B.Tech. I Year I Semester

S.No.	Category	Title	L/D	T	P	Credits
1.	BS&H	Engineering Physics	3	0	0	3
2.	BS&H	Linear Algebra & Calculus	3	0	0	3
3.	Engineering Science	Basic Electrical & Electronics Engineering	3	0	0	3
4.	Engineering Science	Engineering Graphics	1	0	4	3
5.	Engineering Science	Introduction to Programming	3	0	0	3
6.	Engineering Science	IT Workshop	0	0	2	1
7.	BS&H	Engineering Physics Lab	0	0	2	1
8.	Engineering Science	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9.	Engineering Science	Computer Programming Lab	0	0	3	1.5
10.	BS&H	NSS/Community Service	-	-	1	0.5
Total			**13**	**00**	**15**	**20.5**

B.Tech. I Year II Semester

S.No.	Category	Title	L/D	T	P	Credits
1.	BS&H	Communicative English	2	0	0	2
2.	BS & H	Chemistry	3	0	0	3
3.	Engineering Science	Differential Equations & Vector Calculus	3	0	0	3
4.	Engineering Science	Basic Civil & Mechanical Engineering	3	0	0	3
5.	Professional Core	Network Analysis	3	0	0	3
6.	BS&H	Communicative English Lab	0	0	2	1
7.	BS&H	Chemistry lab	0	0	2	1
8.	Engineering Science	Engineering Workshop	0	0	3	1.5
9.	Professional Core	Network Analysis And Simulation Laboratory	0	0	3	1.5
10.	BS&H	Health and wellness, Yoga and Sports	-	-	1	0.5
Total			**14**	**00**	**11**	**19.5**

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24BS1T03	**Engineering Physics** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2	Familiarize with the basics of crystals and their structures.
CO3	Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
CO5	Identify the type of semiconductor using Hall effect.

Unit-I: Wave Optics CO1 12L

Interference

Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.

Diffraction

Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization

Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

Unit-II: Crystallography and X-ray diffraction CO2 8L

Crystallography

Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices, separation between successive (hkl) planes.

X-ray diffraction

Bragg's law-X-ray Diffractometer–crystal structure determination by Laue's and powder methods.

Unit-III: Dielectric and Magnetic Materials CO3 10L

Dielectric Materials

Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation – complex dielectric constant – Frequency dependence of polarization – dielectric loss.

Magnetic Materials

Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro&Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

Unit-IV: Quantum Mechanics and Free electron Theory CO4 10L

Quantum Mechanics

Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory

Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy.

Unit-V: Semiconductors CO5 10L

Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Textbooks:

1. A Textbook of Engineering Physics, M. N. Avadhanulu, P. G. Kshirsagar& TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - D. K. Bhattacharya and Poonam Tandon, Oxford press (2015).
3. Engineering Physics – P.K. Palanisamy, Scitechpublishers(2011).

Reference book(s)

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics –Dr. M. Armugam, anuradhaPublications , 2015.
4. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press, 2010.
5. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web reference(s)

1. https://www.loc.gov/rr/scitech/selected-internet/physics.html

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24BS1T02	**Linear Algebra and Calculus** (Common to all branches of Engineering)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle Various real-world problems and their applications.

Course Outcomes

After completion of this course,the learners will be able to

CO1	Develop and use of matrix algebra techniques that are needed by engineers for Practical applications.
CO2	Applications of Eigen values and Eigen Vectors in Communication Engineering.
CO3	Utilize mean value theorems to real life problems.
CO4	Familiarize with functions of several variables which is useful in optimization. Learn important tools of calculus in higher dimensions in partial differentiation.
CO5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using Cylindrical and spherical coordinates.

Unit-I:Matrices CO1 12L

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). 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 Jordan method and Gauss SeidelIteration Methods.

Unit-II: Eigen values, Eigen vectors and Orthogonal Transformation CO2 12L

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

Unit-III:Calculus CO3 11L

Infinite series tests, Ratio, comparison nth root test, Alternating series Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation,Cauchy's mean value theorem,Taylor's and Maclaurin theorems with Remainders (withoutproof), Problems and applications on the above theorems.

Unit-IV: Partial differentiation and Applications (Multi variable calculus) CO4 13L

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Mac laurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange Multipliers.

Unit-V:Multiple Integrals(Multi variable Calculus) CO5 12L

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas(by double integrals) and volumes (by double integrals and triple integrals).

Textbook(s)

1. Higher Engineering Mathematics, B.S.Grewal, Khanna Publishers,2017,44th Edition
2. Advanced Engineering Mathematics, ErwinKreyszig, John Wiley & amp; Sons, 2018,10th Edition.

Referencebook(s)

1. Thomas Calculus, George B.Thomas, Maurice D.Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R.K.Jain and S.R.K.Iyengar, Alpha Science International Ltd.,2021 5th Edition (9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Micheael Greenberg, Pearson publishers, the dition
5. Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications,2014, Third Edition (Reprint 2021)

Webreference(s)

1. https://www.loc.gov/rr/scitech/selected-internet/mathematics.html

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24ES1T03	**Basic Electrical & Electronics Engineering** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.

Course Outcomes

After the completion of the course students will be able to

CO1	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments.
CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations.
CO3	Calculate electrical load and electricity bill of residential and commercial buildings.
CO4	Demonstrate fundamental of semiconductor devices.
CO5	Demonstrate Rectifiers and power supplies, Amplifiers and Conversion of number systems, Describe logic gates.

Unit-I: DC & AC Circuits CO1 10L

DC Circuits:

Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor.

Unit-II: Measuring Instruments CO2 7L

Measuring Instruments

Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge, Energy meter, Phantom loading, Absolute instruments, Standardization of meter.

Unit-III: Energy Resources, Electricity Bill CO3 10L

Energy Resources:

Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity Bill

Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Unit-IV: Semiconductor Devices CO4 8L

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor, — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.

Unit-V: Basic Electronic Circuits and Digital Electronics CO5 10L

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra.

Textbook(s)

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009.
3. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.
4. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013.
5. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

Reference book(s)

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.
4. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition.
5. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020.
6. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.
7. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017.

Web reference(s)

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24ES1T04	**Engineering Graphics** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
CO2	Drawandinterpretorthographicprojectionsofpoints,lines,planesandsolidsinfront,top and side views.
CO3	Understand and draw projection of solids in various positions in first quadrant.
CO4	Explain principles behind development of surfaces.
CO5	Prepare isometric and perspective sections of simple solids

Unit-I: Introduction, Curves and Scales CO1 9L

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.

Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.

Scales: Plain scales, diagonal scales and vernier scale

Unit-II: Orthographic Projections- Projection of Points, Straight Lines and Planes CO2 9L

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

Unit-III: Projection of Solids CO3 12L

Projections of Solids: Types of solids: Poly hedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

Unit-IV: Section of Solids and Development of Surfaces CO4 10L

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.
Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

Unit-V: Conversion of Views and Computer Graphics CO5 10L

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.
Computer graphics: Creating2D&3Ddrawingsof objects including PCB and Transformations using Auto CAD (*Not for end examination*)

Textbook(s)

1. N.D.Bhatt, Engineering Drawing, Charotar PublishingHouse,2016.

Reference book(s)

1. Engineering Drawing, K.L.Narayana and P.Kannaiah,TataMcGrawHill, 2013.
2. Engineering Drawing, M.B.Shah and B.C.Rana,Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD,DhananjayJolhe,TataMcGraw Hill, 2017

Web reference(s)

1. https://onlinecourses.nptel.ac.in/noc21_me128/preview
2. https://www.sdcpublications.com/Textbooks/Engineering-Graphics/85/
3. https://fractory.com/engineering-drawing-basics/
4. https://omicstutorials.com/engineering-graphics-and-design/
5. https://onlinecourses.nptel.ac.in/noc24_mg131/preview
6. https://onlinecourses.swayam2.ac.in/aic22_ts42/preview

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24ES1T02	**Introduction to Programming** (Common for All Engineering Branches)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

To Familiarize students with programming concepts such as data types, control structures, functions, and arrays. Gain knowledge of the operators, selection and repetition statements in C. Understand and Apply different programming concepts to deal with real world problems.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Explain fundamentals of computer, programming languages. Use appropriate data types for storing data and choose the operators for writing complex expressions in C.
CO2	Make use of Decision Making and Looping statements to Solve various problems in C.
CO3	Solve problems using Arrays and Strings for efficiently accessing homogenous data.
CO4	Develop programs using pointers, structures and unions.
CO5	Develop programs to handle functions for reusability and redundancy. Apply file-handling functions to read/write data to files.

Unit-I: Introduction CO1 10L

Introduction to Computer and Computer Languages

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Flow charts; Algorithms, Pseudo code

Introduction to C Programming

Data types, Key words; Variables and Constants; Format-Specifies, basic input and output statements; Operators: Arithmetic, relational, logical operators; Assignment, increment, decrement, conditional operators; Bitwise and special operators, operator precedence and associativity, type conversion.

Unit-II: Control Structures CO2 10L

Decision Making statements

Simple if, if-else; nested if, else-if ladder; Switch-Case.

Looping Statements

While loop, Do-while loop, For loop, Comparison of while, do while and for; Nested loops, Break and continue.

Unit-III: Arrays and Strings CO3 10L

Arrays

Introduction to Arrays, one dimensional Arrays, two dimensional Arrays, Applications of 1D-Arrays: Bubble Sort, Insertion Sort; Selection Sort; Linear Search and Binary Search, Applications of 2D-Arrays: Matrix Addition; Matrix Multiplication and Transpose.

Strings
Introduction to Strings; string handling functions; Implementation of string copy and string concatenation without using string library functions.

Unit-IV: Structures, Unions and PointersCO4 10L

Structures and Unions
Structures, Accessing elements of a structure, Array of structures; pointer to structure; Unions, Compare structures and unions; Bit fields.

Pointers
Pointers, dereferencing and address operators, Pointer arithmetic; Accessing array elements using pointers.

Unit-V: Functions and File Handling CO5 10L

Functions
Functions, Declaration, Definition, call; Actual and formal parameters, return values; Call by value, call by reference; passing and returning pointers through functions; Passing arrays to functions; Dynamic memory allocation, malloc(), calloc(), realloc(), free(), storage classes; Command line arguments.

File Handling
Files, File streams, File types, File modes of operation, Functions for reading from a file, Functions to write data to a file; Random file access functions, Macros.

Textbook(s)

1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall, 1988.
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996.

Reference book(s)

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, RemaTheraja, Oxford, 2016, 2nd edition.
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition.

Web Reference(s)

1. https://www.w3schools.com/c/c intro.php
2. https://www.geeksforgeeks.org/c-programming-language/
3. https://www.hackerrank.com/domains/c

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24ES1L03	**IT WORKSHOP** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	0	0	2	1

Course Objectives

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools

Course Outcomes

At the end of the course, the learner will be able to

CO1	Perform Hardware troubleshooting.
CO2	Understand Hardware components and inter dependencies
CO3	Safeguard computer systems from viruses/worms
CO4	Document/ Presentation preparation
CO5	Perform calculations using spreadsheets

List of Experiment(s)

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva Virtual Machine setup

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva.

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva.

Internet & World Wide Web

Task 1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally, students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop-up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1: Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create a project certificate. Features to be covered: -Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 3: Creating project abstract Features to be covered: -Formatting Styles, inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes**.**

Task 4: Creating a Newsletter: Features to be covered: - Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Task 2: Calculating GPA -. Features to be covered: - Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting.

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes,Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

- Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference(s)

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003.
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition.
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.

Web Resource(s)

1. https://assembleyourpc.net
2. https://www.latex-tutorial.com/tutorial
3. http://www.teachmsoffice.com/
4. https://www.geeksforgeeks.org/top-12-most-used-git-commands-for-developers/

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24BS1L02	**Engineering Physics Lab** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	0	0	2	1

Course Objectives

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Operate optical instruments like travelling microscope and spectrometer.
CO2	Estimate the wavelengths of different colours using diffraction grating.
CO3	Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
CO5	Calculate the band gap of a given semiconductor.
CO6	Identify the type of semiconductor using Hall effect.

List of Experiment(s)

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law.
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by non-

uniform bending (or double cantilever) method.

18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

Reference(s)

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

Web Resource(s)

1. www.vlab.co.in
2. https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24ES1L04	**Electrical & Electronics Engineering Workshop** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	0	0	3	1.5

Course Objectives

To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Course Outcomes

After competition of this course, the student will be able to

CO1	Measure voltage, current and power in an electrical circuit.
CO2	Measure of Resistance using Wheat stone bridge
CO3	Discover critical field resistance and critical speed of DC shunt generators.
CO4	Investigate the effect of reactive power and power factor in electrical loads.
CO5	Identify & testing of various electronic components.
CO6	Understand the usage of electronic measuring instruments.
CO7	Plot and discuss the characteristics of various electron devices.
CO8	Explain the operation of a digital circuit

List of Experiment(s)

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises
8. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
9. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
10. Implementation of half wave and full wave rectifiers
11. Plot Input & Output characteristics of BJT in CE and CB configurations
12. Frequency response of CE amplifier.
13. Simulation of RC coupled amplifier with the design supplied
14. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gate using ICs.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

Reference(s)

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition .
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
4. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
5. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

Web reference(s)

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24ES1L02	**Computer Programming Lab** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	0	0	3	1.5

Course Objectives

To be familiar with the programming concepts of C Language. To provide hands on experience with coding and debugging and to foster logical thinking and problem-solving skills using programming

Course Outcomes

After completion of this course, the learners will be able to

CO1	Develop C Programs with utilize memory efficiently using various programming constructs.
CO2	Select appropriate control structure to Solve real world problems.
CO3	Solve various complex problems using Modular Programming skills.
CO4	Develop, Debug and Execute programs that demonstrate the applications of arrays, functions, basic concepts of pointers in C.

List of Experiment(s)

1. Familiarization with programming environment.
   i) Basic Linux environment and its editors like Vi, Vim &Emacs etc.
   ii) Exposure to Turbo C, gcc
   iii) Writing simple programs using printf(), scanf().
2. Converting algorithms/flow charts into C Source code.Developing the algorithms/flowcharts for the following sample programs.
   i) Sum and average of 3 numbers
   ii) Conversion of Fahrenheit to Celsius and vice versa
   iii) Simple interest calculation Verification of Brewster's law.
3. Simple computational problems using arithmetic expressions.
   i) Finding the square root of a given number
   ii) Finding compound interest
   iii) Area of a triangle using heron's formulae
   iv) Distance travelled by an object
4. Simple computational problems using the operator' precedence and associativity
   i) Evaluate the following expressions.
      a. A+B*C+(D*E) + F*G
      b. A/B*C-B+A*D/3
      c. A+++B---A
      d. J= (i++) + (++i)
   ii) Find the maximum of three numbers using conditional operator
   iii) Take marks of 5 subjects in integers, and find the total, average in float
5. Problems involving if-then-else structures.

i) Write a C program to find the max and min of four numbers using if-else.
ii) Write a C program to generate electricity bill.
iii) Find the roots of the quadratic equation.
iv) Write a C program to simulate a calculator using switch case.
v) Write a C program to find the given year is a leap year or not.

6. Iterative problems e.g., the sum of series
   i) Find the factorial of given number using any loop.
   ii) Find the given number is a prime or not.
   iii) Compute sine and cos series
   iv) Checking a number palindrome
   v) Construct a pyramid of numbers.
7. 1D Array manipulation, linear search
   i) Find the min and max of a 1-D integer array.
   ii) Perform linear search on1D array.
   iii) The reverse of a 1D integer array
   iv) Find 2's complement of the given binary number.
   v) Eliminate duplicate elements in an array Determination of temperature coefficients of a thermistor.
8. Matrix problems, String operations, Bubble sort
   i) Addition of two matrices
   ii) Multiplication two matrices
   iii) Sort array elements using bubble sort
   iv) Concatenate two strings without built-in functions
   v) Reverse a string using built-in and without built-in string functions.
9. Pointers and structures, memory dereferences.
   i) Write a C program to find the sum of a 1D array using malloc()
   ii) Write a C program to find the total, average of n students using structures
   iii) Enter n students data using calloc() and display failed students list
   iv) Read student name and marks from the command line and display the student details along with the total.
   v) Write a C program to implement realloc() .
10. Bitfields, linked lists Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields
    i) Create and display a singly linked list using self-referential structure.
    ii) Demonstrate the differences between structures and unions using a C program.
    iii) Write a C program to shift/rotate using bitfields.
    iv) Write a C program to copy one structure variable to another structure of the same type.
11. Simple functions using call by value, solving differential equations using Eulers theorem.
    i) Write a C function to calculate NCR value.
    ii) Write a C function to find the length of a string.
    iii) Write a C function to transpose of a matrix.
    iv) Write a C function to demonstrate numerical integration of differential

equations using Euler's method.

12. Recursive functions
    i) Write a recursive function to generate Fibonacci series.
    ii) Write a recursive function to find the lcm of two numbers.
    iii) Write a recursive function to find the factorial of a number.
    iv) Write a C Program to implement Ackermann function using recursion.
    v) Write a recursive function to find the sum of series.
13. Simple functions using Call by reference, Dangling pointers.
    i) Write a C program to swap two numbers using call by reference.
    ii) Demonstrate Dangling pointer problem using a C program.
    iii) Write a C program to copy one string into another using pointer.
    iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.
14. File operations
    i) Write a C program to write and read text into a file.
    ii) Write a C program to write and read text into a binary file using fread() and fwrite()
    iii) Copy the contents of one file to another file.
    iv) Write a C program to merge two files into the third file using command-line arguments.
    v) Find no. of lines, words and characters in a file
    vi) Write a C program to print last n characters of a given file.

Textbook(s)

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill

Reference(s)

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PrenticeHall of India.
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

Web Resource(s)

1. https://www.w3schools.com/c/index.php
2. https://www.geeksforgeeks.org/c-programming-language/?ref=lbp

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. I Sem. (1st Semester)			
Course Code 24HS1L03	**NSS/ Community Service** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	0	0	1	0.5

Course Objectives

The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Understand the importance of discipline, character and service motto.
CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3	Explore human relationships by analyzing social problems.
CO4	Determine to extend their help for the fellow beings and downtrodden people.
CO5	Develop leadership skills and civic responsibilities.

Unit-I: Orientation CO1 5L

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

i) Conducting ice breaking sessions-expectations from the course-knowing personal talents and skills.
ii) Conducting orientations programs for the students –future plans-activities-releasing road map etc.
iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv) Conducting talent show in singing patriotic songs-paintings- any other contribution.

Unit-II: Nature & Care CO2,CO4 4L

Activities:

i) Best out of waste competition.
ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organising Zero.

Unit-III: Community Service CO3,CO5 6L

Activities:

i) Conducting One Day Special Camp in a village contacting village-area leaders-Survey in the village, identification of problems- helping them to solve via media-authorities experts-etc.
ii) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS.
iii) Conducting consumer Awareness. Explaining various legal provisions etc.
iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and

Population Education.

v) Any other programmes in collaboration with local charities, NGOs etc.

Reference book(s)

1. Nirmalya Kumar Sinha &SurajitMajumder, A Text Book of National Service Scheme Vol;.I, VidyaKutir Publication, 2021 (ISBN 978-81-952368-8-6).
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi.
3. Davis M. L. and Cornwell D. A., “Introduction to Environmental Engineering”, McGraw Hill, New York 4/e 2008.
4. Masters G. M., Joseph K. and Nagendran R. “Introduction to Environmental Engineering and Science”, Pearson Education, New Delhi. 2/e 2007.

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General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

Web reference(s)

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24HS2T01	**Communicative English** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	3	0	0	2

Course Objectives

The main objective of introducing this course, Communicative English, is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
CO2	Apply grammatical structures to formulate sentences and correct word forms.
CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO4	Evaluate reading / listening texts and to write summaries based on global comprehension of these texts.
CO5	Create a coherent paragraph, essay, and resume.

UNIT-I

Lesson: Human Values: Gift of Magi (Short Story) CO1 10L

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Writing: Mechanics of Writing

Grammar: Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT-II

Lesson: Nature: The Brook by Alfred Tennyson (Poem) CO2 8L

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

UNIT-III

Lesson: Biography: Elon Musk **CO3** **8L**

Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.
Reading: Readinga text in detail by making basic inferences.
Writing: Summarizing, Note-making, paraphrasing.
Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations.
Vocabulary: Compound words, Collocations.

UNIT-IV

Lesson: Inspiration: The Toys of Peace by Saki **CO4** **8L**

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal).
Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes.
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice.
Vocabulary: Words often confused, Jargon.

UNIT-V

Lesson: Motivation: The Power of Intrapersonal Communication (An Essay) **CO6** **8L**

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts.
Reading: Reading comprehension.
Writing: Writing structured essays on specific topics.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement).
Vocabulary: Technical Jargons.

Textbook(s)

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3).
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5).

Reference book(s)

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020.
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Web reference(s)

Grammar:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

Vocabulary :

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24BS2T01	**Chemistry** (Common to ECE, CSE, IT & allied branches)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electro chemistry and polymers
- To introduce instrumental methods, molecular machines and switches.

Course Outcomes

At the end of the course, the learners will be able to

CO1	Compare the materials of construction for battery and electrochemical sensors.
CO2	Explain the preparation, properties, and applications of thermoplastics & thermosetting &elastomers conducting polymers.
CO3	Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.
CO4	Apply the principle of Band diagrams in the application of conductors and semiconductors.
CO5	Summarize the concepts of Instrumental methods.

Unit-I:Structure and Bonding Models CO4 8L

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory–bonding in homo- and hetero nuclear diatomic molecules – energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

Unit-II: Modern Engineering materials CO4 10L

Semiconductors – Introduction, basic concept, application Super conductors - Introduction basic concept, applications. Supercapacitors : Introduction, Basic Concept-Classification – Applications.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

Unit-III: ElectrochemistryandApplications CO1 10L

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples. Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries-working of the batteries including cell reactions; Fuel cells, hydrogen-oxygenfuel cell–working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

Unit-IV: Polymer Chemistry **CO2** **12L**

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation. Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres. Elastomers–Buna-S, Buna-N–preparation, properties and applications.Conducting polymers–polyacetylene, polyaniline,–mechanism of conduction and applications.Bio-Degradable polymers- Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

Unit-V:Instrumental Methods and Applications **CO3,CO5** **10L**

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Textbook(s)

1. Jain and Jain, EngineeringChemistry,16/e, Dhanpat Rai Publishers,2013.
2. Peter Atkins, Juliode Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference book(s)

1. Skoog and West, Principles of Instrumental Analysis,6/e,Thomson,2007.
2. J.D.Lee, Concise Inorganic Chemistry,5thEdition,Wiley Publications,Feb.2008
3. Textbook of Polymer Science, Fred W.BillmayerJr,3rd Edition.

Web reference(s)

1. https://nptel.ac.in
2. https://www.azdocuments.in/2022/02/engineering-chemistry-21che1222.html
3. http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering Chemistry.pdf
4. https://archive.nptel.ac.in/courses/122/101/122101001/

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24BS2T04	**Differential Equations and Vector Calculus** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Solve the system of Homogeneous and non Homogeneous equations by using Matrices.
CO2	Solve the differential equations related to various engineering fields.
CO3	Identify solution methods for partial differential equations that model physical processes.
CO4	Interpret the physical meaning of different operators such as gradient, curl and divergence
CO5	Estimate the work done against a field, circulation and flux using vector calculus..

Unit-I: Differential equations of first order and first degree CO1 12L

Linear differential equations –Bernoulli's equations-Exact equations and equations reducible to exact form.

Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits.

Unit-II: Linear differential equations of higher order(Constant Coefficients) CO2 12L

Definitions, homogenous and non-homogenous, complimentary function, general solution particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations.

Applications: L-C-R Circuit problems and Simple Harmonic motion.

Unit-III: Partial Differential Equations CO3 11L

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method Homogeneous Linear Partial differential equations with constant coefficients.

Unit-IV: Vector Differentiaon CO4 13L

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities, Force conservative

Unit-V:Vector Integration CO5 12L

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Textbook(s)

1. HigherEngineeringMathematics,B.S.Grewal,KhannaPublishers,2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference book(s)

1. Advanced Engineering Mathematics, MicheaelGreenberg,,Pearson publishers,9thdition.
2. Higher Engineering Mathematics, H.KDas ,Er.RajnishVerma,S.Chand Publications,2014, Third Edition (Reprint 2021).

Web reference(s)

1. https://www.loc.gov/rr/scitech/selected-internet/mathematics.html

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24ES2T01	**Basic Civil and Mechanical Engineering** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

Upon course completion, students should be able to recognize the significance and breadth of mechanical engineering across various sectors and industries, articulate knowledge of different engineering materials and manufacturing processes, and provide a comprehensive overview of thermal and mechanical transmission systems while introducing the fundamentals of robotics and their practical applications.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Upon course completion, students will demonstrate a comprehensive understanding of the role of mechanical engineering in society and industry, including its application across various sectors. They will also exhibit knowledge of fundamental engineering materials and their properties.
CO2	Upon course completion, students will be able to explain the fundamental principles of manufacturing processes, including casting, forming, joining, and machining, and demonstrate knowledge of thermal engineering concepts such as combustion cycles, refrigeration, and air conditioning, as well as an introduction to electric and hybrid vehicles.
CO3	Upon course completion, students will be able to explain the working principles of various power plants (steam, diesel, hydro, and nuclear), analyze different mechanical power transmission systems, and demonstrate a basic understanding of robotics, including its components and applications..

Unit-I: Introduction to Mechanical Engineering, Engineering Materials CO1 9L

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive,Aerospace,andMarinesectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

Unit-II: Introduction to Mechanical Engineering, Engineering Materials CO2 9L

Manufacturing Processes: Principles of Casting**,** Forming, joining processes, Machining, Introduction to CNC machines, 3Dprinting, and Smart manufacturing.

Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

Unit-III: Introduction to Mechanical Engineering, Engineering Materials CO3 9L

Power plants – Working principle of Steam, Diesel, Hydro, Nuclear power plants.
Mechanical Power Transmission-Belt Drives, Chain, Rope drives, Gear Drives and their applications.
Introduction to Robotics-Joints & links, configurations, and applications of robotics.

Textbook(s)

1. Internal Combustion Engines by V.Ganesan, By Tata McGrawHill publications (India) Pvt. Ltd.
2. A textbook of Theory of Machines by S.S.Rattan,Tata McGrawHill Publications,(India)Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference book(s)

1. G.Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering,TataMcGraw Hill publications (India)Pvt. Ltd.
2. Thermal Engineering by Mahesh M Rathore TataMcGrawHill publications (India) Pvt.Ltd.
3. 3D printing & Additive Manufacturing Technology-L.Jyothish Kumar,Pulak M Pandey, Springer publications
4. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
5. Nuclear Energy- Fundamentals and Concepts, Dr Yarrapragada Subba Rao, Volume-1, Scientific international publishing House
6. A Text Book of Engineering Thermodynamics, Dr Yarrapragada Subba Rao, Volume-1, Alpha International Publication

Web reference(s)

1. https://onlinecourses.nptel.ac.in/noc24_me104/preview
2. https://archive.nptel.ac.in/courses/112/103/112103108/

Part B: Basic Civil Engineering

Course Objectives

Students will develop an understanding of the breadth and significance of civil engineering disciplines. The course will introduce foundational concepts of surveying and the critical role of transportation in national economic growth. Students will also gain an appreciation for the importance of water quality, conveyance, and storage. Finally, the course will provide a basic overview of civil engineering materials and construction methods.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Upon successful completion of this course, students will demonstrate a comprehensive understanding of the civil engineering profession, including its diverse disciplines, the role of civil engineers in society, and fundamental knowledge of construction materials and techniques.
CO2	Upon completion of this course, students will be able to apply fundamental surveying techniques to accurately determine horizontal and vertical distances, angles, and elevations, and produce basic topographic maps.
CO3	Upon completion of this course, students will be able to evaluate the significance of transportation infrastructure in economic development and possess foundational knowledge of highway pavements, as well as a basic understanding of key transportation systems (harbors, tunnels, airports, and railways). Additionally, students will be introduced to water resources engineering concepts, including water sources, quality, and basic water management structures.

Unit-I: Basics of Civil Engineering, Hydraulics and Water Resources Engineering — CO1 9L

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo- technical Engineering-Transportation Engineering

Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline- Building Construction and Planning-Construction Materials-Cement-Aggregate- Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

Unit-II:Surveying — CO2 9L

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings-Contour mapping.

Unit-III: Transportation Engineering, Water Resources and Environmental Engineering: **CO3 9L**

Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements – Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Textbook(s)

1. Basic Civil Engineering, M.S.Palanisamy, Tata Mcgraw Hill publications (India) Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference book(s)

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K. Khanna, C.E.G. Justo and Veeraraghavan, Nemch and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

Web reference(s)

1. https://onlinecourses.nptel.ac.in/noc24_ce111/preview
2. https://archive.nptel.ac.in/courses/105/106/105106201/
3. https://www.nptelvideos.com/discipline.php?name=civil-engineering
4. https://onlinecourses.nptel.ac.in/noc22_ce42/preview

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24EC2PCT01	**Network Analysis** (ECE & allied branches)	L	T	P	C
Prerequisites	Nil	3	0	0	3

Course Objectives

To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits. To impart knowledge on applying appropriate theorem for electrical circuit analysis. To explain transient behaviour of circuits in time and frequency domains. To teach concepts of resonance. To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

Course Outcomes

At the end of this course students will demonstrate the ability to

CO1	Understand basic electrical circuits with nodal, mesh analysis and Network Theorems.
CO2	Find Transient response and Steady state response of a network.
CO3	Find Steady state analysis of an ac circuits.
CO4	Understand the concept of resonance and coupled circuits.
CO5	Compute the parameters of a two-port network.

Unit-1: CO1 10L

Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples.

Network Theorems

Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegen's - problem solving using dependent sources also.

Unit-2: CO2 10L

Transients

First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots.

Laplace transform
introduction, Laplace transformation, basic theorems, problem solving using Laplace transform, partial fraction expansion, Heaviside's expansions, problem solving using Laplace transform.

Unit-3: **CO3 10L**

Steady State Analysis of A.C Circuits
Impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving using Laplace transforms also.

Unit-4: **CO4 10L**

Resonance
Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies.

Coupled Circuits
Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits-problem solving.

Unit-5: **CO5 10L**

Two-port Networks
Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also.
Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.

Textbook(s)

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.
3. Network lines and Fields by John. D. Ryder 2nd Edition, PHI.

Reference book(s)

1. D. Roy Choudhury, Networks and Systems, New Age International Publications, 2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017.

3. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku,McGraw-Hill Education.

Web Resource(s)

1. https://onlinecourses.nptel.ac.in/noc21_ee99/preview
2. https://onlinecourses.nptel.ac.in/noc21_ee14/preview

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24HS2L01	**Communicative English Lab** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Nil	0	0	2	1

Course Objectives

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
CO2	Apply communication skills through various language learning activities.
CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.
CO5	Create effective Course Objectives.

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

1. Walden Infotech
2. Young India Films

Reference Book(s)

1. Raman Meenakshi, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Taylor Grant: English Conversation Practice, Tata McGraw-Hill Education India, 2016.
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. J. Sethi& P.V. Dhamija. A Course in Phonetics and Spoken English, (2nd Ed) , Kindle, 2013

Web Resource(s)

Spoken English:

1.www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1.https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24BS2L01	**Chemistry Lab** (Common to ECE,CSE,IT & Allied Branches)	L	T	P	C
Prerequisites	Nil	0	0	3	1

Course Objectives

Verify the fundamental concepts with experiments.

Course Outcomes

At the end of the course, the learners will be able to

CO1	Determine the cell constant and conductance of solutions.
CO2	Prepare advanced polymer Bakelite materials.
CO3	Measure the strength of an acid present in secondary batteries.
CO4	Analyse the IR spectra of some organic compounds
CO5	Calculate strength of acid in Pb-Acid battery.

List of Experiment(s)

1. Measurement of 10Dq by spectro photometric method.
2. Conductometric titration of strong acid vs. strong base.
3. Conductometric titration of weak acid vs. strong base.
4. Determination of cell constant and conductance of solutions.
5. Potentiometry - determination of redox potentials and emfs.
6. Determination of Strength of an acid in Pb-Acid battery.
7. Preparation of a Bakelite.
8. Verify Lambert-Beer's law.
9. Wavelength measurement of sample through UV-Visible Spectroscopy.
10. Identification of simple organic compounds by IR.
11. Preparation of nanomaterials by precipitation method.
12. Estimation of Ferrous Iron by Dichrometry.

Reference(s)

1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar.

Web Resource(s)

1. https://byjus.com/chemistry/conductometric-titration/
2. https://www.sciencedirect.com/topics/chemistry/potentiometric-titration
3. https://www.slideshare.net/slideshow/fundamentals-of-volumetric-analysispdf/253855292

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24EC2PCL01	**Network Analysis And Simulation Laboratory**	L	T	P	C
Prerequisites	Nil	0	0	3	1.5

Course Objectives

To gain hands on experience in verifying Kirchoff's laws and network theorems. To analyse transient behaviour of circuits. To study resonance characteristics. To determine 2-port network parameters.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Verify Kirchoff's laws and network theorems.
CO2	Measure time constants of RL & RC circuits.
CO3	Analyse behaviour of RLC circuit for different cases.
CO4	Design resonant circuit for given specifications.
CO5	Characterize and model the network in terms of all network parameters.

List of Experiment(s)

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits.
3. Verification of Superposition, Thevenin's & Norton theorems for AC circuits.
4. Verification of maximum power transfer theorem for AC circuits.
5. Verification of Tellegan's theorem for two networks of the same topology. 6. Study of DC transient in RL, RC and RLC circuits.
7. To study frequency response of various 1st order RL & RC networks.
8. To study the transient and steady state response of a 2nd order circuit by varying its various Parameters and studying their effects on responses.
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters,
11. Determination of hybrid (H) and transmission (ABCD) parameters.
12. To measure two port parameters of a twin-T network and study its frequency response.

Reference(s)

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.

Web Resource(s

1. https://onlinecourses.nptel.ac.in/noc21_ee99/preview
2. https://onlinecourses.nptel.ac.in/noc21_ee14/preview

Regulation GEBT24	GIET Engineering College (Autonomous)	I B. Tech. II Sem. (2nd Semester)			
Course Code 24HS2L02	**Health and Wellness ,Yoga and Sports** (Common to All branches of Engineering)	L	T	P	C
Prerequisites	Nil	0	0	1	0.5

Course Objectives

The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Understand the importance of yoga and sports for Physical fitness and sound health.
CO2	Demonstrate an understanding of health-related fitness components.
CO3	Compare and contrast various activities that help enhance their health.
CO4	Assess current personal fitness levels.
CO5	Develop Positive Personality

Unit-I: CO2,C04 7L

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Unit-II: CO1,CO3 5L

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas - Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities: Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

Unit- III C04,CO5 5L

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

Activities:

i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general and specific warm up, aerobics

ii) Practicing cardiores piratory fitness, treadmill, run test, 9 min walk, skipping and running

Textbook(s)

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022.
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice.
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993.
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014.
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/ Sports / Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

B.Tech. COURSE STRUCTURE – GEBT24

(Applicable from the Academic Year 2024-25 onwards)

B.Tech. II Year I Semester

S.No	Course Code	Category	Title	L/D	T	P	Credits
1	24BS3T07	BS	Probability theory and stochastic process	3	0	0	3
2	24BS3T09	HSMC	Universal Human Values– Understanding Harmony andEthical Human Conduct	2	1	0	3
3	24ES3T06	Engineering Science	Signals and Systems	3	0	0	3
4	24EC3PCT02	Professional Core	Electronic Devices and Circuits	3	0	0	3
5	24EC3PCT03	Professional Core	Switching Theory and Logic Design	3	0	0	3
6	24EC3PCL02	Professional Core	Electronic Devices and Circuits Lab	0	0	3	1.5
7	24EC3PCL03	Professional Core	Switching Theory and Logic Design Lab	0	0	3	1.5
8	24CS3SCL02	Skill Enhancement Course	Data Structures using Python	0	1	2	2
9	24AC3T01	Audit Course	Environmental Science	2	0	0	-
	Total			**16**	**02**	**08**	**20**

B.Tech. COURSE STRUCTURE – GEBT24

(Applicable from the Academic Year 2024-25 onwards)

B.Tech. II Year II Semester

S.No	Course Code	Category	Title	L/D	T	P	Credits
1	24HS4T04	Management Course- I	Managerial Economics Financial Analysis	2	0	0	2
2	24ES4T10	Engineering Science	Linear Control Systems	3	0	0	3
3	24EC4PCT04	Professional Core	Electromagnetic Waves Transmission Lines	3	0	0	3
4	24EC4PCT05	Professional Core	Electronic Circuit Analysis	3	0	0	3
5	24EC4PCT06	Professional Core	Analog Communications	3	0	0	3
6	24EC4PCL04	Professional Core	Signals and Systems Lab	0	0	3	1.5
7	24EC4PCL05	Professional Core	Electronic Circuit Analysis lab	0	0	3	1.5
8	24HS4L01	Skill Enhancement course	Soft Skills	0	1	2	2
9	24BS4L04	Engineering Science	Design Thinking & Innovation	1	0	2	2
	Total			**15**	**1**	**10**	**21**
Mandatory Community Service Project Internship of 8 weeks duration during Summer Vacation							

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. ISem. (3rd Semester)			
Course Code 24BS3T07	**Probability Theory and Stochastic Process**	L	T	P	C
Prerequisites	Mathematics-1	3	0	0	3

Course Objectives

This gives basic understanding of random variables and operations that can be performed on them. To know the Spectral and temporal characteristics of Random Process. To Learn the Basic concepts of Information theory Noise sources and its representation for understanding its characteristics

Course Outcomes

After completion of this course, the learners will be able to

CO1	Understand the concepts of Random variable and probability Distribution and Density functions
CO2	Perform operations on single Random variables.
CO3	Perform operations on multiple Random variables.
CO4	Determine temporal characteristics of Random Signals and LTI Systems of Random Signals.
CO5	Determine the spectral characteristics and LTI Systems of Random Signals and Understand the concepts of Noise.

Unit-1: Probability & Random Variable CO1 10L

Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay's Theorem, Independent Events, Random Variable-Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

Unit-2: Operations on Single Random Variables – Expectations CO2 10L

Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic and Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

Unit-3: Operations on Multiple Random Variables - Expectations CO3 10L

Vector Random Variables, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence. Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions. Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables

case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables

Unit-4: Random Processes – Temporal Characteristics CO4 9L

The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second Order and Wide Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

Unit-5: Spectral Characteristics CO5 9L

The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

Noise Sources:

Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties.

Textbook(s)

1. Peyton Z. Peebles - Probability, Random Variables & Random Signal Principles, 4 th Ed, TMH, 2001.
2. Taub and Schilling - Principles of Communication systems, TMH, 2008.

Reference book(s)

1. Bruce Hajck - Random Processes for Engineers, Cambridge unipress, 2015.
2. Athanasios Papoulis and S. Unnikrishna Pillai - Probability, Random Variables and Stochastic.
3. Processes, 4th Ed., PHI, 2002.

Web reference(s)

1. https://link.springer.com/book/10.1007/978-3-030-40183-2M

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. I Sem. (3rd Semester)			
Course Code 24BS3T09	**Universal Human Values – Understanding Harmony and Ethical Human Conduct**	L	T	P	C
Prerequisites	Nil	2	1	0	3

Course Objectives

To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and the movement towards value-based living in a natural way. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Define the terms like Natural Acceptance, Happiness, and Prosperity
CO2	Identify one's self, and one's surroundings (family, society nature)
CO3	Apply what they have learnt to their own self in different day-to-day settings in real life
CO4	Relate human values with human relationship and human society.
CO5	Justify the need for universal human values and harmonious existence
CO6	Develop as socially and ecologically responsible engineers

Unit-1: Introduction to Value Education CO1 8L

Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education). Lecture 2: Understanding Value Education. Tutorial 1: Practice Session PS1 Sharing about Oneself. Lecture 3: self-exploration as the Process for Value Education

Lecture 4: Continuous Happiness and Prosperity – the Basic Human Aspirations Tutorial 2: Practice Session PS2 Exploring Human Consciousness Lecture 5: Happiness and Prosperity – Current Scenario Lecture 6: Method to Fulfil the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

Unit-2: Harmony in the Human Being CO2 6L

Lecture 7: Understanding Human being as the Co-existence of the self and the body. Lecture 8: Distinguishing between the Needs of the Self and the Body. Tutorial 4: Practice Session PS4 Exploring the difference of the Needs of self and body. Lecture 9: The body as an Instrument of the self

Lecture 10: Understanding Harmony in the Self. Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the Self. Lecture 11: Harmony of the self with the body Lecture 12: Programme to ensure self-regulation and Health Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body.

Unit-3: Harmony in the Family and Society CO3 6L

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction. Lecture 14: 'Trust' – the Foundational Value in Relationship. Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust. Lecture 15: 'Respect' – as the Right Evaluation

Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect. Lecture 16: Other Feelings, Justice in Human-to-Human Relationship. Lecture 17: Understanding Harmony in the Society. Lecture 18: Vision for the Universal Human Order. Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

Unit-4: Harmony in the Nature/Existence CO4 6L

Lecture 19: Understanding Harmony in the Nature. Lecture 20: Interconnectedness, self-regulation, and Mutual Fulfilment among the Four Orders of Nature. Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature

Lecture 21: Realizing Existence as Co-existence at All Levels. Lecture 22: The Holistic Perception of Harmony in Existence. Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.

Unit-5: Implications of the Holistic Understanding – a Look at Professional Ethics CO5, CO6 6L

Lecture 23: Natural Acceptance of Human Values. Lecture 24: Definitiveness of (Ethical) Human Conduct. Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order. Lecture 26: Competence in Professional Ethics.

Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education. Lecture 27: Holistic Technologies, Production Systems, and Management Models-Typical Case Studies Lecture 28: Strategies for Transition towards Value-based Life and Profession. Tutorial 14: Practice Session PS14 Exploring Transition Steps towards Universal Human Order.

Textbook(s)

1. A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, Excel Books, 2nd Revised Edition 2019.
2. Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, Excel Books, 2nd Revised Edition 2019.

Reference book(s)

1. Human Values - A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
2. Jeevan Vidya: Ek Parichaya- A.Nagaraj, Jeevan VidyaPrakashan, Amarkantak, 1999
3. The Story of Stuff-Annie Leonard, Free Press, Reprint edition,2011.
4. The Story of My Experiments with Truth-Mohandas Karamchand Gandhi, Fingerprint Publishing, First Edition 2009.
5. Small is Beautiful-E. F Schumacher,HarperCollins,1980.
6. Slow is Beautiful - Cecile Andrews, New Society Publishers; First Edition,2006.
7. Economy of Permanence - J C Kumarappa, Sarva Seva Sangh Prakashan,2007.
8. Bharat Mein Angreji Raj – PanditSunderlal,Prabhat Prakashan; First Edition,2018.
9. Rediscovering India -Dharampal,Society for Integrated Development of Himalayas, 2003.
10. Hind Swaraj or Indian Home Rule – M.K. Gandhi, Navajivan,later Printing edition,1938.
11. India Wins Freedom - Maulana Abdul Kalam Azad,Orient BlackSwan,First

Edition,1988.
12. Vivekananda - Romain Rolland,Prabhat Prakashan Publisher,2019.
13. Gandhi - Romain Rolland,General Press, First Edition,2022.

Web reference(s)

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%2023.pdf
5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf
7. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023-25%20Ethics%20v1.pdf
8. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385
9. https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. I Sem. (3rd Semester)			
Course Code 24ES3T06	**Signals And Systems**	L	T	P	C
Prerequisites	Differential equations and Integrals, Laplace Transforms, Series and expansions	3	0	0	3

Course Objectives

Provide detail of study about signals and systems,To analyze the spectral characteristics of signal using Fourier series and Fourier transforms , To understand the characteristics of systems, To introduce the concept of sampling process and To know various transform techniques to analyze the signals and systems.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Differentiate the various classifications of signals and systems
CO2	Analyze the frequency domain representation of signals using Fourier concepts
CO3	Classify the systems based on their properties and determine the response of LTI Systems.
CO4	Know the sampling process and various types of sampling techniques.
CO5	Apply Lap lace to analyze signals and Systems
CO6	Apply Lap lace and z-transforms to analyze signals and Systems

Unit-1: Introduction CO1 9L

Signals

Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time scaling, amplitude-shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index. Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum function and ramp function **.** Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, closed or complete set of orthogonal functions , Orthogonal in complex functions ,Related problems.

Unit-2: Fourier Series And Fourier Transform CO2, CO3 9L

Fourier Series

Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlets conditions, Trigonometric Fourier series and Exponential Fourier series, Relation between Trigonometric and Exponential Fourier series ,Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform, Related problems.

Unit-3: Analysis Of Linear Systems CO4 10SL

Linear System

Introduction - Linear system, impulse response, Response of a linear system, Linear time

invariant (LTI) system, Linear time variant(LTV)system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system, Related problems. Introduction - Filter characteristics of linear systems. Distortion less transmission through a system, Signal band width, system band width, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time .

Unit-4: Correlation and Sampling Theorem CO5 10L

Correlation

Introduction Correlation: Auto-correlation and cross-correlation of functions, properties of correlation function, Energy density spectrum, Parsevals theorem, Power density spectrum, Relation between Convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering

Sampling Theorem

Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples ,effect of under sampling −Aliasing, Introduction to Band Pass sampling, Related problems .

Unit-5: Laplace transforms and Z-Transform CO6 10L

Laplace transforms

Introduction, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.Ts, Inverse Laplace transform, Relation between L.Ts, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

Z-transforms

Concept of Z-Transform of a discrete sequence .Region of convergence in Z Transform, constraints on ROC for various classes of signals, Inverse Z transform, properties of Z-transforms .Distinction between Laplace ,Fourier and Z transforms. .

Textbook(s)

1. Signals, Systems & Communications-B.P.Lathi,BS Publications,2003.
2. Signals and Systems-A.V. Oppenheim, A.S. Willsky and S.H. Nawab,PHI,2ndEdn,1997
3. Signals&Systems-SimonHaykinandVanVeen,Wiley,2ndEdition,2007

Reference book(s)

1. Principles of Linear Systems and Signals−BP Lathi, Oxford University Press,2015
2. Signals and Systems−TK Rawat, Oxford University press,2011 Engineering

Web reference(s)

1. https://www.loc.gov/rr/scitech/selected-internet/signals.html

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. ISem. (3rd Semester)			
Course Code 24EC3PCT02	**Electronic Devices and Circuits**	L	T	P	C
Prerequisites	Engineering Physics, Basic Electronics	3	0	0	3

Course Objectives

- To learn and understand the basic concepts of semiconductor physics.
- Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
- To learn and understand the application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
- Acquire knowledge about the principle of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics.
- To learn and understand the purpose of transistor biasing and its significance
- Small signal equivalent circuit analysis of BJT and FET transistor amplifiers and compare different configurations.

Course Outcomes	
After completion of this course, the learners will be able to	
CO1	Apply the basic concepts of semiconductor physics.
CO2	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
CO3	Analyze the construction, working principle of Semiconductor Devices and Diode Circuits.
CO4	Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
CO5	Apply small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

UNIT-1: Review of Semiconductor Physics CO1 10L

Mobility and Conductivity, Intrinsic and extrinsic semiconductors, Hall effect, continuity equation, law of junction, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semiconductors.

Junction Diode Characteristics

Energy band diagram of PN junction Diode, Open circuited p-n junction, Biased p-n junction, p-n junction diode, current components in p-n junction Diode, Diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance.

UNIT-2: Special Semiconductor Devices CO2 10L

Zener Diode, Breakdown mechanisms, Zener diode applications, Varactor Diode, LED, Photodiode, Tunnel Diode, UJT, PNPN Diode, SCR, Construction, operation and V-I characteristics.

Diode Circuits

The Diode as a circuit element, The Load-Line concept, The Piecewise Linear Diode model, Clipping (limiting) circuits, Clipping at Two Independent Levels, Peak Detector, Clamping

circuits, Comparators, Basic Rectifier setup, half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, Filters, Inductor filter, Capacitor filter, π-section Filter, comparison of various filter circuits in terms of ripple factors

UNIT- 3: Transistor Characteristics CO3 10L

Junction transistor, transistor current components, transistor equation in CB configuration, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, punch through/ reach through, Photo transistor, typical transistor junction voltage values.

Transistor Biasing and Thermal Stabilization

Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias, Stabilization against variations in VBE, Ic, and β, Stability factors, (S,S' ,S''), Bias compensation, Thermal runaway, Thermal stability.

UNIT- 4 : Small Signal Low Frequency Transistor Amplifier Models CO4 8L

BJT

Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers

UNIT- 5 : FET CO5 10L

FET types, JFET operation, characteristics, small signal model of JFET.

MOSFET

MOSFET Structure, Operation of MOSFET: operation in triode region, operation in saturation region, MOSFET as a variable resistor, derivation of V-I characteristics of MOSFET, Channel length modulation, MOS transconductance, MOS device models: MOS small signal model, PMOS Transistor, CMOS Technology, Comparison of Bipolar and MOS devices.

CMOS amplifiers

General Considerations, Common Source Stage, Common Gate Stage, Source Follower, comparison of FET amplifiers

Textbook(s)

1. Millman's Electronic Devices and Circuits- J. Millman, C. C. Halkias and Satyabrata Jit, Mc-Graw Hill Education, 4th edition, 2015.
2. Electronic Devices and Circuits- S. Salivahanan, N. Suresh Kumar, Mc-Graw Hill, 5th edition, 2022.
3. Fundamentals of Microelectronics-Behzad Razavi, Wiley, 3rd edition, 2021.

Reference book(s)

1. Basic Electronics-Priciples and Applications, Chinmoy Saha,Arindam Halder, Debarati Ganguly, Cambridge University Press.
2. Electron Devices and Circuits- Atul P. Godse, Uday A. Bakshi ,Technical Publications,2020.

3. Electronics devices & circuit theory- Robert L.Boylestad and LouiNashelsky, Pearson, 11th edition, 2015.
4. Electronic Devices and Circuits - David A. Bell, Oxford University Press, 5th edition, 2008.

Web reference(s)

1.https://onlinecourses.nptel.ac.in/noc21_ee80/preview
2.https://onlinecourses.nptel.ac.in/noc21_ee55/preview

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. ISem. (3rd Semester)			
Course Code 24EC3PCT03	**Switching Theory and Logic Design**	L	T	P	C
Prerequisites	Basic Electronics and Electricals	3	0	0	3

Course Objectives

- To solve a typical number base conversion and analyze new error coding techniques.
- Theorems and functions of Boolean algebra and behavior of logic gates
- To optimize logic gates for digital circuits using various techniques.
- Boolean function simplification using Karnaugh maps and Quine-McCluskey methods
- To understand concepts of combinational circuits.
- To develop advanced sequential circuits.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Classify different number systems and apply to generate various codes.
CO2	Use the concept of Boolean algebra in minimization of switching functions
CO3	Design different types of combinational logic circuits.
CO4	Apply knowledge of flip-flops in designing of Registers and counters
CO5	The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
CO6	Produce innovative designs by modifying the traditional design techniques.

UNIT-1: Review Of Number Systems & Codes CO1 10L

Representation of numbers of different radix, conversation from one radix to another radix, r 1's compliments and r's compliments of signed members. Gray code ,4 bit codes; BCD, Excess-3, 2421, 84-2-1 code etc. Error detection & correction codes: parity checking, even parity, odd parity, Hamming code.

Boolean Theorems And Logic Operations

Boolean theorems, principle of complementation & duality, De-morgan theorems. Logic operations ; Basic logic operations -NOT, OR, AND, Universal Logic operations, EX-OR, EX- NOR operations. Standard SOP and POS Forms, NAND-NAND and NOR-NOR realizations, Realization of three level logic circuits.

UNIT-2: Minimization Techniques CO2 10L

Minimization and realization of switching functions using Boolean theorems, K-Map (up to 6 variables)and tabular method(Quine-mccluskey method) with only four variables and single function.

Combinational Logic Circuits Design

Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders; 4-bit adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit and carry look-a- head adder circuit, Design code converts using Karnaugh method and draw the complete circuit diagrams.

UNIT- 3: Combinational Logic Circuits Design using MSI & LSI CO3 10L

Design of encoder, decoder, multiplexer and de-multiplexers, Implementation of higher order circuits using lower order circuits . Realization of Boolean functions using decoders and multiplexers. Design of Priority encoder, 4-bit digital comparator and seven segment decoder.

Introduction of PLD's

PLDs: PROM, PAL, PLA -Basics structures, realization of Boolean functions, Programming table.

UNIT- 4 : Sequential Circuits I CO4 10L

Classification of sequential circuits (synchronous and asynchronous) , operation of NAND & NOR Latches and flip-flops; truth tables and excitation tables of RS flip-flop, JK flip- flop, T flip-flop, D flip-flop with reset and clear terminals. Conversion from one flip-flop to another flip- flop. Design of 5ripple counters, design of synchronous counters, Johnson counter, ring counter. Design of registers - Buffer register, control buffer register, shift register, bi directional shift register, universal shift, register Study the following relevant ICs and their relevant functions 7474,7475,7476,7490,7493,74121.

UNIT- 5 : Sequential Circuits II CO5 C06 8L

Finite state machine; state diagrams, state tables, reduction of state tables. Analysis of clocked sequential circuits Mealy to Moore conversion and vice-versa. Realization of sequence generator, Design of Clocked Sequential Circuit to detect the given sequence (with overlapping or without overlapping)

Textbook(s)

1. Switching and finite automata theory Zvi.KOHAVI,Niraj.K.Jha 3rdEdition,Cambridge UniversityPress,2009
2. Digital Design by M.MorrisMano, Michael D Ciletti,4th editionPHIpublication,2008
3. Switching theory and logic design by Hill and Peterson,Mc-Graw Hill TMH edition, 2012.

Reference book(s)

1. Fundamentals of Logic Design by Charles H. Roth Jr,JaicoPublishers,2006
2. Digital electronics by R S Sedha.S.Chand &companylimited,2010
3. Switching Theory and Logic Design by A. AnandKumar,PHI Learningpvtltd,2016.
4. Digital logic applications and design by John M Yarbough, Cengagelearning,2006.

Web Reference(s)

1. https://onlinecourses.nptel.ac.in/noc20_cs67/preview.
2. https://dl.acm.org/doi/10.5555/1074100.1074844

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. I Sem. (3rd Semester)			
Course Code 24EC3PCL02	**Electronic Devices and Circuits Lab**	L	T	P	C
Prerequisites	Basic Electricals and Electronics Lab	0	0	3	1.5

Course Objectives

The aim of this laboratory is to give practical exposure to students on various electronic components, semiconductor devices and electronics instruments which facilitates to design basic electronic circuits and analyze their characteristics.To analyse the characteristics and behaviour of electronic devices, including diodes ,BJT'S,FET's through experimental observation.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Construct and Analyse the Clipper and Clamper circuits using Diodes.
CO2	Implement the rectifier circuits with and without filter.
CO3	Analyse the input and output characteristics of BJT and FET.
CO4	Understand the concepts of SCR & UJT and observe its characteristics.
CO5	Measure and observe the Lissajous patterns using CRO.
CO6	Analyse the frequency response of BJT and FET amplifiers.

List of Experiment(s)

1. Clipper circuit using diode
2. Clamping circuit using diode
3. Rectifiers (without and with c-filter)
   Part A: Half-wave Rectifier
   Part B: Full-wave Rectifier
4. BJT Characteristics (CE Configuration)
   Part A: Input Characteristics
   Part B: Output Characteristics
5. FET Characteristics (CS Configuration)
   Part A: Drain Characteristics
   Part B:Transfer Characteristics
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
9. CRO Operation and its Measurements
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier
12. FET-CS Amplifier

Note: Minimum of Ten Experiments has to be performed

Reference(s)

1.Electronic Devices and Circuits- S. Salivahanan, N. Suresh Kumar, Mc-Graw Hill, 5th edition, 2022.

Web Resource(s)

1.https://www.vlab.co.in/broad-area-electronics-and-communications

Regulation GEBT24	GIET Engineering College (Autonomous)				II B. Tech. I Sem. (3rd Semester)	
Course Code 24EC3PCL03	**Switching Theory and Logic design Lab**		L	T	P	C
Prerequisites	Basic Electronics		0	0	3	1.5

Course Objectives

The objectives of the Switching Theory and Logic Design Lab course are to provide knowledge of digital logic design techniques, , and familiarize students with combinational and sequential logic circuits, study flip flops, shift registers and representation of switching functions

Course Outcomes

After completion of this course, the learners will be able to

CO1	Test the operation of different logic gates using relevant IC's.
CO2	Apply the concept of Boolean algebra or k-maps to reduce and Construct logic circuit for given function.
CO3	Examine the operation of different combinational logic circuits
CO4	Analyse the Truth tables of different Flip-Flops.
CO5	Design of registers using sequential logic circuits
CO6	Design of Synchronous and Asynchronous counters using Flip-Flops

List of Experiment(s)

1. Verification of truth tables of the following Logic gates Two input (i) OR (ii) AND (iii) NOR (iv) NAND (v) Exclusive-OR (vi) Exclusive-NOR

2. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit.

3. Verification of functional table of 3 to 8-line Decoder /De-multiplexer

4. Variable logic function verification using 8 to1 multiplexer.

5. Design full adder circuit and verify its functional table.

6. Verification of functional tables of (i) JK Edge triggered Flip–Flop (ii) JK Master Slave Flip–Flop (iii) D Flip-Flop

7. Design a four-bit ring counter using D Flip–Flops/JK Flip Flop and verify output.

8. Design a four-bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output

9. Verify the operation of 4-bit Universal Shift Register for different Modes of operation.

10. Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T-Flip Flops and Test It with a low frequency clock and sketch the output waveforms.

11. Design MOD–8 synchronous counter using T Flip-Flop and verify the result and sketch the output waveforms.

12. (a) Draw the circuit diagram of a single bit comparator and test the output

    (b) Construct 7 Segment Display Circuit Using Decoder and7 Segment LED and test it.

Additional Experiments:

1. Design BCD Adder Circuit and Test the Same using Relevant IC
2. Design Excess-3 to 9- Complement convertor using only four Full Adders and test the Circuit.
3. Design an Experimental model to demonstrate the operation of 74154 De-Multilixer using LEDs for outputs.
4. Design of any combinational circuit using Hardware Description Language.
5. Design of any sequence circuit using Hardware Description Language.

Reference(s)

1. Switching Theory and Logic Design by A. AnandKumar, PHI Learningpvtltd,2016.

Web Resource(s)

1. Virtual Labs (iitkgp.ac.in)

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. I Sem. (3rd Semester)			
Course Code 24CS3SCL02	**Data Structures using Python**	L	T	P	C
Prerequisites	Programming Skills	0	1	2	2

Course Objectives

- Introduce core programming concepts of Python programming language.
- Understand various data representation techniques in the real world.
- Implement linear and non-linear data structures.
- Develop real-time applications using suitable data structure.
- Identify suitable data structure to solve various computing problems.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Implement oops concepts in Python.
CO2	Develop Programs on modules and Packages
CO3	Develop the programs on stacks, queues and linked lists.
CO4	Develop the programs on Searching and Sorting.
CO5	Design and implementation of programs on Binary Search Tree.
CO6	Design Programs that handle errors.

List of Experiment(s)

1. Write a Python program for class, Flower, that has three instance variables of type str, int, and float that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type.
2. Develop an inheritance hierarchy based upon a Polygon class that has abstract methods area( ) and perimeter( ). Implement classes Triangle, Quadrilateral, Pentagon, that extend this base class, with the obvious meanings for the area( ) and perimeter( ) methods. Write a simple program that allows users to create polygons of the various types and input their geometric dimensions, and the program then outputs their area and perimeter
3. Write a python program to implement Method Overloading and Method Overriding.
4. Write a Python program to illustrate the following comprehensions:

   a) List Comprehensions

   b) Dictionary Comprehensions

   c) Set Comprehensions

   d) Generator Comprehensions

5. Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. Example: Original list: [1, 2, 3, 4, 5, 6, 7, 8, 9] Combinations of 2 distinct objects: [1, 2] [1, 3] [1, 4] [1, 5] .... [7, 8] [7, 9] [8, 9].
6. Write a program for Linear Search and Binary search.

7. Write a program to implement Bubble Sort and Selection Sort.
8. Write a program to implement Merge sort and Quick sort.
9. Write a program to implement Stacks and Queues.
10. Write a program to implement Singly Linked List.
11. Write a program to implement Doubly Linked list.
12. Write a program to implement Binary Search Tree.

Reference(s)

1. Data Structures and Algorithms Using Python, Rance D. Necaise, JOHN WILEY & SONS, INC.
2. ReemaThareja, Python Programming using Problem Solving Approach, First Edition,Oxford Higher Eduction.

Web Resource(s)

1.https://www.geeksforgeeks.org/python-data-structures/
2.https://www.javatpoint.com/data-structures-and-algorithms-in-python-set-1

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. I Sem. (3rd Semester)			
Course Code 24AC3T01	**Environmental Science** (Common for all branches of Engineering)	L	T	P	C
Prerequisites	Basic Science	2	0	0	-

Course Objectives

- To make the students to get awareness on environment
- To understand the importance of protecting natural resources, ecosystems for future
- generations and pollution cause due to the day-to-day activities of human life
- To save earth from the inventions by the engineers.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Grasp multi-disciplinary nature of environmental studies and various Renewable and non-renewable resources.
CO2	Understand flow and bio-geo- chemical cycles and ecological pyramids &The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web and role of bio diversity in society.
CO3	Understand various causes of pollution and solid waste management and related preventive measures.
CO4	Understand the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.
CO5	Illustrate the causes of population explosion, value education and welfare programmes.
CO6	Self-Sustaining Green Campus with Environment Friendly aspect of – Energy and gain the knowledge by site seeing

Unit-1: Multidisciplinary Nature of Environmental Studies and Natural resources CO1 7L

Multidisciplinary Nature of Environmental Studies

Definition, Scope and Importance Need for Public Awareness.

Natural Resources

Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources

Unit-2: Ecosystems and Biodiversity and Its Conservation CO2 7L

Ecosystems

Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation

Introduction and Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit-3: Environmental Pollution and Disaster Management CO3 6L

Environmental Pollution

Definition, Cause, effects and control measures of: a. Air Pollution. b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management

Disaster management

Floods, earthquake, cyclone and landslides

Unit-4: Social Issues and the Environment CO4 6L

Social Issues

From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, and watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

Unit-5: Human Population and The Environment CO5 CO6 6L

Human Population

Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education - HIV/AIDS –Women and Child Welfare – Role of information Technology in Environment and human health – Case studies. Field Work: Visit to a local area to document environmental

assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc

Textbook(s)

1. Erach Bharucha, Text book of Environmental Studies for Undergraduate Courses, Universities Press (India) Private Limited, 2019.
2. Palani Swamy, Environmental Studies, 2/e, Pearson education, 2014.
3. S. Azeem Unnisa, Environmental Studies, Academic Publishing Company, 2021.
4. K.Raghavan Nambiar, “Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus”, SciTech Publications (India), Pvt. Ltd, 2010.

Reference book(s)

1. Deeksha Dave and E.Sai Baba Reddy, Textbook of Environmental Science, 2/e, Cengage Publications, 2012.
2. M.Anji Reddy, “Textbook of Environmental Sciences and Technology”, BS Publication, 2014.
3. J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, 2006.
4. J. Glynn Henry and Gary W. Heinke, Environmental Sciences and Engineering, Prentice Hall of India Private limited, 1988.
5. G.R. Chatwal, A Text Book of Environmental Studies, Himalaya Publishing House, 2018.
6. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 1/e, Prentice Hall of India Private limited, 1991

Web reference(s)

1. https://onlinecourses.nptel.ac.in/noc23_hs155/preview
2. https://www.youtube.com/watch?v=5QxxaVfgQ3k

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. IISem. (4th Semester)			
Course Code 24HS4T04	**Managerial Economics And Financial Analysis**	L	T	P	C
Prerequisites	Mathematics, Analytical analysis	2	0	0	2

Course Objectives

- To inculcate the basic knowledge of microeconomics and financial accounting
- To make the students learn how demand is estimated for different products, input output relationship for optimizing production and cost
- To Know the Various types of market structure and pricing methods and strategy
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

Course Outcomes

After completion of this course, the learners will be able to	
CO1	Define the concepts related to Managerial Economics, financial accounting and management
CO2	Evaluate the fundamentals of Economics viz., Demand, Production, cost, revenue and markets
CO3	Apply the Concept of Production cost and revenues for effective Business decision
CO4	Analyze how to invest their capital and maximize returns
CO5	Evaluate the capital budgeting techniques.
CO6	Develop the accounting statements and evaluate the financial performance of business entity S

UNIT-1: Managerial Economics CO1 7L

Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT-2: Production and Cost Analysis CO2 7L

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behaviour- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems). .

UNIT- 3: Business Organizations and Markets CO3 6L

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies .

UNIT- 4: Capital Budgeting CO4 6L

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT- 5 : Financial Accounting and Analysis CO5 6L

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Textbook(s)

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH.

Reference book(s)

1. Ahuja Hl Managerial economics Schand.
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

Web reference(s)

1. https://www.slideshare.net/123ps/managerial-economics-ppt.
2. https://www.slideshare.net/rossanz/production-and-cost-45827016.
3. https://www.slideshare.net/darkyla/business-organizations-19917607.

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. IISem. (4th Semester)			
Course Code 24ES4T10	**Linear Control Systems**	L	T	P	C
Prerequisites	Mathematics, Signals and Systems	3	0	0	3

Course Objectives

- To introduce the concepts of open loop and closed loop systems, mathematical models of mechanical and electrical systems, and concepts of feedback.
- To study the characteristics of the given system in terms of the transfer function and introducing various approaches to reduce the overall system for necessary analysis.
- To develop the acquaintance in analyzing the system response in time-domain and frequency domain in terms of various performance indices.
- To analyze the system in terms of absolute stability and relative stability by different approaches.
- To design different control systems for different applications as per given specifications
- To introduce the concepts of state variable analysis, design and also the concepts of controllability and observability.

Course Outcomes

After completion of this course, the learners will be able to

C01	This course introduces the concepts of feedback and its advantages to various control systems
CO2	The performance metrics to design the control system intime-domain and frequency domain are introduced.
CO3	Control systems for various applications can be designed using time-domain and frequency domain analysis.
CO4	In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.
CO5	Design and analyze compensators, PID controllers, and state-space models, understand state variables, controllability, observability, and time-invariant equations.

UNIT-1: Introduction CO1 10L

Concepts of System, Control Systems: Open Loop and closed loop control systems and their differences. Different examples of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models, Differential equations, Impulse Response and transfer functions. Translational and Rotational mechanical systems

UNIT-2: Transfer Function Representation CO1 10L

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 flowgraph-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.

UNIT-3: Stability Analysis In S-Domain CO3 10L

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability100

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-4: Frequency Response Analysis CO4 8L

Introduction, Correlation between time and frequency response, PolarPlots, BodePlots,Nyquist Stability Criterion

UNIT-5:Classical Control Design Techniques CO5 10L

Compensation techniques – Lag, Lead, Lead-Lag Controllers design infrequency Domain, PIDControllers. State Space Analysis of Continuous Systems 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 it's Properties – Concepts of Controllability and Observability.

Textbook(s)

1. Automatic Control Systems 8th edition– by B.C.Kuo – Johnwiley and son's, 2003.
2. Control Systems Engineering –by I. J.Nagrathand M.Gopal, New Age International (P) Limited, Publishers, 2nd edition, 2007.
3. Modern Control Engineering–by Katsuhiko Ogata–Pearson Publications, 5th edition, 2015.

Reference book(s)

1. Control Systems by A.Nagoorkani, RB Apublications, 3 edition, 2017.
2. Control Systems by A.Anandkumar, PHI, 2 Edition, 2014.

Web reference(s)

1. https://onlinecourses.nptel.ac.in/noc21_ee80/preview
2. https://onlinecourses.nptel.ac.in/noc21_ee55/preview

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. IISem. (4th Semester)			
Course Code 24EC4PCT04	**Electromagnetic Waves and Transmission Lines**	L	T	P	C
Prerequisites	Engineering Physics	3	0	0	3

Course Objectives

Understand the fundamentals of electric fields, coulomb's law and gauss law Familiar with of Biot-Savart Law, Ampere's Circuital Law and Maxwell equations. Aware of electromagnetic wave propagation in dielectric and conducting media. Study the equivalent circuit of transmission lines and parameters of the transmission. Lines Learn the working of smith chart and its usage in the calculation of transmission line. parameters

Course Outcomes

After completion of this course, the learners will be able to

CO1	Determine electric field intensity using coulomb's law and Gauss law.
CO2	Determine magnetic field intensity using Biot-Savarts Law and Ampere's Circuital Law.
CO3	Analyze the electromagnetic wave propagation in dielectric and conducting media.
CO4	Examine the primary and secondary constants of different types of transmission lines
CO5	Derive the expressions for input impedance, reflection coefficient, and VSWR of transmission lines and calculate these parameters using smith chart.

Unit-1: Electrostatics CO1 10L

Review of Co-ordinate Systems, Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial Capacitors, Illustrative Problems.

Unit-2: Magnetostatics CO2 10L

Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems.

Maxwell's Equations (Time Varying Fields)

Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface, Illustrative Problems

Unit-3: EM Wave Characteristics CO3 10L

Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space, wave propagation in good conductors, skin depth, Polarization & Types, Illustrative Problems. Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics,

Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem, Illustrative Problems.

Unit-4: Transmission Lines – I CO4 9L

Types, Parameters, T & π Equivalent Circuits, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines, Illustrative Problems

Unit-5: Transmission Lines – II CO5 9L

Input Impedance Relations, Reflection Coefficient, VSWR, Average Power, Shorted Lines, Open Circuited Lines, and Matched Lines, Low loss radio frequency and UHF Transmission lines, UHF Lines as Circuit Elements, Smith Chart – Construction and Applications, Quarter wave transformer, Single Stub Matching, Illustrative Problems.

Textbook(s)

1. Elements of Electromagnetic – Matthew N. O. Sadiku, Oxford University Press, 7th edition, 2018.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2 nd Edition, 2008.

Reference book(s)

1. Engineering Electromagnetics – William H. Hayt, John A. Buck, Jaleel M. Akhtar, TMH, 9th edition, 2020.
2. Electromagnetic Field Theory and Transmission Lines –G. S. N. Raju, Pearson Education 2006
3. Electromagnetic Field Theory and Transmission Lines: G SasiBhushana Rao,Wiley India 2013.
4. Networks, Lines and Fields John D. Ryder, Second Edition, Pearson Education, 2015.

Web reference(s)

1. https://onlinecourses.nptel.ac.in/noc22_ee43/preview

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. II Sem. (4th Semester)			
Course Code 24EC4PCT05	**Electronic Circuit Analysis**	L	T	P	C
Prerequisites	Knowledge of electronic devices and circuits & also solve the fundamental problems in engineering physics related to semiconductors.	3	0	0	3

Course Objectives

The main objectives of this course are:

- To learn hybrid- π parameters at high frequency and compare with low frequency parameters.
- Learn and understand the purpose of cascading of single stage amplifiers and derive the overall voltage gain.
- Analyze the effect of negative feedback on amplifier characteristics and derive the characteristics.
- Learn and understand the basic principle of oscillator circuits and perform the analysis of different oscillator circuits.
- Compare and analyze different Power amplifiers like Class A, Class B, Class C, Class AB and other types of amplifiers.
- Analyze different types of tuned amplifier circuits.

Course Outcomes

After completion of this course, the learners will be able to	
CO1	Design and analysis of small signal high frequency transistor amplifier using BJT and FET.
CO2	Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT.
CO3	Know the effect of negative feedback on amplifier characteristics and derive the characteristics.
CO4	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
CO5	Know the classification of the power and tuned amplifiers and their analysis with performance comparison.

UNIT-1: Small Signal High Frequency Transistor Amplifier models CO1 10L

BJT

Transistor at high frequencies, Hybrid- π common emitter transistor model, Hybrid π conductance, Hybrid π capacitances, validity of hybrid π model, determination of high frequency parameters in terms of low-frequency parameters , CE short circuit current gain, current gain with resistive load, cut-off frequencies, frequency response and gain bandwidth product.

FET

Analysis of common Source and common drain Amplifier circuits at high frequencies.

UNIT-2: Multistage Amplifiers CO2 9L

Classification of amplifiers, methods of coupling, cascaded transistor amplifier and its

analysis, analysis of two stage RC coupled amplifier, high input resistance transistor amplifier circuits and their analysis-Darlington pair amplifier, Cascode amplifier, Boot-strap emitter follower, Differential amplifier using BJT.

UNIT- 3: Feedback Amplifiers CO3 10L

Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, Characteristics of negative feedback amplifiers, Generalized analysis of feedback amplifiers, Performance comparison of feedback amplifiers, Method of analysis of feedback amplifiers.

UNIT- 4 : Oscillators CO4 9L

Oscillator principle, condition for oscillations, types of oscillators, RC phase shift and Wien bridge oscillators with BJT and FET and their analysis, Generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators using BJT, Frequency and amplitude stability of oscillators.

UNIT-5 : Power Amplifiers CO5 10L

Power Amplifiers

Classification of amplifiers(A to H), Class A power Amplifiers, Class B Push-pull amplifiers, Complementary symmetry push pull amplifier, Class AB power amplifier, Class-C power amplifier, Thermal stability and Heat sinks.

Tuned Amplifiers

Introduction, Q-Factor, small signal tuned amplifier, capacitance single tuned amplifier, double tuned amplifiers, , staggered tuned amplifiers.

Textbook(s)

1. Integrated Electronics- J.Millman and C.C.Halkias, Tata McGraw Hill, 1972.
2. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition, 2009.
3. Electronic Devices and Integrated Circuits – B.P. Singh, Rekha, Pearson publications, 2006

Reference book(s)

1. Electronic Circuit Analysis and Design – Donald A.Neaman, McGraw Hill, 2010.
2. Micro electronic Circuits - Sedra A.S. and K.C. Smith, Oxford University Press, Sixth Edition, 2011.
3. Electronic Circuit Analysis - B.V.Rao, K.R.Rajeswari, P.C.R.Pantulu, K.B.R.Murthy, Pearson Publications.

Web reference(s)

1. https://digimat.in/nptel/courses/video/108102095/L30.html
2. https://nptel.ac.in/courses/117106088
3. https://www.smartzworld.com/notes/electronic-circuit-analysis-pdf-notes-eca-pdf/

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. IISem. (4th Semester)			
Course Code 24EC4PCT06	**Analog Communications**	L	T	P	C
Prerequisites	Basic Electronics, Mathematics	3	0	0	3

Course Objectives

- Familiarize with the fundamentals of analog communication systems.
- Familiarize with various techniques for analog modulation and demodulation of signals.
- Distinguish the figure of merits of various analog modulation methods.
- Develop the ability to classify and understand various functional blocks of radio
- transmitters and receivers.
- Familiarize with basic techniques for generating and demodulating various pulse
- modulated signals.

Course Outcomes

After completion of this course, the learners will be able to	
CO1	Describe the Modulation and Demodulation techniques of standard AM.
CO2	Compare different types of Amplitude Modulation and Demodulation techniques.
CO3	Analyse the concepts of generation and detection of Angle Modulated signals.
CO4	Outline the Radio Receivers with different sections.
CO5	Interpret the Radio Transmitters completely.
CO6	Illustrate the noise performance in Analog Modulation techniques and also the concepts of Pulse Analog Modulation and Demodulation techniques.

UNIT-1: Amplitude Modulation CO1 10L

Introduction to Fourier transform, Introduction to communication system, Need for modulation, Frequency Division Multiplexing, Amplitude Modulation, Time domain and Frequency domain descriptions, Single tone modulation, Power relations in AM waves, Generation of AM waves: Square law Modulator, Switching modulator, Detection of AM Waves: Square law detector, Envelope detector, Related problems.

UNIT-2: DSB & SSB Modulation CO1 10L

Double sideband suppressed carrier modulator: Time domain and frequency domain description, Generation of DSBSC Waves: Balanced Modulator, Ring Modulator, Detection of DSBSC Waves: Coherent detection, COSTAS Loop, Squaring Loop.

Single sideband suppressed carrier modulator: Time domain and Frequency domain description, Generation of SSBSC Waves: Frequency discrimination method, Phase discrimination method, Demodulation of SSB Waves: Coherent Detection.

Vestigial sideband modulation

Time domain description, Frequency domain description, Generation of VSB Modulated wave, Envelope detection of a VSB Wave pulse Carrier, Comparison of different AM Techniques, Applications of different AM Systems, Related problems.

UNIT- 3: Angle Modulation **CO3** **10L**

Introduction, Basic concept of phase modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave, Generation of FM Waves: Direct Method, Indirect Method, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM, Related problems.

UNIT- 4: Radio Transmitters **CO4, CO5** **10L**

Classification of Transmitters, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter: Variable reactance type and Phase modulated FM Transmitter, Frequency stability in FM Transmitter.

Radio Receivers

Receiver Types: Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics, Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Amplitude limiting, Comparison of FM & AM Receivers, Communication Receivers,Extension of Super Heterodyne principle and additional circuits.

UNIT- 5 : Noise **CO2, CO6** **8L**

Review of noise and noise sources, Noise figure, Noise in Analog communication Systems: Noise in DSB & SSB Systems, Noise in AM System and Noise in Angle Modulation Systems, Threshold effect in Angle Modulation System, Pre-emphasis & De-emphasis.

Pulse Analog Modulation

Types of Pulse modulation, PAM (Single polarity, double polarity), PWM: Generation & Detection of PWM, PPM: Generation and Detection of PPM, Time Division Multiplexing, TDM Vs FDM.

Textbook(s)

1. Communication Systems, Simon Haykin, Michael Moher, Wiley, 5th Edition, 2009.
2. Principles of Communication Systems, H Taub, D L Schilling, Gautam Sahe, TMH, 4th Edition, 2017.
3. Modern Digital and Analog Communication Systems, B.P.Lathi, Zhi Ding, Hari Mohan Gupta, Oxford University Press, 4th Edition, 2017.

Reference book(s)

1. Electronics & Communication Systems, George Kennedy, Bernard Davis, S R M Prasanna, TMH, 6th Edition, 2017.
2. Communication Systems, R P Singh, S D Sapre, TMH, 3nd Edition, 2017.
3. Communication Systems (Analog and Digital), Dr. Sanjay Sharma, Katson Books, 7th Reprint Edition, 2018

Web reference(s)

1. http://nptel.ac.in/courses/117102059/ Prof. Surendra Prasad.
2. https://ict.iitk.ac.in/wp-content/uploads/EE320A-Principles-Of-Communication CommunicationSystems-4ed-Haykin.pdf.

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. II Sem. (4th Semester)			
Course Code 24EC4PCL04	**Signals And Systems Lab**	L	T	P	C
Prerequisites	Mathematics, Engineering Physics	0	0	3	1.5

Course Objectives

The aim of this laboratory is to develop the understanding of the basic ideas of the signals and systems encountered in engineering. The main focus will be on the methods for characterizing and analyzing continuous-time and discrete time signals and systems through experimental observation.

Course Outcomes	
After completion of this course, the learners will be able to	
CO1	Understand basics of MATLAB syntax, functions and programming.
CO2	Generate and characterize various continuous and discrete time signals.
CO3	Perform the basic operations on the signals.
CO4	Analyze the convolution and correlation.
CO5	Analyze the spectral characteristics of signals using Fourier analysis
CO6	Analyze the systems using Laplace transform and Z-transform.

List of Experiment(s)

I. Generation of Basic Signals (Analog and Discrete)
1. Unit step
2. Unit impulse
3. Unit Ramp
4. Sinusoidal
5. Signum

II. Operations on signals
1. Addition & Subtraction
2. Multiplication & Division
3. Maximum & minimum

III. Energy and power of signals ,even and odd signals

IV. Transformation of the independent variable

1. Shifting (Delay & Advance)
2. Reversing
3. Scaling

V. Convolution & Deconvolution

VI. Correlation

VII. Fourier Series Representation

VIII. Fourier Transform and Analysis of Fourier Spectrum

IX. Laplace Transforms

X. Z-Transforms

Reference(s)

1. Signals, Systems & Communications-B.P.Lathi, BS Publications,2003.

Web Resource(s)

1.www.vlab.co.in

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. II Sem. (4th Semester)			
Course Code 24EC4PCL05	**Electronic Circuit Analysis Lab**	L	T	P	C
Prerequisites	EDC Lab	0	0	3	1.5

Course Objectives

To study the concepts of Electronic Circuit Analysis Lab are typically designed to provide students with practical experience in analyzing and designing electronic circuits. Here are some common objectives you might find. These objectives help bridge the gap between theoretical knowledge and practical application, preparing students for real-world engineering challenges.

Course Outcomes	
After completion of this course, the learners will be able to	
CO1	Teach students how to design electronic circuits and use simulation software to predict circuit behaviour before physical implementation .
CO2	Develop hands-on skills in assembling and testing electronic circuits on breadboards or printed circuit boards .
CO3	ability to use various electronic measuring instruments, such as oscilloscopes, MultiMate's, and function generators .
CO4	Train students to collect, analyze, and interpret experimental data, and compare it with theoretical predictions .
CO5	Install an understanding of safety protocols and best practices for working with electronic circuits and laboratory equipment .
CO6	Identify the type and semiconductor various parameters .

List of Experiment(s)

1. Determination of Ft of a given transistor.
2. Determination Voltage-Series Feedback Amplifier
3. Determination Current-Shunt Feedback Amplifier
4. Determination Frequency of RC Phase Shift/Wien Bridge Oscillator
5. Determination Frequency of Hartley/Colpitts Oscillator
6. Determination Two Stage RC Coupled Amplifier
7. Determination Darlington Pair Amplifier
8. Determination Boots trapped Emitter Follower
9. Calculate Efficiency of Class A Series-fed Power Amplifier
10. Calculate Efficiency of Transformer-coupled Class A Power Amplifier
11. Calculate Efficiency of Class B Push-Pull Power Amplifier
12. Calculate Efficiency of Complementary Symmetry Class B Push-Pull Power Amplifier
13. Determination gain of Single Tuned Voltage Amplifier

14. Determination gain Double Tuned Voltage Amplifier

Note: Minimum of Ten Experiments has to be performed. The students are required to design the circuit and perform the simulation using Multisim / Equivalent Industrial Standard Licensed simulation software tool. Further they are required to verify the result using necessary hardware equipment. .

Reference(s)

1. Electronic Circuit Analysis and Design −Donald A.Neaman, McGrawHill, 2010.
2. Micro electronic Circuits-Sedra A.S. and K.C. Smith, Oxford University Press, Sixth Edition, 2011.

Web Resource(s)

1. www.vlab.co.in
2. https://phet.colorado.edu/en/simulations/filter?subjects=eca&type=html,prototype

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech.II Sem. (4th Semester)			
Course Code 24HS4L01	Soft Skills	L	T	P	C
Prerequisites	Basic Communication Skills	0	1	2	2

Course Objectives

- To prepare to face global competition for employment and excellence in profession.
- To help the students understand and build interpersonal and interpersonal skills that will enable them to lead meaningful professional life.

Course Outcomes	
After completion of this course, the learners will be able to	
CO1	Assimilate and understood the meaning and importance of soft skills and learn how to develop them.
CO2	Understand the significance of soft skills in the working environment for professional excellence.
CO3	Prepare to undergo the placement process with confidence and clarity.
CO4	Ready to face any situation in life and equip themselves to handle them effectively.
CO5	Understand and learn the importance of etiquette in both professional and personal life

UNIT – 1: Introduction CO1 6L

Introduction- Emergence of life skills, Definition & Meaning, Importance& need, reasons for skill gap, Analysis--Soft Skills vs Hard skills, Linkage between industry and soft skills, Challenges, Personality Developments. Soft Skills, Soft Skills vs English - Improving Techniques

UNIT – II: Intra-Personal CO2 6L

Definition-Meaning – Importance-SWOT analysis, Johari windows - Goal Setting- quotient skills - Emotional Intelligence- Attitudinal skills - Right thinking- Problem Solving-Time management, stress management

UNIT – III: Inter-Personal CO3 6L

Definition – Meaning – Importance-Communications skills- Team Work, managerial skills - Negotiation skills- Leadership skills, corporate etiquettes

UNIT – IV: Verbal Skills CO4 6L

Definition and Meaning-Listening skills, need- types, advantages, Importance-Improving Tips for Listening, Speaking, need- types, advantages, Importance- Improving Tips, Reading- Writing Skills, Report, Resume, statement of purpose, need- types, advantages, Importance-Improving Tips

UNIT – V: Non Verbal Skills& Interview skills CO5 6L

Definition and Meaning – Importance- Facial Expressions- Eye Contact – ProxemicsHaptics

-Posture, cross cultural body language, body language in interview room, appearance and dress code – Kinetics- Para Language - tone, pitch, pause, neutralization of accent, use of appropriate language, Interview skills, interview methods and questions.

Textbook(s)

1. Sherfield, M. Robert at al, Cornerstone Developing Soft Skills, 4/e, Pearson Publication, New Delhi, 2014.
2. Alka Wadkar, Life Skills for Success, 1/e, Sage Publications India Private Limited, 2016.

Reference book(s)

1. Sambaiah.M. Technical English, Wiley publishers India. New Delhi. 2014.
2. Gangadhar Joshi, From Campus to Corporate, SAGE TEXT.
3. Alex.K, Soft Skills, 3rd ed. S. Chand Publication, New Delhi, 2014.
4. Meenakshi Raman and Sangita Sharma, Technical Communication: Principle and Practice, Oxford University Press, 2009.
5. Shalini Varma, Body Language for Your Success Mantra, 4/e, S. Chand Publication, New Delhi, 2014.
6. Stephen Covey, Seven Habits of Highly Effective People, JMD Book, 2013.

Web reference(s)

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2. http://www.youtube.com/@softskillsdevelopment6210
3. https://youtube.com/playlist?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q&si=Fs05Xh8ZrOPsR8F4
4. https://www.coursera.org/learn/people-soft-skills-assessment?language=English
5. https://www.edx.org/learn/soft-skills

Regulation GEBT24	GIET Engineering College (Autonomous)	II B. Tech. IISem (4th Semester)			
Course Code 24BS4L04	**Design Thinking & Innovation**	L	T	P	C
Prerequisites	Critical Thinking , Communication Skills & Adaptability	1	0	2	2

Course Objectives: The objectives of the course are to

- Bring awareness on innovative design and new product development.
- Explain the basics of design thinking.
- Familiarize the role of reverse engineering in product development.
- Train how to identify the needs of society and convert into demand.
- Introduce product planning and product development process.

Course Outcomes

After completion of this course, the learners will be able to

CO1	Define the concepts related to design thinking.
CO2	Explain the fundamentals of Design Thinking and innovation.
CO3	Apply the design thinking techniques for solving problems in various sectors.
CO4	Analyze to work in a multidisciplinary environment .
CO5	Evaluate the value of creativity.

UNIT-1 Introduction to Design Thinking **C01**

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry**.**

UNIT-2 Design Thinking Process **C02**

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Activity

Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development**.**

UNIT-3 Innovation **C03**

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity**.**

Activity

Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation

UNIT-4 Product Design C04

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies.

Activity

Importance of modeling, how to set specifications, Explaining their own product design.

UNIT-5 Design Thinking in Business Processes C05

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.

Activity

How to market our own product, about maintenance, Reliability and plan for start up.

Textbook(s)

1. Tim Brown, Change by design, 1/e, Harper Bollins, 2009.Idris Mootee,
2. Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

Reference book(s)

1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2. Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
3. William lidwell, Kritinaholden, &Jill butter, Universal principles of design, 2/e, Rockport Publishers, 2010.
4. Chesbrough.H, The era of open innovation, 2003.

Web reference(s)

1. https://nptel.ac.in/courses/110/106/110106124/
2. https://nptel.ac.in/courses/109/104/109104109/