-8 Decoders -74138.
4. 8 x 1 Multiplexer -74X151
5. 2x4 Demultiplexer-74X155

6. 4-bit Comparator-74X85.
7. D Flip-Flop 74X74.
8. Decade counter-74X90.

For Software Simulation

1. Computer Systems
2. LAN Connections (Optional)
3. Operating Systems
4. VHDL/ VERILOG
5. FPGAS/CPLDS (Download Tools)

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B.Tech. ECM	L	T-P-D	C
II Year - I Semester	2	0-0-0	0

(F210C) GENDER SENSITIZATION
(Common to EEE, ECE,CSE, IT, ECM)

Course Objectives:

The students will

1. Understand caste system
2. Learn women's work its politics and economics aware rebuilding lives.
3. Understand about relationships, responsibilities and gender identities

Course Outcomes:

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

1. Describe the basic structure of caste system in India and the major four categories to which all castes could be come out of ignorance and archaic indoctrination to make the world a better place for both men and women
2. Learn to keep them safe and alive in the face of domestic violence
3. Learn to maintain equality in gender.
4. Understand the responsibility of being good citizens overcoming social evils
5. Describe the basic structure of caste system in India and the major four categories to which all castes could be

UNIT-I:

Gender: Why should we study it?, Socialization: Making women, Making Men

Introduction, Preparing For Womanhood, Growing up male, First lessons in caste, Different masculinities.

UNIT-II:**Women's Work: Its Politics and Economics,**

Fact and fiction, Unrecognized and unaccounted work, Further reading:
Wages and conditions of work

Domestic Violence: Speaking Out, Is home a safe place?, When women unite [Film], Rebuilding lives, Further reading: New forums for justice.

UNIT-III:**Just Relationships: Being Together as Equals,**

Mary kom and Onler, Love and acid just do not mix, Love letters.

Mothers and fathers, Further Reading: Rosa Parks – The brave heart.

Text Books:

1. Towards a world of equals by A.SuneethaSusicTharu publication
Telugu academy Hyderabad

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B.Tech. ECM	L	T-P-D	C
II Year - II Semester	3	1-0-0	4

(F222C) CONTROL SYSTEMS

Course Objectives:

To learn

1. To understand the use of transfer function models for analysis physical systems.
2. To provide adequate knowledge in the time response of systems and steady state error analysis.
3. To accord basic knowledge in obtaining the open loop and closed-loop frequency responses of systems.
4. To introduce stability analysis and state variable analysis.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Understand the modelling of linear-time-invariant systems using transfer function and state-space representations.
2. Understand the concept of stability and its assessment for linear-time invariant systems.
3. Design simple feedback controllers.

UNIT-I:

INTRODUCTION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences – Different examples of control systems – Classification of control systems, Feed-Back Characteristics, Effects of feedback.

Mathematical models – Differential equations, Impulse Response and transfer functions – Translational and Rotational mechanical systems

UNIT-II:

TRANSFER FUNCTION REPRESENTATION

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by

Signal flow graph – Reduction using Mason’s gain formula.

Time Response Analysis:

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT–III:

STABILITY ANALYSIS IN S-DOMAIN

The concept of stability – Routh’s stability criterion – qualitative stability and conditional stability – limitations of Routh’s stability.

Root Locus Technique:

The root locus concept - construction of root loci-effects of adding poles and zeros to $G(s)H(s)$ on the root loci.

UNIT–IV:

**FREQUENCY RESPONSE ANALYSIS AND STABILITY ANALYSIS
INFREQUENCY DOMAIN**

Introduction, Frequency domain Specifications – Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram.

Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots-Nyquist Plots-Stability Analysis.

UNIT-V:

**CLASSICAL CONTROL DESIGN TECHNIQUES AND STATE SPACE ANALYSIS
OF CONTINUOUS SYSTEMS**

Compensation techniques – Lag, Lead, Lead – Lag Controllers design in frequency Domain, PID Controllers.

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties – Concepts of Controllability and Observability

Text Books:

1. Automatic Control Systems 7th edition– by B. C. Kuo 2009– PHI/JohnWiley 8ed.
2. Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

References:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by Anand Kumar, PHI 2008.
3. Control Systems Engg. by NISE 5th Edition – John Wiley.

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B.Tech. ECM	L	T-P-D	C
II Year - II Semester	3	0-0-0	3

(F224E) ANALOG ELECTRONICS

Course Objectives:

The students will

1. Understand the amplifier operation at low and high frequency and its frequency responses and generalize the power amplifiers.
2. Learn about different types of feedback amplifiers and oscillators
3. Understand the internal block diagram of operational amplifier and its characteristics of both ideal and practical.
4. Illustrate some typical applications of operational amplifiers in linear and nonlinear modes of operation and construct various active filter circuits using operational amplifier for various frequency response characteristics.
5. Understand techniques of analog to digital and digital to analog converters and its specifications.

Course Outcomes:

The students will be able to

1. Identify the classification of amplifiers and analyse the CE, CB, CC amplifiers using small signal hybrid model and derive the voltage gain, current gain, input impedance and output impedance and interpret different types of power (large signal) amplifiers and compare them in terms of efficiency.
2. Write the different types of negative feedback amplifiers and find the condition for oscillations in oscillators
3. Demonstrate the internal operation of Op-Amp and its specifications.
4. Classify various active filter configurations based on frequency response and construct using 741 Op-Amp.
5. Differentiate between A to D and D to A conversion technique.

UNIT-I:**TRANSISTOR CIRCUITS**

Biasing schemes for BJT and FET amplifiers, bias stability, various configurations (such as CE/CS, CB/CG, CC/CD) and their features, small signal analysis, low frequency transistor models, estimation of voltage gain, input resistance, output resistance etc., design procedure for particular specifications, low frequency analysis of multistage amplifiers. High frequency transistor models, frequency response of single stage and multistage amplifiers. cascode amplifier.

POWER AMPLIFIERS:

Various classes of operation (Class A, B, AB, C etc.), their power efficiency and linearity issues. Calculation with practical circuits.

UNIT-II:**NEGATIVE FEEDBACK IN AMPLIFIERS**

Feedback topologies: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., Voltage amplifier, Current amplifier, Trans-conductance amplifier and trans-resistance amplifier.

Oscillators: Review of the basic concept, Barkhausen criterion, RC oscillators (phase shift, Wien bridge etc.), LC oscillators (Hartley, Colpitt, Clapp etc.), non-sinusoidal oscillators.

UNIT-III:**INTRODUCTION TO OP-AMP**

Differential amplifier: Basic structure and principle of operation, calculation of differential gain, common mode gain, CMRR and ICMR.

OP-AMP design: Design of differential amplifier for a given specification, design of gain stages and output stages, compensation.

UNIT-IV:**OP-AMP APPLICATIONS:**

Review of inverting and non-inverting amplifiers, summing amplifier, integrator and differentiator, precision rectifier, Schmitt trigger and its applications.

Active filters: Low pass, high pass, band pass and band stop, design guidelines.

UNIT-V: CONVERTERS

Digital-to-analog converters (DAC): Weighted resistor, R-2R ladder, resistor string etc.

Analog to-digital converters (ADC): Single slope, dual slope, successive approximation, flash etc. Switched capacitor circuits: Basic concept, practical configurations, application in amplifier, integrator, ADC etc.

Text Books:

1. Electronic Devices and Circuits, David A. Bell – 5th Editions, Oxford.
2. P. Horowitz and W. Hill, The Art of Electronics, 2nd edition, Cambridge University Press, 1989.
3. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College 11 5. Publishing, Edition IV 6.
4. Paul R. Gray and Robert G. Meyer, Analysis and Design of Analog Integrated Circuits, John Wiley, 3rd Edition
5. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 3rd Ed., 2008.

References:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, TMH
2. Microelectronic Circuits – Sedra / Smith – 5th Edition – Oxford, 2009
3. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004.
4. Electronic Devices and Circuits, Anil.K. Maini, Varsha Agrawal, 1st Edition, WILEY.
5. Electronic Devices and Circuits – 2nd Edition by Muhammad H. Rashid, Cengage Learning.

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UGC AUTONOMOUS

B.Tech. ECM	L	T-P-D	C
II Year - II Semester	3	0-0-0	3

(F225A) OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to ECM, CSE, IT)

Course Objectives:

At the end of the course, students will:

1. Understand and learn constructors and string handling functions
2. Explain inheritance and polymorphism
3. Familiar with packages and interfaces
4. Familiar with exception handling and multithreading
5. Familiar with applet programming, event handling and scripting.

Course Outcomes:

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

1. Familiar with constructors and string handling
2. Understand inheritance and polymorphism
3. Understand packages and interfaces
4. Understand exception handling and multithreading
5. Understand applet programming

UNIT-I:

Introduction: OOP concepts, history of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program.

Classes and Objects: concepts of classes, objects, constructors, methods, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion.

String handling: String, String Buffer, String Tokenize.

UNIT-II:

Inheritance: base class object, subclass, member access rules, super uses, using final with

inheritance, method overriding, abstract classes

Interfaces: defining an interface, implementing interface, differences

between classes and Interfaces and extending interfaces.

Packages: Defining, creating and accessing a package, importing packages, access control, exploring package - java.io

UNIT-III:

Exception handling: concepts of exception handling, benefits of exception handling, exception hierarchy, checked and unchecked exceptions, usage of-try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Multithreading: differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT-IV:

Applets: concepts of applets, differences between applets and applications, life cycle of applet, types of applets, creating applets, passing parameters to applets.

Event Handling: events, event sources, event classes, event listeners, delegation event model, handling mouse and key board events, adapter classes. The AWT class hierarchy, user interface components-labels, buttons, canvas, scrollbars, text components, checkbox, checkbox groups, choices, lists.

UNIT-V:

Layout manager: layout manager types-border, grid, flow, card and grid bag.

Swing: Introduction, limitations of AWT, components, containers,

Exploring swing– JApplet, JFrame and JComponent, Icons and Labels, Text fields, buttons –The JButton class, Checkboxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees and Tables.

Text Books:

1. Java The complete reference, 8th edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T.Budd, Pearson education.

References:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.

**J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS**

B.Tech. ECM	L	T-P-D	C
II Year - II Semester	3	0-0-0	3

(F220B) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to ME, ECE,CSE, ECM)

Course Objectives:

To learn this course is to be intended to familiarize the students with the basics of managements concepts, production and cost analysis concepts, trends in economic environment and financial accounting topics.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Understand the Importance of Micro Economics and demand analysis concepts in detail.
2. Get an idea about the production concepts and analysis of various types of costs.
3. Apply the various pricing strategies and understanding of competitive markets.
4. Apply fundamental concepts of financial accounting.
5. Analyze & interpretation of financial ratios for more financial accuracy.

UNIT-I:

Introduction to Managerial Economics & Demand Analysis:

Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT-II:

Production & Cost Analysis:

Production Function - Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

UNIT-III:

Types of Markets & Economic Environment:

Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Pricing - Objectives and Policies of Pricing. Methods of Pricing.

Trends in economic Environment: Inflation, GDP, Introduction to GST, Interest rates.

UNIT-IV:

Introduction to Financial Accounting

Accounting concepts and Conventions - Introduction IFRS - Double - Entry Book Keeping, Journal, Ledger and Trial Balance.

Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments)

UNIT-V:

FINANCIAL ANALYSIS

Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

Du Pont Chart analysis. Theoretical concepts of funds flow statements.

References:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2014.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2014.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2014.
4. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2012.
5. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
6. Lipsey & Chrystel, Economics, Oxford University Press, 2012.

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B.Tech. ECM	L	T-P-D	C
II Year - II Semester	2	0-0-0	0

(F220E) ENVIRONMENTAL SCIENCES

(Common to EEE, ECE,CSE, IT, ECM)

Course Objectives:

At the end of the course, students will:

1. Know the importance of Environment is a key to the future of mankind.
2. Understand global warming, the depletion of ozone layer and loss of biodiversity and to made everyone aware of environmental issues.
3. Examine environmental studies which encourage to explore the social, aesthetic, ethical, scientific, and technical aspects of environmental issues.
4. Apply modeling to understand the behavior make predictions for future and plan management in view of changing environmental conditions.

Course Outcomes:

After learning the contents of this paper the student must be able to:

- Understand the importance of natural resources and use them efficiently and knowing how to conserve the biodiversity.
- Imply environmental plan in developing any sort of environmental projects.
- Apply the environmental legislation in every walk of life and reserve the natural resources for future generations in sustainable manner.

UNIT-I:

Ecosystems & Natural Resources, Biodiversity: Concept, Classification of Resources: Water resources, Land resources, land degradation, Forest resources, Mineral resources, Energy resources.

Concept of ecosystem, Classification of ecosystem, Functions of ecosystem. Biodiversity, Level, values, hotspots of biodiversity, Threats to Biodiversity, Conservation of Biodiversity.

UNIT-II:

Global Environmental Problems and Global Efforts: Deforestation, Greenhouse effect, Global Warming, Sea level rise, Ozone depletion. International conventions/protocols: green-belt-development, Concept of Green Building, Clean Development Mechanism (CDM).

Environmental Impact Assessment (EIA) And Environmental Management

Plan: Definition of Impact, classification of impacts, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society, impact assessment methodologies. Environmental management plan (EMP).

UNIT-III:

Environmental Policy, Legislation, Rules And Regulations: Environmental Protection Act: Air (Prevention and control of pollution) Act-1981, Water (Prevention and control of pollution) Act-1974, Forest Conservation Act.

Towards Sustainable Future: Concept of Sustainable Development, Threats to Sustainability, Strategies for achieving Sustainable development, Environmental Ethics, Environmental Economics, Concept of Green Computing.

Text Books:

1. TEXT BOOK OF ENVIRONMENTAL Science and Technology by M.Anji Reddy 2007
2. Principles of Environmental Science and Engineering by P.Venugopal Rao.
3. Introduction to Environmental Studies by K.Mukkanti
4. Text book of Environmental studies by Kaushik & Anubha kaushik

References:

1. Tata McgrawHill : Introduction to Environmental Studies by Benny Joseph
2. Environmental Studies by Erach Bharucha 2005, University Grants Commission, University Press.

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B.Tech. ECM	L	T-P-D	C
II Year - II Semester	2	0-0-0	2

(F220D) BIOLOGICAL SCIENCES
 (Common to EEE, ECE,CSE, IT, ECM)

Course Objectives:

At the end of the course, students will:

Learn the basics of biology such as cell structure and functions, inheritance & evolution, systems of human life, basic concepts of genetics, and an introduction to microbiology

Course Outcomes:

After learning the contents of this paper the student must be able to:

1. Acquire the Knowledge of basic biology
2. Acquire the Knowledge of Human Biological Systems
3. Acquire the knowledge of Nutrients
4. Acquire Knowledge on Microorganisms
5. Acquire the knowledge gene expression

UNIT-I:

Basic Biology: Introduction, Living organisms.

Functions of cell organelles: Cell structure and Organelles, Organogenesis.

UNIT-II:

Human Anatomy: Systems of Life-Digestion, Respiration, Circulatory systems.

Excretion, Reproduction, and Nervous systems.

UNIT-III:

Biochemistry: Diet and Nutrition- Macro (Carbohydrates, proteins, lipids) - and Micronutrients (vitamins).

Minerals: Essential minerals and their role; deficiency symptoms; and their role; deficiency symptoms.

UNIT-IV:

Microbiology: Microorganisms-Classification of Microorganisms.

Advantages and disadvantages of microorganisms: Beneficial and harmful effects of Bacteria, Fungi and Viruses.

UNIT-V:

Genetics: Basic principles of Mendel, molecular genetics, structure and function of genes and chromosomes.

Gene expressions: Transcription and Translation, gene expression and regulation.

Text Books:

1. P K Gupta , "Elements of Biotechnology", RASTOGI Publications
2. Dr RC Dubey, "Advanced Biotechnology", S Chand Publications.

References:

1. Cell biology", Rastogi Publications
2. Microbiology, PELCZAR
3. Biotechnology, U.sathyanarayana

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B.Tech. ECM	L	T-P-D	C
II Year - II Semester	0	0-4-0	2

(F2251) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB.
(Common to CSE, IT, ECM)

Course Objectives:

The student will:

1. Write java programs using arithmetic operators, control statements, type conversion, constructors and string handling
2. Explain how to write java programs using inheritance and polymorphism
3. Explain how to write java programs for creation of user defined packages and interfaces
4. Familiar with exception handling, multithreading and event handling
5. Explain how to write java programs using applets.

Course Outcomes:

After learning the contents of this paper the student must be able to:

1. Write java programs using arithmetic operators, control statements, type conversion, constructors and string handling
2. Write java programs for inheritance and polymorphism
3. Write java programs for creation of user defined packages and interfaces
4. Write java programs for exception handling and multithreading
5. Write java programs for creation of applets.

EXPERIMENT 1:

Write java programs that implement the following

- a) Constructor
- b) Parameterized constructor
- c) Method overloading
- d) Constructor overloading.

EXPERIMENT 2:

a) Write a Java program that checks whether a given string is a palindrome or not.

Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use String Tokenizer class of java.util

EXPERIMENT 3:

Write java programs that uses the following keywords

a) this b) super

c) static d) final

EXPERIMENT 4:

a) Write a java program to implement method overriding

b) Write a java program to implement dynamic method dispatch.

c) Write a Java program to implement multiple inheritance.

d) Write a java program that uses access specifiers

EXPERIMENT 5:

a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file

EXPERIMENT 6:

a) Write a Java program for handling Checked Exceptions.

b) Write a Java program for handling Unchecked Exceptions

EXPERIMENT 7:

- a) Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
- b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication

EXPERIMENT 8:

- a) Develop an applet that displays a simple message.
- b) Develop an applet that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named “Compute” is clicked

EXPERIMENT 9:

Write a Java program that works as a simple calculator. Use a grid layout to arrange button for the digits and for the +, -, *, % operations. Add a text field to display the result

EXPERIMENT 10:

- a) Write a Java program for handling mouse events.
- b) Write a Java program for handling key events.

EXPERIMENT 11:

Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception and display the exception in a message dialog box.

EXPERIMENT 12:

- a) Write a java program that simulates traffic light. The program lets the user select one of three lights: red, yellow or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No I Light is on when the program starts.
- b) Write a Java program that allows the user to draw lines, rectangles and ovals

Text Books:

1. Java: the complete reference,8th editon ,Herbert Schildt, TMH.
2. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
3. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education.
4. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited

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B.Tech. ECM	L	T-P-D	C
II Year - II Semester	0	0-3-0	1.5
(F2241)ANALOG ELECTRONICS LAB.			

Course Objectives:

The students will

1. Understand the amplifier operation at low and high frequency and its frequency responses and generalize the power amplifiers.
2. Learn about different types of feedback amplifiers and oscillators
3. Understand the internal block diagram of operational amplifier and its characteristics of both ideal and practical.
4. Illustrate some typical applications of operational amplifiers in linear and non linear modes of operation and construct various active filter circuits using operational amplifier for various frequency response characteristics.
5. Understand techniques of analog to digital and digital to analog converters and its specifications.

Course Outcomes:

The students will be able to

1. Identify the classification of amplifiers and analyze the CE, CB, CC amplifiers using small signal hybrid model and derive the voltage gain, current gain, input impedance and output impedance and interpret different types of power (large signal) amplifiers and compare them in terms of efficiency.
2. Write the different types of negative feedback amplifiers and find the condition for oscillations in oscillators
3. Demonstrate the internal operation of Op-Amp and its specifications.
4. Classify various active filter configurations based on frequency response and construct using 741 Op-Amp.
5. Differentiate between A to D and D to A conversion techniques.

Minimum Twelve experiments to be conducted:

Design (any six) and Simulation (any Ten) using Multisim or Pspice or Equivalent Simulation Software:

List of the Experiments:

1. Common Emitter Amplifier
2. Common Source amplifier
3. Two Stage RC Coupled Amplifier
4. Current Shunt and Voltage Series Feedback Amplifier
5. Class B Complementary Symmetry Amplifier
6. Class A Power Amplifier (Transformer less)
7. Current Shunt and Voltage Series Feedback Amplifier
8. RC Phase Shift, Wien Bridge Oscillator using Transistors
9. Hartley and Colpitt's Oscillator
10. Inverting and Non Inverting Adder, Subtractors, using IC 741 Op-Amp.
11. Integrator and Differentiator using IC741 Op-Amp.
12. Active Low Pass & High Pass Butterworth (second Order).
13. A/D and D/A converters

Equipment required for Laboratories:

1. **For software simulation of Electronic circuits**
 - Computer Systems with latest specifications
 - Connected in LAN (Optional)
 - Operating system (Windows XP)
 - Simulations software (Multisim / TINAPRO) Package
2. **For Hardware simulations of Electronic Circuits**
 - RPS
 - CRO
 - Function Generators
 - Multimeters
 - Components