# List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

**Department : *Electronics and Communication Engineering***

**Programme Name : *B.Tech.***

***Academic Year : 2020-21***

***List of Courses Focus on Employability/ Entrepreneurship/Skill Development***

| Sr. No. | Course Code | Name of the Course |
|---|---|---|
| 01. | MA201TBS01 | Mathematics-I |
| 02. | PH201TBS02 | Physics |
| 03. | EC201TES01 | Basic Electrical & Electronics Engineering |
| 04. | IT201TES02 | Introduction to Information Technologies |
| 05. | EN201THS01 | English Communication |
| 06. | PH201PBS01 | Physics Lab |
| 07. | ME201PES01 | Engineering Graphics |
| 08. | ME201PES02 | Workshop Technology & Practices |
| 09. | EC201PES03 | Basic Electrical Engineering Lab |
| 10. | MA202TBS03 | Mathematics-II |
| 11 | CY202TBS04 | Chemistry |
| 12 | CE202TES03 | Engineering Mechanics |
| 13 | CS202TES04 | Computer Programming |
| 14 | CM202TES05 | Basic Civil & Mechanical Engineering |
| 15 | CY202PBS02 | Chemistry Lab |
| 16 | CE202PES04 | Engineering Mechanics Lab |
| 17 | CS202PES05 | Computer Programming Lab |
| 18 | EC03TPC01 | Electronic Devices |
| 19 | EC03TPC02 | Digital System Design |
| 20 | EC03TPC03 | Signals and Systems |
| 21 | EC03TPC04 | Network Theory |
| 22 | EC03TBS05 | Mathematics-III |
| 23 | EC03THS02 | Engineering Economics |
| 24 | EC03PPC01 | Electronics Devices Lab |
| 25 | EC03PPC02 | Digital System Design Lab |
| 26 | EC04TPC05 | Analog and Digital Communication |

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|---|---|---|
| 27 | EC04TPC06 | Analog Circuits |
| 28 | EC04TPC07 | Microcontrollers |
| 29 | EC04TBS06 | Numerical Methods |
| 30 | EC04TES05 | Electronics Measurement & Instrumentation |
| 31 | EC04THS03 | Effective Technical Communication |
| 32 | EC04PPC03 | Analog and Digital Communication Lab |
| 33 | EC04PPC04 | Analog Circuits Lab |
| 34 | EC04PPC05 | Microcontrollers Lab |
| 35 | EC05TPC08 | Electromagnetic Waves |
| 36 | EC05TPC09 | Computer Network |
| 37 | EC05TPC10 | LIC and its Application |
| 38 | EC05TPC11 | Control Systems |
| 39 | EC05TPE01 | Information Theory & Coding |
| 40 | EC05TPE02 | CMOS Design |
| 41 | EC05TPE03 | Introduction to MEMS |
| 42 | EC05TPE04 | Computer Architecture |
| 43 | EC05TOE01 | Data Structure and Algorithms |
| 44 | EC05TOE02 | Operating Systems |
| 45 | EC05PPC06 | Electromagnetic Waves Lab |
| 46 | EC05PPC07 | Computer Networks Lab |
| 47 | EC05PPC08 | LIC and its Application Lab |
| 48 | EC06TPC12 | Digital Signal Processing |
| 49 | EC06TPC13 | Probability Theory and Stochastic Processes |
| 50 | EC06TPE05 | Antenna & Wave Propagation |
| 51 | EC06TPE06 | Power Electronics |
| 52 | EC06TPE07 | High Speed Devices & Circuits |
| 53 | EC06TPE08 | Nanoelectronics |
| 54 | EC06TOE03 | Cryptography & network Security |
| 55 | EC06TOE04 | Artificial Intelligence |
| 56 | EC06TBS07 | Life Science |
| 57 | EC06PPC09 | Digital Signal Processing Lab |
| 58 | EC06PPC10 | Electronic Measurement Lab |
| 59 | EC06PPC11 | Mini Project/Electronic Design Wokshop |
| 60 | EC5TPC07 | Lic & Its Application |
| 61 | EC5TPC08 | Communication System- II |

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|---|---|---|
| 62 | EC5TPC09 | Electromagnetic Field Theory |
| 63 | EC5TPE01 | Microprocessor & Its Application |
| 64 | EC5TPE02 | Data Structure & Operating System |
| 65 | EC5TOE11 | Computer Architecture |
| 66 | EC5TOE12 | OOP in C++ |
| 67 | EC5TOE13 | Introduction to Information Security |
| 68 | EC5TOE14 | Project Management |
| 69 | EC5TOE15 | Rural Technology and Community Development |
| 70 | EC5PPC07 | Lic & Its Application Lab |
| 71 | EC5PPE01 | Microprocessor & Its Application Lab |
| 72 | EC5PPC08 | Communication System -II Lab |
| 73 | EC6TPC10 | Digital Signal Processing |
| 74 | EC6TPC11 | Antenna & wave propagation |
| 75 | EC6TPE03 | Data Communication & Computer Networking |
| 76 | EC6TPE04 | Fundamental of VLSI Design |
| 77 | EC6T0E21 | UNIX, Operating System |
| 78 | EC6T0E22 | Probability & Stochastic Process |
| 79 | EC6TOE23 | Advanced Instrumentation |
| 80 | EC6T0E24 | Knowledge management |
| 81 | EC6T0E25 | Engineering System Design Optimization |
| 82 | EC6PPE02 | VHDL Lab |
| 83 | EC6PPC06 | Digital Signal Processing Lab |
| 84 | EC6PSP01 | Seminar |
| 85 | EC7TPC12 | Microwave Engineering |
| 86 | EC7TPC13 | Wireless Mobile Communication |
| 87 | EC7TPE05 | Advance Hardware Design |
| 88 | EC7TPE06 | Power Electronics |
| 89 | EC7TOE31 | Wireless Sensor Network |
| 90 | EC7TOE32 | Information theory and coding |
| 91 | EC7TOE33 | Nanotechnology |
| 92 | EC7TOE34 | Optical instrumentation and measurement |
| 93 | EC7TOE35 | Neural Network and Fuzzy Logic |
| 94 | EC7TPPC12 | Microwave Engineering Lab |
| 95 | EC7TPPE05 | Comprehensive Viva |
| 96 | EC7PSP02 | Project-I |

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|---|---|---|
| 97 | EC8TPC14 | Radar and Satellite Engineering |
| 98 | EC8TPC15 | Optical Fiber Communication |
| 99 | EC8TPE07 | VLSI Fabrication Methodology |
| 100 | EC8TOE41 | Basic building block of Microwave Engineering |
| 101 | EC8TOE42 | Principle of Management |
| 102 | EC8TOE43 | Mobile Computing |
| 103 | EC8TOE44 | Embedded System |
| 104 | EC8TOE45 | Advanced Power Electronics |
| 105 | EC8TPPC15 | Optical Fiber Communication Lab |
| 106 | EC8TPPC16 | Advanced RF and Microwave Design lab |
| 107 | EC8TPSP03 | Project-II |
| 108 | EC8TPSP04 | Comprehensive Viva |
| 109 | ET7100 | Research Methodology in engineering |
| 110 | EC102 | Vaccume Technology |
| 111 | EC103 | Finite Element Method |
| 112 | EC104 | Sensors Measurement Science & Technology |
| 113 | EC105 | Artificial Intelligence |
| 114 | EC106 | Optimization Techniques |
| 115 | EC107 | Antenna for Modern Wireless Communication |
| 116 | EC108 | Wireless and Computer Network |

विभागाध्यक्ष (इले. एव संचार अभियांत्रिकी)
H.O.D. (Elect. & Comm. Engineering)
प्रौद्योगिकी संस्थान
Institute of Technology
गु. घा. वि., बिलासपुर (छ.ग.)
G. G. V. Bilaspur (C.G.)

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING,**
**SoS, ENGINEERING & TECHNOLOGY, GGV**
**B. TECH. FIRST YEAR SYLLABUS (W.E.F SESSION 2020-21)**

| SYLLABUS | (SEMESTER-II) | Periods/ Week | | | INTERNAL ASSESSMENT (IA) | | | ESE | Grand total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | ME201PES01/ ME202PES03 | L | T | P | IA | MSE | TOTAL | | | |
| *Subject:* | ENGINEERING GRAPHICS | 1 | 0 | 3 | 30 | -- | 30 | 20 | 50 | 3 |

**Course Learning Objectives**:

- To learn the basic of Engineering Drawing and OrthographicProjections
- To learn the Sections and Sectional Views of Right AngularSolids
- To learn the Isometric Projections covering and overview of ComputerGraphics

**UNIT 1:Introduction Engineering Graphics and Engineering Curves**: Principles of engineering graphics and their significance – drawing instruments and their use – conventions in drawing – lettering – BIS conventions. Dimensioning rules, geometrical construction. Engineering Curves - Conic Sections, Special Curves-Cycloids, Epicycloids, Hypocycloids, Involutes and trochoid.
**UNIT 2:Projection of Points, Straight lines and Planes**: Principles of orthographic projections – conventions – first and third angle projections. Projections of points and lines inclined to both the planes. Projections of regular planes, inclined to both planes
**UNIT 3:Projections Solids:**Introduction, Type of solid, Projections of solids in simple position, Projection of solids with axes inclined to one of the reference planes and parallel to the other, Projections of solids with axes inclined to both H.P. and the V.P.
**UNIT 4: Section of Solids and Development of Surfaces**: Sectioning of regular solids - Section planes perpendicular to one plane and parallel or inclined to other plane - Development of surfaces of right, regular solids – development of prisms, cylinders, pyramids, cones and their parts.
**UNIT 5: Isometric Projections and Orthographic Views**: Principles of Isometric Projections-Isometric Scale- Isometric Views Conventions-Plane Figures, Simple and Compound Solids. Conversion of isometric views to orthographic views. Conversion of orthographic views to isometric projections, vice-versa. Introduction to perspective projection.

**Computer Aided Drafting:** Introduction to computer aided drafting package to make 2-D drawings. Demonstration purpose only - not to be included in examinations.

**Textbooks/References:**

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, PearsonEducation
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. CAD Software Theory and User Manuals

**Course Outcomes:**

1. At the end of the course, the student shall be able to
2. Draw engineering curves, orthographic projections of lines, planes and solids.
3. Draw sections of solids including cylinders, cones, prisms and pyramids.
4. Make development of surfaces, Orthographic and Isometric projections
5. Overview of Computer Graphics.

| SYLLABUS | (SEMESTER-II) | Periods/ Week | | | INTERNAL ASSESSMENT (IA) | | | ESE | Grand total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | ME201PES02 / ME202PES04 | L | T | P | IA | MSE | TOTAL | 20 | 50 | 2 |
| *Subject:* | WORKSHOP TECHNOLOGY & PRACTICES | 1 | 0 | 2 | 30 | -- | 30 | | | |

**Course objectives:**

- To impart student knowledge on various hand tools for usage in engineeringapplications.
- Be able to use analytical skills for the production ofcomponents.
- Design and model different prototypes using carpentry, sheet metal andwelding.
- Make electrical connections for dailyapplications.
- To make student aware of safety rules in workingenvironments.

**Course Content:**

Lectures & videos:

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods (3lectures)
2. CNC machining, Additive manufacturing
3. Fitting operations & power tools
4. Electrical &Electronics
5. Carpentry
6. Plastic moulding, glass cutting
7. Metal casting
8. Welding (arc welding & gas welding), brazing

**Textbooks/References:**

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of WorkshopTechnology", Vol. I 2008 and Vol. II 2010, Media promoters and publishersprivate limited,Mumbai.
2. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition,2002.
3. Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008. (iv)Roy A. Lindberg, "Processes and Materials of Manufacture", 4thedition, PrenticeHallIndia, 1998.
4. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata Mc-Graw Hill House,2017.

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

- Make half lap joint, Dovetail joint and Mortise &Tenonjoint
- Produce Lap joint, Tee joint and Butt joint using Gaswelding
- Prepare trapezoidal tray, Funnel and T-joint using sheet metaltools
- Make connections for controlling one lamp by a single switch, controlling two lamps by a singleswitch and stair casewiring

| CO SYLLABUS | (SEMESTER-II) | Periods/ Week | | | INTERNAL ASSESSMENT (IA) | | | ESE | Grand total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Code: | EC201PES03/ EC202PES05 | L | T | P | IA | MSE | TOTAL | | | |
| Subjects: | BASIC ELECTRICAL ENGINEERING LAB | - | - | 2 | 30 | -- | 30 | 20 | 50 | 1 |

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**Course Learning Objectives**:

1. To understand basic electrical wiring, measurements,errors and method.
2. To practically provide the concept of different theorems.
3. To have actually hands-on on machines like transformers, DC and AC machines to get better understanding.
4. To get experimental knowledge of Diodes and Transistors
5. To make students learn Digital logic design.

**Course Content:**

**List of experiments/demonstrations:**

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
- Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope).
- Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and Verification. Observation of phase differences between current and voltage. Resonance in R-L-C circuits.
- Transformers: Polarity test, OC & SC tests. Loading of a transformer: measurement of primary and secondary voltages and currents and power.
- Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), and single-phase induction machine.
- Study of Diodes and transistors characteristics
- Study of full-wave and half-wave rectifier
- Verification of De Morgan's theorems.
- Study of Logic gates
- Study of half and full adder

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

- Acquire knowledge about different types of meters and take readings and Construct circuits and measure different electrical quantities.
- Analyze Single Phase and Three phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
- Work on machines like transformers

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| SYLLABUS | Periods/ | Periods/ Week | | | Internal Assessment ( IA) | | | ESE | Grand Total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | MA202TBS03 | L | T | P | CT-I | CT-II | TOTAL | 70 | 100 | 4 |
| *Subject:* | MATHEMATICS-II | 3 | 1 | - | 15 | 15 | 30 | | | |

**Course Content:**

**Unit 1:** First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut'stype.

**Unit 2:** Ordinary differential equations of higher orders (Prerequisite 2c, 4a) second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

**Unit 3:** Partial Differential Equations – First order (Prerequisite 5a-b): First order partial differential equations, solutions of first order linear and non-linear PDEs.

**Unit 4:** Partial Differential Equations– Higher order(Prerequisite 5b-c) Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method. Flows, vibrations and diffusions, second-order linear equations and their classification, Initial and boundary conditions (with an informal description of well-posed problems).

**Unit 5:**D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. One dimensional diffusion equation and its solution by separation of variables. Boundary-value problems: Solution of boundary- value problems for various linear PDEs in variousgeometries.

**Textbooks/References:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &Sons,2006.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India,2009.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India,1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India,1995.
5. E. L. Ince, Ordinary Differential Equations, Dover Publications,1958.
6. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill,2007.
7. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications,1993.
8. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall,1998.
9. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill,1964.
10. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition,2010
11. Denianmurry,defferential equations ,oxfordpublications

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| SYLLABUS | (SEMESTER-I) | Periods/ Week | | | Internal Assessment ( IA) | | | ESE | Grand Total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | CY201TBS02/ CY202TBS04 | L | T | P | CT-1 | CT-II | TOTAL | 70 | 100 | 04 |
| *Subject:* | CHEMISTRY | 3 | 1 | - | 15 | 15 | 30 | | | |

**Course Learning Objectives**:

The objective of this Course is to:

- To make aware and enrich the the students about the basic concept and understanding of chemical concepts of basic Chemistry and spectroscopictechniques.

**Course Content:**

**UNIT-1: I** Concept of Quantum Energy and Spectroscopy: Quantization of Energy, Regions of spectrum. Electronic Spectroscopy: Electronic Transition, Woodward Fieser rules for calculating $\lambda_{max}$ of conjugated dienes & α, β-unsaturated carbonyl compound, various shifts in $\lambda_{max}$ and intensities. Infra-Red Spectroscopy: Conditions for Infra-Red Spectroscopy, Molecular vibrations & factors affecting Infra-Red frequencies.

**UNIT-2:** Chemical Bonding in Molecules: Introduction of chemical bonding, VSEPER Theory, V.B.Theory and Molecular Orbital Theory. Energy level diagrams of diatomic molecules and ions.

**UNIT-3:** Concept of Chirality, Enantiomers, Diastereomers,Meso-compounds and Racemic mixtures. Conformation of Acyclic hydrocarbons (Ethane, Propane & n-Butane) and cyclic hydrocarbon (Cyclohexane), Plane of symmetry, Centre of symmetry, Absolute and Relative Configuration (R &S, D & L and E & Z).

**UNIT -4:** Reactivity of Organic Molecules, Factors influencing acidity, basicity and nucleophilicity of molecules, kinetic vs thermodynamic control of reactions.

**UNIT -5:** Strategy for Synthesis of Organic Compounds: Reaction intermediates: Stability of Free Radicle, Carbocation and Carbanion. Introduction to reaction involving Addition, Elimination, Substitution and Ring opening and Cyclization.

**Textbooks/References:**

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai PublicationCo.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015edition.
3. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition(second).
4. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015edition.
5. A textbook of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., LatestEdition
6. Applied Chemistry by H.D. Gesser, SpringerPublishers
7. Textbook of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press,IIM
8. B. Siva Shankar, "Engineering Chemistry", Tata Mc Graw Hill Publishing Limited, 3rd Edition, 2015.
9. S. S. Dara, Mukkanti, "Text of Engineering Chemistry", S. Chand & Co, New Delhi, 12th Edition, 2006.
10. C. V. Agarwal, C. P. Murthy, A. Naidu, "Chemistry of Engineering Materials", Wiley India, 5th Edition, 2013.

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| SYLLABUS | (SEMESTER-I) | Periods/ Week | | | Internal Assessment ( IA) | | | ESE | Grand Total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | CE201TES01 / CE202TES03 | L | T | P | CT-1 | CT-II | TOTAL | 70 | 100 | 04 |
| *Subject:* | ENGINEERING MECHANICS | 3 | 1 | - | 15 | 15 | 30 | | | |

**Course Learning Objectives**:

To learn about

- The concepts Force systems, free body diagrams, resultant of forces and equations of equilibrium, Supports and support reactions and calculation ofCentroid
- The Concept of moment of inertia of plane figures, Laws and applications offriction
- The Analysis of the truss and determination of axial forces by Method ofJoints
- Motion of a body and their relationships and application of D Alembert's principle in rectilinear and curvilinearmotions

**Course Content:**

**UNIT- 1**: Introduction to Engineering Mechanics covering, Force Systems Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems

**UNIT-2:** Friction covering, Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion ofBodies.
Basic Structural Analysis covering, Equilibrium in three dimensions; Method of Sections; Method of Joints; Simple Trusses; Zero force members.

**UNIT 3:** Centroid and Centre of Gravity covering, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections.

**UNIT-4:** Virtual Work and Energy Method-Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency.
Review of particle dynamics- Rectilinear motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct andoblique).

**UNIT-5:** Introduction to Kinetics of Rigid Bodies covering, Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation;

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| SYLLABUS | (SEMESTER-I) | Periods/ Week | | | Internal Assessment ( IA) | | | ESE | Grand Total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | CS201TES02 / CS202TES04 | L | T | P | CT-I | CT-II | TOTAL | 70 | 100 | 03 |
| *Subject:* | COMPUTER PROGRAMMING | 3 | 0 | - | 15 | 15 | 30 | | | |

**Course Learning Objectives**:

- To understand the basic of Idea ofAlgorithm.
- To understand the programing concept of Arithmetic expressions and BasicAlgorithms
- To learn the Functions and Structure ofarray.

**Course Content:**

**UNIT-1: Introduction to Programming**
Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) -
**Idea of Algorithm:**steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.From algorithms to programs; source code, variables (with data types) variables and memory locations,Syntax and Logical Errors in compilation, object and executablecode.

**UNIT-2**: **Arithmetic expressions and precedence**
Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching Iteration and loops, **Arrays** (1-D, 2-D), Character arrays and strings

**UNIT-3: Basic Algorithms**
Searching,concept of binary search etc, Basic Sorting Algorithms Bubble sort etc,Finding roots of equations, introduction of Algorithm complexity

**UNIT-4: Function**
Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference binary search etc.
**Recursion functions Recursion**, as a different way of solving problems. Example programs, such as, Finding Factorial, Fibonacci series, etc.

**UNIT -5: Structure**
Structures, Defining structures and Array of Structures
**Pointers** Idea of pointers, defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

**Textbooks/References:**

1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, TataMcGraw-Hill

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| SYLLABUS | (SEMESTER-I) | Periods/ Week | | | Internal Assessment ( IA) | | | ESE | Grand Total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | CM201TES03 / CM202TES05 | L | T | P | CT-I | CT-II | TOTAL | 70 | 100 | 03 |
| *Subject:* | BASIC CIVIL & MECHANICAL ENGINEERING | 3 | 0 | - | 15 | 15 | 30 | | | |

**Course Learning Objectives**:

- To studythe properties and uses ofbasic civil engineering materials.
- To study the importance of NBC, IS Codes (materials), types of buildings and foundations, basic requirements of foundations.
- To study the basic types of surveys, linear and angular measurements, and GPS measurements
- To familiarize with the fundamentals of heat and work interactions, heat transfer mechanisms and energy conversion processes.
- To provide exposure to various engineering materials and processes of manufacturing.
- To impart basic knowledge of the interdisciplinary nature of engineering systems.

**UNIT 1:** Civil Engineering Materials: Properties &Uses of Stones, Bricks, Cement, Aggregates, Steel,Concrete-quality of good concrete, strength, curing and grade of concrete, standard tests on concrete.IS Codes and classification

**UNIT 2:** National Building Code (NBC), Salient features, Classification of Building as per NBC(India), Site selection for buildings - Components of building, Foundations-Introduction, Types of Foundations & its Suitability, Basic requirements and purpose of foundation on different soils.
Brief description about: Brick & stone masonry, Plastering, Lintels; Doors &Windows, Beams &columns, Formwork, Roofs.

**UNIT 3:** Surveying: Objects, uses, Basic principle, Classification, Plans&Maps, Scales, Units of measurement, Conventional symbols, Different survey equipment.
Measurements– Linear &Angular, levelling, Determination of Area & Volume, Introduction to Triangulation and GPS

**UNIT 4:** Materials and Manufacturing
Introduction to engineering materials – metals, alloys, composites, smart materials, phase-change materials; Introduction to various processes of manufacturing – conventional machine tools – lathe and its types, shaping, milling and related operations – turning, threading, knurling, etc., unconventional methods.

**UNIT 5:** Automobile and Refrigeration and Air conditioning
Theoretical thermodynamic cycles and working principle of Petrol and Diesel Engines – Hybrid and Electric Vehicle - Turbines, Pumps, Compressors. Principle of vapour compression and absorption refrigeration system–Layout of typical domestic refrigerator–Window and Split type room Air conditioner. Introduction to renewable energy utilization and technology.

**Textbooks/References:**

1. Punmia, B.C, Ashok Kumar Jain, Arun Kumar Jain, Basic Civil Engineering, Lakshmi Publishers, 2012.
2. SatheeshGopi, Basic Civil Engineering, Pearson Publishers, 2009.
3. Rangwala, S.C, Building materials, Charotar Publishing House, Pvt. Limited, Edition 27, 2009.
4. Palanichamy, M.S, Basic Civil Engineering, Tata McGraw Hill, 2000.
5. Elements of Workshop Technology Vol. 1 – S.K. HajraChoudhary, A.K. HajraChoudhary – Media promoters & Publishers Pvt. Ltd.

| SYLLABUS | (SEMESTER-I) | Periods/ Week | | | INTERNAL ASSESSMENT (IA) | | | ESE | Grand total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | CY201PBS01 / CY202PBS02 | L | T | P | IA | MSE | TOTAL | 20 | 50 | 01 |
| *Subject:* | CHEMISTRY LAB | 0 | 0 | 2 | 30 | - | 30 | | | |

**Course Learning Objectives**:

The Lab sessions would help in learning:

- Application of iodometrically& titration inlab.
- Recognition of different chemicalreaction.
- Advanced lab methods like Spectrophotometry andchromatography

**Course Content:**

**Group – A:**

1. Standardization of sodium thiosulphate solution by standard potassium dichromatesolution.
2. To determine the Normality and Strength (g/L) of given Ferrous Ammonium Sulphate solution 'A' using standard Ferrous Ammonium Sulphate (N/30) solution 'B' taking KMnO4 solution as anintermediate.
3. To determine the concentration of hypo solution ($Na_2S_2O_3.5H_2O$) iodometrically with given Iodine (N/50)solution.
4. Find out the Temporary hardness of given water sample using 0.01M EDTA solution,buffer solution (pH-10) and EBT as anindicator.
5. To determine chloride ion in a given water sample by Argentometric method (Mohr'smethod)

**Group – B:**

6. Preparation of Urea Formaldehyderesin.
7. Acetylation of Primary Amine: Preparation ofAcetanilide.
8. Base Catalyzed Aldol Condensation: Synthesis ofdibenzalpropanone.
9. [4+2] Cycloaddition Reaction: Diels-Alderreaction.
10. Preparation of aspirin and calculate itsyield.

**Group – C:**

11. To calculate the $\lambda_{max}$ of a given compound using UV-visiblespectrophotometer.
12. To separate the metallic ions by paperchromatography.
13. To determine the surface tension of a liquid bystalagmometer.
14. To determine the percentage composition of the given mixture consisting of two liquids A and B (non- interacting system) by viscositymethod.
15. To determine the relative viscosity of given liquids by Ostwald'sviscometer.

**Note: At least two Experiments from each group must be performed.**

**Course Outcomes-** On completion of the course, the students will be able to handle the chemicals of synthesis as well as titration that will ultimately make them efficient and develop their future chemistry laboratoryskills

| SYLLABUS | (SEMESTER-I) | Periods/ Week | | | INTERNAL ASSESSMENT (IA) | | | ESE | Grand total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | CE2011ES01/ CE202PES04 | L | T | P | IA | MSE | TOTAL | 20 | 50 | 1 |
| *Subject:* | ENGG MECHANICS LAB | - | - | 2 | 30 | -- | 30 | | | |

**Course objectives:**

- To perform the practical giving basic understanding to fundamental principles of mechanics like parallelogram of forces, triangle of forces and polygon of forces by universal forcetable
- To perform the practical giving basic understanding to fundamental application of mechanics like screw jack, winch crab and simple wheel andaxle

**Course Content:**

**List of Experiments**

1. Verification of law of parallelogram offorces.
2. Verification of law of triangle offorces.
3. Verification of law of polygon of forces by universal forcetable.
4. Verification of law of moment by parallel forcesapparatus.
5. Practical verification of forces in the member of jibcrane.
6. Practical verification of forces in the member of thetruss.
7. Determination of coefficient of friction between two given surfaces by inclined planemethod.
8. Determination of efficiency of simple screwjack.
9. Determination of efficiency of single purchase winchcrab.
10. Determination of efficiency of double purchase winchcrab.
11. Determination of efficiency of simple wheel andaxle.

**Course Outcome:** At the end of the course students will be able to:

- Verify the fundamental principles of mechanics like parallelogram of forces, triangle of forces and polygon of forces by universal forcetable
- Analyze the friction coefficient between twosurfaces
- Calculate the efficiency of screw jack, winch crab and wheel andaxle

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING,**
**SoS, ENGINEERING & TECHNOLOGY, GGV**
**B. TECH. FIRST YEAR SYLLABUS (W.E.F SESSION 2020-21)**

| SYLLABUS | (SEMESTER-I) | Periods/ Week | | | INTERNAL ASSESSMENT (IA) | | | ESE | Grand total | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subject Code:* | CS201PES02 / CS202PES05 | L | T | P | IA | MSE | TOTAL | 20 | 50 | 01 |
| *Subject:* | COMPUTER PROGRAMMING LAB | - | - | 2 | 30 | -- | 30 | | | |

**Course Learning Objectives**:

- To learn the Branching and logical expressions andLoops
- To learn the Arrays andFunction
- To understand the Numerical methods andRecursion

**Course Content:**
**The laboratory should be preceded or followed by a tutorial to explain the approach or Algorithm to be implemented for the problem given.]**

**Tutorial 1:** Problem solving using computers:
**Lab1:** Familiarization with programming environment

**Tutorial 2:** Variable types and type conversions:
**Lab 2:** Simple computational problems using arithmetic expressions

**Tutorial 3:** Branching and logical expressions:
**Lab 3**: Problems involving if-then-else structures

**Tutorial 4:** Loops, while and for loops:
**Lab 4:** Iterative problems e.g., sum of series

**Tutorial 5:** 1D Arrays: searching, sorting:
**Lab 5:** 1D Array manipulation

**Tutorial 6:** 2D arrays and Strings
**Lab 6:** Matrix problems, String operations

**Tutorial 7:** Functions, call by value:
**Lab 7:** Simple functions

**Tutorial 8 &9:** Numerical methods (Root finding, numerical differentiation, numerical Integration):
**Lab 8 and 9:** Programming for solving Numerical methods problems

**Tutorial 10:** Recursion, structure of recursive calls
**Lab 10:** Recursive functions

**Tutorial 11:** Pointers, structures and dynamic memory allocation
**Lab 11:** Pointers and structures

**Course Outcomes-** At the end of the course students will be able to

- Utilization of Branching and logical expressions and Loops, Arrays and Function and Numerical methods and Recursion for writing the programmes for various engineeringapplications

| Sub Code | L | T | P | Duration | IA | ESE | Credits |
|---|---|---|---|---|---|---|---|
| EC03TPC01 | 3 | 0 | 0 | 3 hours | 30 | 70 | 3 |

## ELECTRONIC DEVICES

**Course Objectives:**

Students will try to learn:

1. To understand operation of semiconductor devices.
2. To understand DC analysis and AC models of semiconductor devices.
3. To apply concepts for the design of Regulators and Amplifiers
4. To verify the theoretical concepts through laboratory and simulation experiments.
5. To implement mini projects based on concept of electronics circuit concepts.

**UNIT-I :Semiconductor concept:** Metals, Insulators and Semiconductors, Electrical properties of Ge and Si, Conductivity Equation, Mobility and Conductivity, Electron and holes in intrinsic and extrinsic semiconductors, Donor and Acceptor Impurities,

Electrons in periodic Lattices, E-k diagrams. Energy bands in intrinsic and extrinsic silicon, Transport Phenomena of semiconductor, Generation and recombination of carriers, Charge density in Semiconductor, Hall Effect, Injected minority charge carriers, Potential variation within graded semiconductor.

**Junction Diode Characteristics:** Properties of P-N junction, Open circuited P-N junction, V-I characteristics, Temperature dependence of V-I characteristics, Diode resistance, Current component of PN diode: Space charge capacitance, Charge control description of a diode, Diffusion capacitance, Junction diode switching times, Breakdown mechanism.

**UNIT-II :Diode Circuits:** Load line concepts, Graphical analysis, Clipper circuit, Clamper, Comparator, Rectifier, Full wave circuits, Filter circuits: Inductor filter, Capacitor filter, LC filter, Multiple LC filter, CLC or π filter, Zener diode regulator circuit.

**OTHER DIODES:** Negative conductance in semiconductors- Tunnel diode, Photo diode - Photo voltaic effect, Solar cells, Schottky Diode, Varactor Diode, Avalanche diode, PIN diode, LED, LASER.

**UNIT-III :Transistor Characteristics:** Junction Transistor, Transistor current components, Transistor as an amplifier, Transistor construction, Transistor circuit configuration (CB, CE, CC)- Analytical Expression for transistor characteristics and Operation, Early Effect, Ebers-Moll Model, β-re model, Transistor as a switch.

**Transistor Biasing and Thermal Stabilization:** The operating point, Bias stability, Stability factor- Stabilization against variation in $I_{CO}$, $V_{BE}$ and β, Emitter bias, Collector – to – base bias, Voltage divider bias with emitter bias, Emitter bypass capacitor. Bias compensation.

**UNIT-IV: Field Effect Transistor (FET):** JFET Construction, Operation, V-I characteristics, Transfer characteristics, Drain characteristics. Metal Oxide Semiconductor Field Effect Transistor (MOSFET)- Construction, Operation and characteristics, Depletion MOSFET, Enhancement MOSFET,

| Sub Code | L | T | P | Duration | IA | ESE | Credits |
|---|---|---|---|---|---|---|---|
| EC03TPC02 | 3 | 0 | 0 | 3 hours | 30 | 70 | 3 |

## DIGITAL SYSTEM DESIGN

**Course Objectives:**

Students will try to learn:

1. To understand number representation and conversion between different representation in digital electronic circuits.
2. To analyze logic processes and implement logical operations using combinational logic circuits.
3. To understand characteristics of memory and their classification.
4. To understand concepts of sequential circuits and to analyze sequential systems in terms of state machines.
5. To understand concept of Programmable Devices, PLA, PAL, CPLD and FPGA and implement digital system using VHDL.
6. To implement combinational and sequential circuits using VHDL.

**UNIT-I :**Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De-Morgan's Theorem, SOP & POS forms, Canonical forms, Karnaugh maps up to 6 variables, Binary codes, Code Conversion.

**UNIT-II:**MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display, Half and Full Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel Shifter and ALU.

**UNIT-III :**Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM, Algorothmic State Machine Charts, Designing Finite synchronous circuits like Pulse train generator, PseudoRandom Binary Sequence generator, Clock generation

**UNIT-IV :**Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Concept of Programmable Logic Devices like FPGA, Logic implementation using Programmable devices.

**UNIT-V :**VLSI Design flow: Design entry: Schematic, FSM & HDL, different modeling styles in VHDL, Data types and objects, Dataflow, Behavioral and Structural Modeling, Synthesis & Simulation , VHDL constructs and codes for combinational and sequential circuits.

**Text/Reference Books:**

1. R.P. Jain, "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2009.
2. Douglas Perry, "VHDL", Tata McGraw Hill, 4th edition, 2002.
3. W.H. Gothmann, "Digital Electronics- An introduction to theory and practice", PHI, 2nd edition ,2006.
4. D.V. Hall, "Digital Circuits and Systems", Tata McGraw Hill, 1989
5. Charles Roth, "Digital System Design using VHDL", Tata McGraw Hill 2nd edition2012.

| Sub Code | L | T | P | Duration | IA | ESE | Credits |
|---|---|---|---|---|---|---|---|
| EC03TPC03 | 3 | 0 | 0 | 3 hours | 30 | 70 | 3 |

## SIGNALS & SYSTEMS

**Course Objectives:**

Students will try to learn:

1. To introduce students the concept and theory of signals and systems needed in electronics and telecommunication engineering fields.
2. To introduce students to the basic idea of signal and system analysis and its characterization in time and frequency domain

**UNIT-I:**Signals and systems as seen in everyday life, and in various branches of engineering and science. Energy and power signals, continuous and discrete time signals, continuous and discrete amplitude signals. System properties: linearity additivity and homogeneity, shift-invariance, causality, stability, realizability.

**UNIT-II:** Linear shift-invariant (LSI) systems, impulse response and step response, convolution, input-output behavior with aperiodic convergent inputs. Characterization of causality and stability of linear shift-invariant systems. System representation through differential equations and difference equations.

**UNIT-III :**Periodic and semi-periodic inputs to an LSI system, the notion of a frequency response and its relation to the impulse response, Fourier series representation, the Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality. The Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval's Theorem: The idea of signal space and orthogonal bases.

**UNIT-IV :**The Laplace Transform, notion of eigen functions of LSI systems, a basis of eigen functions, region of convergence, poles and zeros of system, Laplace domain analysis, solution to differential equations and system behavior. The z-Transform for discrete time signals and systems- eigen functions, region of convergence, z-domain analysis.

**UNIT-V:**State-space analysis and multi-input, multi-output representation. The state-transition matrix and its role. The Sampling Theorem and its implications- Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold, and so on. Aliasing and it seffects. Relation between continuous and discrete time systems.

**Text/Reference books:**

1. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall,1983.
2. R.F. Ziemer, W.H. Tranter and D.R. Fannin, "Signals and Systems - Continuous and Discrete", 4th edition, Prentice Hall, 1998.
3. Papoulis, "Circuits and Systems: A Modern Approach", HRW, 1980.
4. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press, c1998.
5. Douglas K. Lindner, "Introduction to Signals and Systems", McGraw Hill InternationalEdition: c1999.