



VIGNAN'S INSTITUTE OF MANAGEMENT AND TECHNOLOGY FOR WOMEN

(An Autonomous Institution)

[Sponsored by Lavu Educational Society, Affiliated to JNTUH & Approved by AICTE, New Delhi]
Kondapur (V), Ghatkesar (M), Medchal - Malkajgiri (D) - 501 301. Phone: 96529 10002/3



ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE – VR24

I B.Tech. – I Semester

S.No.	Course Code	Course	L	T	P	Credits
1	MA101BS	Matrices and Calculus	3	1	0	4
2	PH102BS	Applied Physics	3	1	0	4
3	DS103ES	C Programming for Engineers	3	0	0	3
4	ME104ES	Engineering Workshop	0	1	3	2.5
5	EN105HS	English for Skill Enhancement	2	0	0	2
6	EC106ES	Elements of Electronics and Communication Engineering	0	0	2	1
7	PH107BS	Applied Physics Laboratory	0	0	3	1.5
8	DS108ES	C Programming for Engineers Laboratory	0	0	2	1
9	EN109HS	English Language and Communication Skills Laboratory	0	0	2	1
10	MC110	Environmental Science	3	0	0	0
		Total	14	3	12	20

I B.Tech. - II Semester

S.No.	Course Code	Course	L	T	P	Credits
1	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	CH202BS	Engineering Chemistry	3	1	0	4
3	ME203ES	Computer Aided Engineering Graphics	1	0	4	3
4	EE204ES	Basic Electrical Engineering	2	0	0	2
5	EC205ES	Electronic Devices and Circuits	2	0	0	2
6	EC206ES	Electronic Devices and Circuits Laboratory	0	0	2	1
7	CH207BS	Engineering Chemistry Laboratory	0	0	2	1
8	EE208ES	Basic Electrical Engineering Laboratory	0	0	2	1
9	ML209ES	Applied Python Programming Laboratory	0	1	2	2
		Total	11	3	12	20

Note: L - Theory T - Tutorial P - Practical

II B.Tech. – I Semester

S.No.	Course Code	Course	L	T	P	Credits
1	MA301BS	Numerical Methods and Complex Variables	3	1	0	4
2	EC302PC	Analog Circuits	3	0	0	3
3	EC303PC	Network analysis and Synthesis	3	0	0	3
4	EC304PC	Digital Logic Design	3	0	0	3
5	EC305PC	Signals and Systems	3	1	0	4
6	EC306PC	Analog Circuits Laboratory	0	0	2	1
7	EC307PC	Digital logic Design Laboratory	0	0	2	1
8	EC308PC	Basic Simulation Laboratory	0	0	2	1
9	*MC309	Constitution of India	3	0	0	0
		Total	18	2	6	20

II B.Tech. - II Semester

S.No.	Course Code	Course	L	T	P	Credits
1	EC401PC	Probability Theory and Stochastic Processes	3	0	0	3
2	EC402PC	Electromagnetic Fields and Transmission Lines	3	0	0	3
3	EC403PC	Analog and Digital Communications	3	0	0	3
4	EC404PC	Linear and Digital IC Applications	3	0	0	3
5	EC405PC	Electronic Circuit Analysis	3	0	0	3
6	EC406PC	Analog and Digital Communications Laboratory	0	0	2	1
7	EC407PC	Linear and Digital IC Applications Laboratory	0	0	2	1
8	EC408PC	Electronic Circuit Analysis Laboratory	0	0	2	1
9	EC409PC	Real Time Project/ Field Based Project	0	0	4	2
10	*MC410	Gender Sensitization Lab	0	0	2	0
		Total	15	0	12	20

Note: **L - Theory** **T - Tutorial** **P - Practical**



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III B.Tech.-I Semester

S.No.	Course Code	Course	L	T	P	Credits
1	EC501PC	Microcontrollers	3	1	0	4
2	EC502PC	IoT Architectures and Protocols	3	0	0	3
3	EC503PC	Control Systems	3	1	0	4
4	MS504BS	Business Economics & Financial Analysis	3	0	0	3
5		Professional Elective – I	3	0	0	3
6	EC505PC	Microcontrollers Laboratory	0	0	2	1
7	EN506BS	Advanced English Communication Skills Laboratory	0	0	2	1
8	EC507PC	IoT Architectures and Protocols Laboratory	0	0	2	1
9	MC508BS	Intellectual Property Rights	3	0	0	0
		Total	18	2	6	20

III B.Tech.-II Semester

S.No.	Course Code	Course	L	T	P	Credits
1	EC601PC	Antennas and Wave Propagation	3	0	0	3
2	EC602PC	Digital Signal Processing	3	0	0	3
3	EC603PC	CMOS VLSI Design	3	0	0	3
4		Professional Elective - II	3	0	0	3
5		Open Elective – I	3	0	0	3
6	EC604PC	Digital Signal Processing Laboratory	0	0	2	1
7	EC605PC	CMOS VLSI Design Laboratory	0	0	2	1
8	EC606PC	Advanced Communication Laboratory	0	0	2	1
9	EC607PC	Industry Oriented Mini Project/ Internship	0	0	4	2
10	MC608BS	Environmental Science	3	0	0	0
		Total	18	0	10	20

Note: L-Theory

T-Tutorial

P-Practical

C-Credits



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Professional Elective-I

S.No.	Course Code	Course	L	T	P	Credits
1	EC511PE	Computer Organization & Operating Systems	3	0	0	3
2	IT512PE	Data Communications and Computer Networks	3	0	0	3
3	EC513PE	Electronic Measurements and Instrumentation	3	0	0	3
4	EC514PE	Signal Engineering & Automatic Train Protection-Kavach	3	0	0	3

Professional Elective-II

S.No.	Course Code	Course	L	T	P	Credits
1	EC621PE	Digital Image Processing	3	0	0	3
2	EC622PE	Mobile Communications and Networks	3	0	0	3
3	EC623PE	Embedded System Design	3	0	0	3

Open Elective-I

S.No.	Course Code	Course	L	T	P	Credits
1	EC621OE	Fundamentals of Internet of Things	3	0	0	3
2	EC622OE	Principles of Signal Processing	3	0	0	3
3	EC623OE	Digital Electronics for Engineering	3	0	0	3



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ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE-VR24

IV B.Tech.-I Semester

S.No.	Course Code	Course	L	T	P	Credits
1	EC701PC	Microwave and Optical Communications	3	1	0	4
2		Professional Elective – III	3	0	0	3
3		Professional Elective – IV	3	0	0	3
4		Open Elective – II	3	0	0	3
5	MS702BS	Professional Practice, Law & Ethics	2	0	0	2
6	EC703PC	Microwave and Optical Communications Laboratory	0	0	4	2
7	EC704PC	Project Stage –I	0	0	6	3
		Total	15	1	10	20

IV B.Tech.-II Semester

S.No.	Course Code	Course	L	T	P	Credits
1		Professional Elective – V	3	0	0	3
2		Professional Elective – VI	3	0	0	3
3		Open Elective – III	3	0	0	3
4	EC801PC	Project Stage – II including Seminar	0	0	22	11
5		Total	9	0	22	20

Note: L-Theory T-Tutorial P-Practical C-Credits



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Professional Elective -III

S.No.	Course Code	Course	L	T	P	Credits
1	EC731PE	Radar Systems	3	0	0	3
2	EC732PE	CMOS Analog IC Design	3	0	0	3
3	EC733PE	Artificial Neural Networks	3	0	0	3

Professional Elective -IV

S.No.	Course Code	Course	L	T	P	Credits
1	EC741PE	Network Security and Cryptography	3	0	0	3
2	EC742PE	Satellite Communications	3	0	0	3
3	EC743PE	Biomedical Instrumentation	3	0	0	3

Professional Elective -V

S.No.	Course Code	Course	L	T	P	Credits
1	ML851PE	Artificial Intelligence	3	0	0	3
2	EC852PE	5G and beyond Communications	3	0	0	3
3	ML853PE	Machine learning-ML	3	0	0	3

Professional Elective -VI

S.No.	Course Code	Course	L	T	P	Credits
1	IT861PE	Multimedia Database Management Systems	3	0	0	3
2	EC862PE	System on Chip Architecture	3	0	0	3
3	EC863PE	Wireless sensor Networks	3	0	0	3

Open Elective-II

S.No.	Course Code	Course	L	T	P	Credits
1	EC721OE	Electronic Sensors	3	0	0	3
2	EC722OE	Electronics for Health Care	3	0	0	3
3	EC723OE	Telecommunications for Society	3	0	0	3

Open Elective-III

S.No.	Course Code	Course	L	T	P	Credits
1	EC831OE	Measuring Instruments	3	0	0	3
2	EC832OE	Communication Technologies	3	0	0	3
3	CS833OE	Fundamentals of Social Networks	3	0	0	3

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

MATRICES AND CALCULUS

(Common for CSE, CSE(AI&ML), ECE, IT, CSE(DS))

Course Objectives: To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.
- Evaluation of multiple integrals and their applications

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

- Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of function of two variables with/without constraints.
- Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT-I: 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 by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values, 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-III: Calculus

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-IV: Multivariable Calculus (Partial Differentiation and applications)

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

UNIT-V: Multivariable Calculus (Integration)

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).

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

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

APPLIED PHYSICS
(Common to CSE (AIML) &ECE)

Course Objectives: The objectives of this course for the student are to:

- Understand the basic principles of quantum physics and band theory of solids.
- Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
- Study the fundamental concepts related to the dielectric, magnetic and energy materials.
- Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
- Study the characteristics of lasers and optical fibers.

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

- Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
- Identify the role of semiconductor devices in science and engineering Applications.
- Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
- Appreciate the features and applications of Nanomaterials.
- Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT - I: Quantum Physics and Solids

Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function – time independent Schrodinger wave equation - particle in one dimensional potential box.

Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch's theorem -Kronig-Penney model – E-K diagram-effective mass of electron-origin of energy bands- classification of solids.

UNIT - II: Semiconductors and Devices

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT - III: Dielectric, Magnetic and Energy Materials

Dielectric Materials: Basic definitions- types of polarizations (qualitative)- ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction,

magnetoresistance - applications – bubble memory devices, magnetic field sensors and multiferroics.

Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors – materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

UNIT - IV: Nanotechnology

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods – top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM & TEM - applications of nanomaterials.

UNIT - V: Laser and Fiber Optics

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations- lasing action - pumping methods- ruby laser, He-Ne laser , CO₂ laser, Argon ion Laser, Nd:YAG laser- semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection- construction of optical fiber - acceptance angle - numerical aperture-classification of optical fibers- losses in optical fiber - optical fiber for communication system - applications.

Text Books:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy” A Text book of Engineering Physics”- S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication, 2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4th Edition, 2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition, 2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

Reference Books:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley & Sons, 11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhyaya - Nano Materials, New Age International, 1st Edition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group
7. Energy Materials, Taylor & Francis Group, 1st Edition, 2022.

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

C PROGRAMMING FOR ENGINEERS
(ECE)

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 Out comes: Upon completing this course, the students will be able to

1. Draw flowcharts for solving arithmetic and logical problems
2. Develop modular reusable code by understanding concepts of functions.
3. Formulate algorithms and programs using arrays, pointers.
5. Formulate algorithms and programs using strings and structures.
4. Write a program using Searching and sorting algorithms.

UNIT-I: Introduction to Computer Algorithms and Programming

Components of a computer system: Memory, processor, I/O devices, storage, operating system, the concept of assembler, compiler, interpreter, loader, and linker.

From algorithm to program: Representation of an algorithm, flowchart, Pseudocode with examples, converting algorithms to programs.

Programming Basics: Structure of C program, writing and executing the first C program, Syntax and logical errors in compilation, object, and executable code. Components of C language, standard I/O in C, data types, variables and constants, memory storage, and storage classes

UNIT-II: Arrays, Strings, Structures and Pointers:

Expressions and Statements

Expressions and their evaluation: Operands and Operators, formation of expressions using arithmetic, relational, logical, and bitwise operators, precedence and associatively rules, mixed operands, type conversion, and evaluation of expressions.

Statements: Simple and compound statements, Conditional Branching: if and switch statements, nested if-else, dangling else problem, use of break and default with switch. Iteration and loops: use of while, do-while and for loops, nested loops, use of break and continue statements.

UNIT-III: Preprocessor and File handling in C: Functions and Arrays

Designing Structured Programs: Introduction to functions, advantages of modularizing a program into functions, types of functions, passing parameters to functions: call by value; call by reference, passing arrays to functions, recursion with example programs.

Arrays: Array notation and representation, manipulating array elements, using multi-dimensional arrays, character arrays, C strings, string input/output functions, Array of strings, string manipulation functions with example programs.

UNIT-IV: Pointers and File handling:

Pointers: Introduction, declaration, applications, dynamic memory allocation (malloc, calloc, realloc, free), use of pointers in self-referential structures.

File handling: File I/O functions, standard C pre-processors, defining and calling macros, command line arguments.

UNIT-V: Searching and Sorting:**Derived types And Basic Algorithms:**

Structures, Union, Enums and Bit-fields: Defining, declaring, and usage of structures, unions, and their arrays, passing structures, and unions to functions, introduction to enums and bit-fields.

Basic Algorithms: Searching and Sorting Algorithms (Bubble, Insertion, and Selection), finding roots of equations, notion of order of complexity through example programs.

Text Books:

1. B. A. Forouzan and R. F. Gilberg -Programming & Data Structures, 3rd Ed., Cengage Learning`
2. Byron Gottfried - Schaum's Outline of Programming with C, McGraw-Hill

Reference Books:

1. Ajay Mittal - Programming in C: A practical approach, Pearson Education, 2010
2. Kernighan Brian W. and Ritchie Dennis M.- The C programming, Pearson Education.
3. J. R. Hanlyand, E. B. Koffman -Problem Solving and Program Design, 5th Ed., Pearson Education.
4. H. Cheng - C for Engineers and Scientists, McGraw-Hill International Edition
5. V. Rajaraman - Computer Basics and C Programming, PHI Learning, 2015.

B.Tech.

L T P C

I Year - I Semester

0 1 3 2.5

ENGINEERING WORKSHOP

(Common for ECE &AIML)

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at workplace.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have a practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

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

- Study and practice on machine tools and their operations.
- Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, and foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

I. TRADES FOR EXERCISES:**At least two exercises from each trade:**

1. Carpentry–(T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
2. Fitting–(V-Fit, Dovetail Fit & Semi-circular fit)
3. Tin-Smithy– (Square Tin, Rectangular Tray & Conical Funnel)
4. Foundry–(Preparation of Green Sand Mould using Single Piece and Split Pattern)
5. Welding Practice–(Arc Welding & Gas Welding)
6. House-wiring–(Parallel & Series, Two-way Switch and Tube Light)
7. Black Smithy–(Round to Square, Fan Hook and S-Hook)

II. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working

Text Books:

1. Workshop Practice/B. L. Juneja / Cengage
2. Workshop Manual/K. Venugopal / Anuradha.

Reference Books:

1. Workshop Manual-P. Kannaiah /K.L. Narayana /Scitech
2. Workshop Manual/ VenkatReddy /BSP

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

ENGLISH FOR SKILL ENHANCEMENT
(Common for CSE(AIML) & ECE)

Course Objectives:

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Develop study skills and communication skills in various professional situations.
- Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes: The student will learn

- Understand the importance of vocabulary and sentence structures.
- Choose appropriate vocabulary and sentence structures for their oral and written communication.
- Demonstrate their understanding of the rules of functional grammar.
- Develop comprehension skills from the known and unknown passages.
- Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
- Acquire basic proficiency in reading and writing modules of English.

UNIT - I:

Chapter entitled 'Toasted English' by R.K.Narayan from "English: Language, Context and Culture" published by Orient Black Swan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes – Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives
Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: 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:

Chapter entitled 'Appro JRD' by Sudha Murthy from "English: Language, Context and Culture" published by Orient Black Swan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

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

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice
Chapter entitled 'Appro JRD' by Sudha Murthy from "English: Language, Context and Culture" published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

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

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

UNIT - III:

Chapter entitled 'Lessons from Online Learning' by F.Haider Alvi, Deborah Hurst et al from "English: Language, Context and Culture" published by Orient Black Swan, Hyderabad.

Vocabulary: Words Often Confused - 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 – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume

UNIT - IV:

Chapter entitled 'Art and Literature' by Abdul Kalam from "English: Language, Context and Culture" published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

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

UNIT - V:

Chapter entitled 'Go, Kiss the World' by Subroto Bagchi from "English: Language, Context and Culture" published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports **Formats** - Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Text Books:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

Reference Books:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

B.Tech. ECE	L	T	P	C
I Year - I Semester	0	0	2	1

ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course Outcomes: The student will learn

- Identify the different components used for electronics applications
 - Measure different parameters using various measuring instruments
 - Distinguish various signal used for analog and digital communications
1. Understand the significance of Electronics and communications subjects
 2. Identify the different passive and active components
 3. Color code of resistors, finding the types and values of capacitors
 4. Measure the voltage and current using voltmeter and ammeter
 5. Measure the voltage, current with Multimeter and study the other measurements using Multimeter
 6. Study the CRO and measure the frequency and phase of given signal
 7. Draw the various Lissajous figures using CRO
 8. Study the function generator for various signal generations
 9. Study of Spectrum analyzer and measure the spectrum
 10. Operate Regulated power supply for different supply voltages
 11. Study the various gates module and write down the truth table of them
 12. Identify various Digital and Analog ICs
 13. Observe the various types of modulated signals.
 14. Know the available Softwares for Electronics and communication applications

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

APPLIED PHYSICS LABORATORY
(Common to CSE(AIML),ECE)

Course Objectives: The objectives of this course for the student to

- Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
- Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
- Able to measure the characteristics of dielectric constant of a given material.
- Study the behavior of B-H curve of ferromagnetic materials.
- Understanding the method of least squares fitting

Course Outcomes: The students will be able to:

- Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
- Appreciate quantum physics in semiconductor devices and optoelectronics.
- Gain the knowledge of applications of dielectric constant.
- Understand the variation of magnetic field and behavior of hysteresis curve.
- Carried out data analysis.

List Of Experiments:

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode
5. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)
 b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam
 b) Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
12. Understanding the method of least squares – torsional pendulum as an example.

Reference Book:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

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

**C PROGRAMMING FOR ENGINEERS LABORATORY
(ECE)**

Course Out comes:

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

1. Write algorithms and to draw flowcharts for solving problems and translate the algorithms/flowcharts to programs (in C language).
2. Use functions to develop modular reusable code.
3. Use arrays, pointers, strings and structures to formulate algorithms and programs.
4. Understand Searching and sorting algorithms

List of Experiments:

1. Write a C program to find the sum of individual digits of a positive integer.
2. 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.
3. Write a C program to generate the first n terms of the sequence.
4. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
5. Write a C program to find the roots of a quadratic equation.
6. Write a C program to find the factorial of a given integer.
7. Write a C program to find the GCD (greatest common divisor) of two given integers.
8. Write a C program to solve Towers of Hanoi problem.
9. 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)
10. Write a C program to find both the largest and smallest number in a list of integers.
11. Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices
12. Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to a given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
13. Write a C program to determine if the given string is a palindrome or not
14. Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
15. Write a C program to count the lines, words and characters in a given text.
16. Write a C program to generate Pascal's triangle.
17. Write a C program to construct a pyramid of numbers
18. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x_2+x_3+\dots+x_n$. For example: if n is 3 and x is 5, then the program computes $1+5+25+125$. Print x, n, the sum Perform error checking.

For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if $n < 0$, then go back and read in the next pair of numbers without computing the sum. Are any values of x also illegal? If so, test for them too.

19. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
20. Write a C program to convert a Roman numeral to its decimal equivalent.
21. Write a C program that uses functions to perform the following operations:
 - i) Reading a complex number
 - ii) Writing a complex number
 - iii) Addition of two complex numbers
 - iv) Multiplication of two complex numbers(Note: represent complex number using a structure.)
22.
 - i) Write a C program which copies one file to another.
 - ii) Write a C program to reverse the first n characters in a file.(Note: The file name and n are specified on the command line.)
23.
 - i) Write a C program to display the contents of a file.
 - ii) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)
24. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
 - i) Bubble sort
 - ii) Selection sort
 - iii) Insertion sort
25. Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a key value in a given list of integers:
 - i) Linear search
 - ii) Binary search

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

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY
 (Common for CSE(AIML) & ECE)

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
- To sensitize the 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 the impact of dialects.
- To train students to use language appropriately for public speaking, group discussions and interviews.

Course Outcomes: The student will learn

- Understand the nuances of English language through audio- visual experience and group activities.
- Neutralize their accent for intelligibility.
- Speak with clarity and confidence which in turn enhances their employability skills

Syllabus: English Language and Communication Skills Lab (ELCS) shall 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- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

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– Weak Forms and Strong Forms Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - *Testing Exercises*

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

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

Exercise - III

CALL Lab:

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -Testing Exercises

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - Testing Exercises

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -Testing Exercises

ICS Lab:

Understand: Group Discussion

Practice: Group Discussion

Computer Assisted Language Learning (CALL) Lab:

1. 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:

Computers with Suitable Configuration

High Fidelity Headphones

2. 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 T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- *Exercises in Spoken English. Part 1,2,3.* CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

Reference Books:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook.* Oxford University Press
4. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.* Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach.* Cambridge University Press.

B Tech

L T P C

I Year – I Semester

3 0 0 0

ENVIRONMENTAL SCIENCE
(Common for ECE & AIML)**Course Objectives:**

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations.

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, flood and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In- Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Waste water Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation.

Global Environmental Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions/ Protocols: Earth summit, Kyoto protocol, and

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

Text Books:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R.Rajagopalan, Oxford University Press.

Reference Books:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHI Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

B.Tech.**L T P C****I Year - II Semester****3 1 0 4****ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**

(Common for CSE, CSE(AI&ML), ECE, IT, CSE(DS))

Course Objectives: To learn

- Methods of solving the differential equations of first and higher order.
- Concept, properties of Laplace transforms.
- Solving ordinary differential equations using Laplace transforms techniques.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

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

- Identify whether the given differential equation of first order is exact or not.
- Solve higher differential equation and apply the concept of differential equation to real world problems.
- Use the Laplace transforms techniques for solving ODE's.
- Evaluate the line, surface and volume integrals and converting them from one to another.

UNIT-I: First Order ODE

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates). Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order

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 $x V(x)$, method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation. Applications: Electric Circuits.

UNIT-III: Laplace transforms

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT-IV: Vector Differentiation

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-V: Vector Integration

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. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi
4. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

B Tech

L T P C

I Year - II Semester

3 1 0 4

ENGINEERING CHEMISTRY
(Common to CSE(AIML) & ECE)**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 water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
- To imbibe the basic concepts of petroleum and its products.
- To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

- Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
- The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
- They can learn the fundamentals and general properties of polymers and other engineering materials.
- They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT - I: Water and its treatment:

Introduction to hardness of water – Estimation of hardness of water by complex metric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of F⁻ ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis

UNIT – II Battery Chemistry & Corrosion

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

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 methods.

UNIT - III: Polymeric materials:

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene Plastics: Definition and characteristics- thermoplastic and thermosetting

plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). Rubbers: Natural rubber and its vulcanization.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-poly acetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT - IV: Energy Sources:

Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages.

UNIT - V: Engineering Materials:

Cement: Portland cement, its composition, setting and hardening. Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermo response materials- Polyacryl amides, Poly vinyl amides

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point

Text Books:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications

Reference Books:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

B.Tech.

L T P C

I Year - II Semester

1 0 4 3

COMPUTER AIDED ENGINEERING GRAPHICS

(Common for CSE(AIML) & ECE)

Course Objectives:

- To develop the ability of visualization of different objects through technical drawings.
- To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products.

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

- Apply computer aided drafting tools to create 2D and 3D objects.
- Sketch conics and different types of solids .
- Appreciate the need of Sectional views of solids and Development of surfaces of solids.
- Read and interpret engineering drawings .
- Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting.

UNIT-I: Introduction to Engineering Graphics:

Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Introduction to Computer aided drafting – views, commands and conics.

UNIT-II: Orthographic Projections:

Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections – points, lines and planes.

UNIT-III Projections of Regular Solids:

Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views, Computer aided projections of solids – sectional views.

UNIT-IV: Development of Surfaces of Right Regular Solids:

Prism, Cylinder, Pyramid and Cone, Development of surfaces using computer aided drafting.

UNIT-V: Isometric Projections:

Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa –Conventions. Conversion of orthographic projection into isometric view using computer aided drafting.

Text Books:

1. Engineering Drawing N.D. Bhatt / Charotar Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S. Chand and company Ltd.

Reference Books:

1. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill
2. Engineering Graphics and Design, WILEY, Edition 2020
3. Engineering Drawing, M. B. Shah, B.C. Rane / Pearson.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford
5. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

B.Tech.

L T P C

I Year - II Semester

2 0 0 2

BASIC ELECTRICAL ENGINEERING

(Common for CSE(AIML) & ECE)

Course Objectives:

- To understand DC and Single & Three phase AC circuits.
- To study and understand the different types of DC, AC machines and Transformers.
- To impart the knowledge of various electrical installations and the concept of power, powerfactor and its improvement.

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

- Understand and analyze basic Electrical circuits.
- Study the working principles of Electrical Machines and Transformers.
- Introduce components of Low Voltage Electrical Installations.

UNIT-I:

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II:

A.C. 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, RLC combinations (series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III:

Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV:

Electrical Machines: Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor, Significance of torque-slip characteristics. Single-phase induction motor, Construction and working. Construction and working of synchronous generator.

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, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, “Basic Electrical Engineering”, Tata McGraw Hill, 2nd Edition, 2008.

Reference Books:

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, “Basic Electrical Engineering”, S. Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, “Basic Electrical and Electronics Engineering”, Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarti, Sudipta Debnath, Chandan Kumar Chanda, “Basic Electrical Engineering”, 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
6. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
7. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989

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

ELECTRONIC DEVICES AND CIRCUITS
(Common for CSE, CSE(AI&ML), CSE(DS), IT & ECE)

Course Objectives:

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of devices.
- To know the switching characteristics of devices

Course Outcomes: The student will learn

- Acquire the knowledge of various electronic devices and their use on real life.
- Know the applications of various devices.
- Acquire the knowledge about the role of special purpose devices and their applications.

UNIT - I: Diodes

Diode - Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances, V-I Characteristics, Diode as a switch- switching times.

UNIT - II: Diode Applications:

Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

UNIT - III: Bipolar Junction Transistor (BJT):

Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times.

UNIT - IV: Junction Field Effect Transistor (FET):

Construction, Principle of Operation, Pinch-Off Voltage, Volt- Ampere Characteristic, Comparison of BJT and FET, FET as Voltage Variable Resistor, MOSFET, MOSTET as a capacitor.

UNIT - V: Special Purpose Devices:

Zener Diode - Characteristics, Zener diode as Voltage Regulator, Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode.

Text Books:

1. Jacob Millman - Electronic Devices and Circuits, McGraw Hill Education
2. Robert L. Boylestead, Louis Nashelsky- Electronic Devices and Circuits theory, 11th Edition, 2009, Pearson.

Reference Books:

1. Horowitz -Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. Chinmoy Saha, Arindam Halder, Debaati Ganguly - Basic Electronics-Principles and Applications, Cambridge, 2018.

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

ELECTRONIC DEVICES AND CIRCUITS LABORATORY

Course Outcomes: The student will learn

- Acquire the knowledge of various semiconductor devices and their use in real life.
- Analyze the applications of diode.
- Design aspects of biasing and keep them in active region of the device for functional circuits
- Ability to design and analyze simple BJT and MOSFET circuits.
- Acquire the knowledge about the role of special purpose devices and their applications

LIST OF EXPERIMENTS:

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Full Wave Rectifier with & without filters
3. Types of Clippers at different reference voltages
4. Types of Clampers at different reference voltages
5. The steady state output waveform of clampers for a square wave input
6. Input and output characteristics of BJT in CB Configuration
7. Input and output characteristics of BJT in CE Configuration
8. Input and output characteristics of BJT in CC Configuration
9. Input and output characteristics of MOS FET in CS Configuration
10. Input and output characteristics of MOS FET in CD Configuration
11. Switching characteristics of a transistor
12. Zener diode characteristics and Zener as voltage Regulator
13. SCR Characteristics.
14. UJT Characteristics and identify negative region
15. Photo diode characteristics
16. Solar cell characteristics
17. LED Characteristics

*Design a circuit to switch on and off LED using diode/BJT/FET as a switch.

Major Equipment required for Laboratories:

1. Regulated Power Suppliers, 0-30V
2. 20 MHz, Dual Channel Cathode Ray Oscilloscopes.
3. Functions Generators-Sine and Square wave signals
4. Multimeters, voltmeters and Ammeters
5. Electronic Components and devices

B Tech

L T P C

I Year - II Semester

0 0 2 1

ENGINEERING CHEMISTRY LABORATORY

(Common for CSE(AIML) & ECE)

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

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry,
- Potentiometry and pH metry methods. Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
- Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

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

- Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
- Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
- Students are able to prepare polymers like bakelite and nylon-6.
- Estimations saponification value, surface tension and viscosity of lubricant oils.

List of Experiments:

1. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.
2. **Conductometry:** Estimation of the concentration of an acid by Conductometry.
3. **Potentiometry:** Estimation of the amount of Fe^{+2} by Potentiometry.
4. **PH Metry:** Determination of an acid concentration using pH meter.
5. **Preparations:**
 - a. Preparation of Bakelite.
 - b. Preparation of Nylon-6.
6. **Lubricants:**
 - a. Estimation of acid value of given lubricant oil.
 - b. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.
7. **Corrosion:** Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.
8. **Virtual lab experiments**
 - a. Construction of Fuel cell and it's working.
 - b. Smart materials for Biomedical applications
 - c. Batteries for electrical vehicles.
 - d. Functioning of solar cell and its applications.

Reference Books:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S. Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th Edition
3. Inorganic Quantitative analysis by A. I. Vogel, ELBS Publications.
4. College Practical Chemistry by V. K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

B.Tech**L T P C****I Year - II Semester****0 0 2 1****BASIC ELECTRICAL ENGINEERING LABORATORY**

(Common for CSE(AIML) & ECE)

Course Objectives:

- To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
- To study the transient response of various R, L and C circuits using different excitations.
- To determine the performance of different types of DC, AC machines and Transformers.

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

- Verify the basic Electrical circuits through different experiments.
- Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
- Analyze the transient responses of R, L and C circuits for different input conditions.

List of experiments/demonstrations:**PART- A (compulsory)**

1. Verification of KVL and KCL
2. Verification of Thevenin's and Norton's theorem
3. Transient Response of Series RL and RC circuits for DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC Series circuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three-phase Induction Motor.

PART-B (any two experiments from the given list)

1. Verification of Superposition theorem.
2. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
3. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
4. Measurement of Active and Reactive Power in a balanced Three-phase circuit
5. No-Load Characteristics of a Three-phase Alternator

Text Books:

1. D.P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, “Basic Electrical Engineering”, Tata McGraw Hill, 2nd Edition, 2008.

Reference Books:

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, “Basic Electrical Engineering”, S. Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, “Basic Electrical and Electronics Engineering”, Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthy, Sudipta Debnath, Chandan Kumar Chanda, “Basic Electrical Engineering”, 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
6. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
7. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989

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

Applied Python Programming Laboratory
(ECE)

Course Objectives:

- To install and run the Python interpreter.
- To learn control structures.
- To Understand Lists, Dictionaries in Python
- To analyse the hardware boards through Python

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

- Build basic programs using fundamental programming constructs.
- Write and execute python codes for different applications.
- Capable to implement on hardware boards.

Note: The lab experiments will be like the following experiment examples.

Cycle - 1

1. Downloading and Installing Python and Modules

a) Python 3 on Linux

Follow the instructions given in the URL

<https://docs.pythonguide.org/starting/install3/linux/>

b) Python 3 on Windows

Follow the instructions given in the URL

<https://docs.python.org/3/using/windows.html>

(Please remember that Windows installation of Python is harder!)

c) pip3 on Windows and Linux

Install the Python package installer by following the instructions given in the URL: <https://www.activestate.com/resources/quick-reads/how-to-install-and-use-pip3/>

d) Installing numpy and scipy

You can install any python3 package using the command `pip3 install <packagename>`

e) Installing jupyterlab

Install from pip using the command `pip install jupyterlab`

2. Introduction to Python3

- a) Printing your biodata on the screen
- b) Printing all the primes less than a given number
- c) Finding all the factors of a number and show whether it is a perfect number, i.e.,

the sum of all its factors (excluding the number itself) is equal to the number itself

3. Defining and Using Functions

- a) Write a function to read data from a file and display it on the screen
- b) Define a boolean function is palindrome (<input>)
- c) Write a function collatz(x) which does the following: if x is odd, $x = 3x + 1$; if x is even, then $x = x/2$. Return the number of steps it takes for $x = 1$
- d) Write a function $N(m, s) = \exp(-(x-m)^2 / (2s^2)) / \sqrt{2\pi}s$ that computes the Normal

4. The package numpy

- a) Creating a matrix of given order m x n containing random numbers in the range 1 to 99999
- b) Write a program that adds, subtracts and multiplies two matrices. Provide an interface such that, based on the prompt, the function (addition, subtraction, multiplication) should be performed
- c) Write a program to solve a system of n linear equations in n variables using matrix

5. The package scipy and pyplot

- a) Finding if two sets of data have the same mean value Course
- b) Plotting data read from a file
- c) Fitting a function through a set a data points using polyfit function
- d) Plotting a histogram of a given data set

6. The strings package

- a) Read text from a file and print the number of lines, words and characters
- b) Read text from a file and return a list of all n letter words beginning with a vowel
- c) Finding a secret message hidden in a paragraph of text
- d) Plot a histogram of words according to their length from text read from a file

Cycle -2

7. Installing OS on Raspberry Pi

- a) Installation using PiImager
- b) Installation using image file
 - Downloading an Image
 - Writing the image to an SD card
 - Using Linux
 - Using Windows
 - Booting up
 - Follow the instructions given in the URL

<https://www.raspberrypi.com/documentation/computers/getting-started.html>

8. Accessing GPIO pins using Python

- a) Installing GPIO Zero library. First, update your repositories list: `sudo apt update`
Then install the package for Python 3: `sudo apt install python3-gpiozero`

- b) Blinking an LED connected to one of the GPIO pin
 - c) Adjusting the brightness of an LED
 - d) Adjust the brightness of an LED (0 to 100, where 100 means maximum brightness) using the in-built PWM wavelength.
9. Collecting Sensor Data
- a) DHT Sensor interface
- Connect the terminals of DHT GPIO pins of Raspberry Pi.
Import the DHT library using `import Adafruit_DHT`
Read sensor data and display it on screen

TEXT BOOKS:

- 1. Supercharged Python:** Take your code to the next level, Overland
- 2. Learning Python, Mark Lutz, O'reilly**

REFERENCE BOOKS:

1. Python for Data Science, Dr. Mohd. Abdul Hameed, Wiley Publications - 1st Ed. 2021.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson
4. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition
5. Think Python, Allen Downey, Green Tea Press
6. Core Python Programming, W. Chun, Pearson
7. Introduction to Python, Kenneth A. Lambert, Cengage

B.Tech (ECE)	L	T	P	C
II Year - I Semester	3	1	0	4
NUMERICAL METHODS AND COMPLEX VARIABLES				

Pre-requisites: Mathematics courses in first year of study.

Course Objectives: To learn

- Expressing periodic function by Fourier series and a non-periodic function by Fourier transforms
- Various numerical methods to find roots of polynomial and transcendental equations.
- Concept of finite differences and to estimate the value for the given data using interpolation.
- Evaluation of integrals using numerical techniques
- Solving ordinary differential equations of first order using numerical techniques.
- Differentiation and integration of complex valued functions.
- Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.
- Expansion of complex functions using Taylor's and Laurent's series.

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

- Express any periodic function in terms of sine and cosine
- Find the root of a given polynomial and transcendental equations.
- Estimate the value for the given data using interpolation
- Find the numerical solutions for a given first order ODE's
- Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
- Taylor's and Laurent's series expansions in complex function

UNIT-I: Fourier Series & Fourier Transforms:

Fourier series - Dirichlet's Conditions - Half-range Fourier series - Fourier Transforms: Fourier Sine and cosine transforms - Inverse Fourier transforms.

UNIT-II: Numerical Methods-I

Solution of polynomial and transcendental equations: Bisection method, Iteration Method, Newton-Raphson method and Regula-Falsi method. Jacobi and Gauss-Seidal iteration methods for solving linear systems of equations.

Finite differences: forward differences, backward differences, central differences, symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae.

Central difference interpolation: Gauss's forward and backward formulae, Lagrange's method of interpolation.

UNIT-III: Numerical Methods-II

Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8th rules.

Ordinary differential equations: Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order for first order ODE.

UNIT-IV: Complex Differentiation

Limit, Continuity and Differentiation of Complex functions. Cauchy-Riemann equations

(without proof), Milne- Thomson methods, analytic functions, harmonic functions, finding harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithm) and their properties. (All theorems without Proofs), Conformal mappings, Mobius transformations.

UNIT-V: Complex Integration:

Line integrals, Cauchy's theorem, Cauchy's Integral formula, zeros of analytic functions, singularities, Taylor's series, Laurent's series, Residues, Cauchy Residue theorem and their properties. (All theorems without Proofs)

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.

Reference Books:

1. M. K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical methods for Scientific and Engineering Computations, New Age International publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Edition, Mc-Graw Hill, 2004.

B.Tech. ECE

L T P C

II Year – I Semester

3 1 0 4

ANALOG CIRCUITS**Course Objectives:**

- Learn the concepts of, load line analysis and biasing techniques
- Learn the concepts of high frequency analysis of transistors.
- To give understanding of various types of amplifier circuits
- Learn the concepts of small signal analysis of BJT and FET
- To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.

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

- Acquire basic knowledge of physical and electrical conducting properties of semiconductors.
- Develop the Ability to understand the design and working of BJT / FET amplifiers.
- Design amplifier circuits using BJT s And FET's. and observe the amplitude and frequency responses of common amplifier circuits
- Observe the effect of negative feedback on different parameters of an Amplifier and different types of negative feedback topologies.
- Observe the effect of positive feedback and able to design and working of different Oscillators using BJTS.

UNIT - I: BJT Biasing

Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing -Fixed Bias, Self Bias, Bias Stability, Bias Compensation using Diode

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Transistor Hybrid model, Determination of h-parameters from transistor characteristics, Typical values of h-parameters in CE,CB and CC configurations, Transistor amplifying action, Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT - II: FET- Biasing Techniques

FET Amplifiers: Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOSFET Amplifiers, MOS Small signal model, Common source amplifier with resistive, Diode connected and Current source loads, Source follower, Common Gate Stage, Cascode and Folded Cascode Amplifier – frequency response.

UNIT - III: Multistage Amplifiers:

Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage amplifiers, Cascade RC Coupled amplifiers, Cascode amplifier, Darlington pair.

Transistor at High Frequency: Hybrid - model of Common Emitter transistor model, f_{α} , f_{β} and unity gain bandwidth, Gain-bandwidth product.

UNIT - IV:Feedback Amplifiers:

Concepts of feedback – Classification of feedback amplifiers – General characteristics of

Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems. transition count testing, signature analysis and test bridging faults.

UNIT - VOscillators:

Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator.

Text Books:

1. Jacob Millman, Christos C Halkias -Integrated Electronics, McGraw Hill Education.
2. Robert L. Boylestead, Louis Nashelsky -Electronic Devices and Circuits theory, 11th Edition, 2009, Pearson.

Reference Books:

1. David A. Bell – Electronic Devices and Circuits, 5th Edition, Oxford.
2. Adel S. Sedra, Kenneth C. Smith- Microelectronic Circuits- Theory and Applications, Oxford.
3. Chinmoy Saha, Arindam Halder, Debaati Ganguly -Basic Electronics-Principles and Applications, 2018, Cambridge.

B.Tech. ECE

L T P C

II Year – I Semester

3 1 0 3

NETWORK ANALYSIS AND SYNTHESIS**Course Objectives:**

1. To understand the basic concepts on RLC circuits.
2. To know the behaviour of the steady state and transient states in RLC circuits.
3. To understand the two port network parameters.
4. Learn the design concepts of various filters and attenuators

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

1. Gain the knowledge on basic RLC circuit's behaviour.
2. Analyze the Steady state and transient analysis of RLC Circuits.
3. Know the characteristics of two port network parameters.
4. Analyse the Design aspect of various filters and attenuators
5. Synthesize LC, RC and RL Functions by foster and causer methods

UNIT - I: Network Topology:

Basic cutset and tie set matrices for planar networks, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

UNIT - II: Transient and Steady state analysis

RC, RL and RLC Circuits, Sinusoidal, Step and Square responses. RC Circuits as integrator and differentiators. 2nd order series and parallel RLC Circuits, Root locus, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves.

UNIT - III: Two port network parameters

Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros. Standard T,N, L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network.

UNIT - IV: Filters

Classification of Filters, Filter Networks, Constant-K Filters-Low pass, high pass, Band pass, band-stop filters, M-derived Filters- T and π filters- Low pass, high pass

Attenuators: Types – T, π , L, Bridge T and lattice, Asymmetrical Attenuators T, π , L Equalizers-Types- Series, Shunt, Constant resistance, bridge T attenuation, bridge T phase, Lattice attenuation, lattice Phase equalizers.

UNIT – V: Network Synthesis:

Driving point impedance and admittance, transfer impedance and admittance, network functions of Ladder and non-ladder networks, Poles, Zeros analysis of network functions Hurwitz Polynomials, Positive Real Functions, synthesis of LC, RC and RL Functions by foster and causer methods.

Text Books:

1. Van Valkenburg -Network Analysis, 3rd Ed., Pearson, 216.
2. JD Ryder - Networks, Lines and Fields, 2nd Ed., PHI, 1999.

Reference Books:

1. J. Edminister and M. Nahvi - Electric Circuits, Schaum's Outlines, Mc Graw Hills Education, 1999.
2. Sudhakar and Shyammohan S Palli - Networks & Circuits, 4th Ed., Tata McGraw- Hill

Publications

3. William Hayt and Jack E. Kimmerley - Engineering Circuit Analysis, 6th Ed., William Hayt and Jack E. Kimmerley, McGraw Hill Company.