**JSS MAHAVIDYAPEETHA**

# JSS UNIVERSITY, NOIDA

## EVALUATION SCHEME AND SYLLABUS

**For**

**B.Tech. First Year**

**Computer Science Engineering (CSE), Information Technology (IT),**
**Computer Science Engineering (Data Science)**
**Computer Science Engineering (Artificial Intelligence & Machine Learning)**
**&**
**Electronics and Communication Engineering (ECE)**
**Robotics and Artificial Intelligence (RAI)**

**Effective from the Session**

**2024-2025**

# JSS UNIVERSITY, NOIDA

**C-20/1, Sector-62, Noida, Gautam Budh Nagar,**
**Uttar Pradesh, India-201301.**

# B. Tech. FIRST YEAR, SEMESTER I

Common for Computer Science Engineering (CSE), Information Technology (IT), Computer Science Engineering (Data Science) (CS-DS), Computer Science Engineering (Artificial Intelligence & Machine Learning) (CS-AIML)

| Sl. No | Course Code | Course Title | Course Category | Teaching Dept. | Teaching hours / week | | | | Credits | Marks | | | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | Total | | CIE | ESE | Total | |
| 1 | JAS 101/ JAS 102 | Applied Physics/ Applied Chemistry | BSC | PH/CH | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| 2 | JAS 103 | Practical Linear Algebra | BSC | MA | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| 3 | JCS 101 | Computational Thinking for Problem Solving | ESC | CSE | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| 4 | JEE 102 | Basics of Electrical & Electronics Engineering | ESC | ECE/ EE | 3 | 1 | 0 | 4 | 4 | 40 | 60 | 100 | 3 hrs |
| 5 | JME 101 | Elements of Mechanical Engineering | ESC | ME | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 | 3 hrs |
| 6 | JHS 101 | English for Technical Communications | HSMC | HU (EN) | 1 | 0 | 2 | 3 | 2 | 100 | -- | 100 | 2 hrs |
| 7 | JHS 104 | Sports and Yoga | HSMC | -- | 0 | 0 | 2 | 2 | 0 | 50* | - | 50* | ------ |
| | | | | | | | | 27 | 21 | 300 | 300 | 600 | |

**L : Lecture ; T: Tutorial ; P: Practical; CIE : Continuous Internal Examination ESE : End Semester Examination;* : Non Audited Course**

# B. Tech. FIRST YEAR, SEMESTER II

Common for Computer Science Engineering (CSE), Information Technology (IT), Computer Science Engineering (Data Science) (CS-DS), Computer Science Engineering (Artificial Intelligence & Machine Learning) (CS-AIML)

| Sl. No | Course Code | CourseTitle | Course Category | Teaching Dept. | Teaching hours / week | | | | Credits | Marks | | | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | Total | | CIE | ESE | Total | |
| 1 | JAS 202/ JAS 201 | Applied Chemistry/ Applied Physics | BSC | CH/ PH | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| 2 | JAS 204 | Probability and Statistics | BSC | MA | 3 | 1 | 0 | 4 | 4 | 40 | 60 | 100 | 3 hrs |
| 3 | JHS 202 | Entrepreneurship & Business Basics | HSMC | CSE/ MBA | 2 | 0 | 0 | 2 | 2 | 40 | 60 | 100 | 2 hrs |
| 4 | JCS 202 | Data Structures | ESC | CSE | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| **5** | JCS 203 | Object Oriented Programming using C++ | ESC | CSE | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| **6** | JEC 201 | DigitalLogic Design | ESC | ECE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 | 3 hrs |
| **7** | JME 202 | Computer Aided Engineering Graphics Lab | ESC | ME | 0 | 0 | 2 | 2 | 1 | 100 | - | 100 | 2 hrs |
| **8** | JHS 203 | Value Education | HSMC | HU (EN) | 3 | 0 | 0 | 3 | 0 | 40* | 60* | 100* | 3 hrs |
| | | | | | | | | 29 | 22 | 340 | 360 | 700 | |

**L : Lecture ; T: Tutorial ; P: Practical; CIE : Continuous Internal Examination ESE : End Semester Examination; * : Non Audited Course**

# B. Tech. FIRST YEAR, SEMESTER I

Common for Electronics and Communication Engineering (ECE) / Robotics and Artificial Intelligence (RAI)

| l. No | Course Code | Course Title | Course Category | Teaching Dept. | Teaching hours / week | | | | Credits | Marks | | | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | Total | | CIE | ESE | Total | |
| 1 | JAS 101/ JAS 102 | Applied Physics / Applied Chemistry | BSC | PH / CH | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| 2 | JAS 105 | Linear Algebra & Differential Equations | BSC | MA | 3 | 1 | 0 | 4 | 4 | 40 | 60 | 100 | 3 hrs |
| 3 | JCS 101 | Computational Thinking for Problem Solving | ESC | CSE | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| 4 | JEE 101/ JEC 102 | Basics of Electrical Engineering / Basics of Electronics Engineering | ESC | EE / ECE | 3 | 1 | 0 | 4 | 4 | 40 | 60 | 100 | 3 hrs |
| 5 | JEC 103/ JME /201 | Basics of Communication Engineering / Elements of Mechanical Engineering | ESC | ECE / ME | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 | 3 hrs |
| 6 | JME 102 | Computer Aided Engineering Graphics Lab | ESC | ME | 0 | 0 | 2 | 2 | 1 | 100 | - | 100 | 2 hrs |
| 7 | JHS 104 | Sports and Yoga | HSMC | -- | 0 | 0 | 2 | 2 | 0 | 50* | - | 50* | - |
| | | | | | | | | | | | | | |
| | | | | | | | | 25 | 20 | 300 | 300 | 600 | |

**L :**Lecture ; **T:** Tutorial ; **P:** Practical; **CIE :** Continuous Internal Examination **ESE :** End Semester Examination;
*: Non Audited Course

# B. Tech. FIRST YEAR, SEMESTER II

Common for Electronics and Communication Engineering (ECE) / Robotics and Artificial Intelligence (RAI)

| Sl. No | Course Code | Course Title | Course Category | Teaching Dept. | Teaching hours / week | | | | Credits | Marks | | | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | Total | | CIE | ESE | Total | |
| 1 | JAS 202/ JAS 201 | Applied Chemistry / Applied Physics | BSC | CH /PH | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| 2 | JAS 206 | Statistics & Integral Transforms | BSC | MA | 3 | 1 | 0 | 4 | 4 | 40 | 60 | 100 | 3 hrs |
| 3 | JCS 202 | Data Structures | ESC | ECE / CSE | 3 | 0 | 2 | 5 | 4 | 40 | 60 | 100 | 3 hrs |
| 4 | JCS 204 | Introduction to Python Programming | ESC | ECE / CSE | 1 | 0 | 2 | 3 | 2 | 40 | 60 | 100 | 2 hrs |
| 5 | JEC 202/ JEE 201 | Basics of Electronics Engineering / Basics of Electrical Engineering | ESC | ECE / EE | 3 | 1 | 0 | 4 | 4 | 40 | 60 | 100 | 3 hrs |
| 6 | JME 201/ JEC 203 | Elements of Mechanical Engineering / Basics of Communication Engineering | ESC | ME / ECE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 | 3 hrs |
| 7 | JHS 201 | English for Technical Communication | HSMC | HU (EN) | 1 | 0 | 2 | 3 | 2 | 100 | -- | 100 | 2 hrs |
| 8 | JHS 203 | Value Education | HSMC | HU (EN) | 3 | 0 | 0 | 3 | 0 | 40* | 60* | 100* | 3 hrs |
| | | | | | | | | | | | | | |
| | | | | | | | | 30 | 23 | 340 | 360 | 700 | |

**L :**Lecture ; **T:** Tutorial ; **P:** Practical; **CIE :** Continuous Internal Examination **ESE :** End Semester Examination; * : Non Audited Course

# *DETAILED SYLLABUS*

**B.Tech. First Year**

**Computer Science Engineering (CSE),**
**Information Technology (IT),**
**Computer Science Engineering (Data Science) (CS-DS),**
**Computer Science Engineering**
**(Artificial Intelligence & Machine Learning) (CS-AIML)**

## Effective from the Session

## 2024-2025

## JAS 101/ JAS 201 APPLIED PHYSICS

**Course Outcomes**

**CO1:** Understand the fundamental concepts of wave-particle duality, Heisenberg uncertainty principle, Schrödinger's wave equation, and their applications in quantum mechanics.

**CO2:** Derive and apply Maxwell's equations to analyse electromagnetic wave propagation in different medium, displacement current, poynting vector, and energy density in various media.

**CO3:** Describe and analyse crystal structures, lattice parameters, Miller indices, and the principles of X-ray diffraction using Bragg's law, and their applications in material science.

**CO4:** Understand the electronic, dielectric and magnetic properties of materials.

**CO5:** Discuss the principle and working of LASER and optical fibre and to examine their industrial and scientific applications.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit – I** | **Quantum Mechanics:** Introduction to Quantum Mechanics, Black body radiation, Plank's hypothesis, Wave-particle duality, de-Broglie matter waves, Heisenberg uncertainty principle and its applications, Wave function and its significance, Probability density and normalization with examples, Schrödinger's wave equation (Time dependent and time independent), particle in one dimensional potential box, Eigen values and Eigen function, Applications of Quantum mechanics (Quantum Computing). | **08 Hrs** |
| **Unit – II** | **Electromagnetic Theory:** Basic concepts of Electromagnetism, Gauss Law of electrostatics, Gauss law in magnetostatics, Faraday's laws of induction, Continuity equation, Displacement Current & modified ampere's circuital law, Maxwell's equations and its physical significance. EM Wave equation and its propagation characteristics in free space and conducting medium, Poynting vector (Qualitative). | **08 Hrs** |
| **Unit – III** | **Crystal Structures and X-ray Diffraction:** Introduction to Crystal Structures: symmetry, space lattice, basis and unit Cell, Bravais Lattices: Seven Crystal Systems, Fourteen Bravais Lattices, Atomic Arrangements in Cubic Structures: Coordination Number, Atomic Radius, Packing Faction, Voids space, Density, Lattice Planes and Miller Indices, X-ray Diffraction by Crystals: Bragg's law, Characterization of Nanoparticles using X-Ray Diffraction | **06 Hrs** |
| **Unit – IV** | **Properties of Materials:** Electronic Properties: Band theory of solids, energy band structure of conductor, insulators and semi-conductors: Fermi Dirac distribution function, Fermi level. Dielectric Properties: Dielectric constant and polarization mechanisms in dielectrics, Types of polarization: electronic, ionic, orientation, and space charge, temperature and frequency dependence of total polarization, internal fields of solids. Magnetic Properties: Magnetization and magnetic moment in materials, Dia, para and ferromagnetism and their applications, Langevin's theory for Diamagnetic materials (Qualitative). | **08 Hrs** |
| **Unit – V** | **Laser and Fibre Optics:** Laser: Spontaneous and Stimulated Emission, Population Inversion, Einstein's Coefficients, Elements of Laser, Construction and Working of He-Ne Lasers, Applications of Laser. Fiber Optics: Fundamental Ideas about Optical Fiber, Propagation Mechanism, | **06 Hrs** |

| | | |
|---|---|---|
| | Acceptance Angle and Numerical Aperture, Single Mode and Multi-Mode optical fibers, Communication Systems (schematic diagram). | |

**APPLIED PHYSICS PRACTICALS**

**Preamble**: The Applied Physics course provides students with a strong foundation in the fundamentals of physics and serves as a basis for various engineering disciplines. This course is designed to develop a scientific perspective in students and equip them with hands-on experience in engineering education

**List of experiments**

1. To determine the Energy band gap of a given semiconductor material using four probe method.
2. To study the variation of Magnetic field along the axis of current carrying coil and then to estimate the Radius of coil.
3. To verify the Stefan's law by electrical method.
4. To determine the Specific resistance of a given wire using Carey foster's bridge.
5. Evaluating Optical Flatness of Surfaces Using Newton's Rings Interference Pattern.
6. Measurement of Electro Chemical Equivalent of copper.
7. Determination of the dielectric constant of the dielectric material used in a capacitor by charging and discharging of the capacitor.
8. Determination of Charge density, charge velocity and Hall coefficient of a given p-type semiconductor by Hall Effect method.
9. Determination of the relative permeability, retentivity, coercivity, and energy loss of a magnetic material by studying its magnetization (B-H) curve.
10. To determine the Numerical aperture, Angle of divergence and Attenuation coefficient of a given optical fiber cable.

**Demonstration Experiments (Not to be part of Examination)**

1. To determine the wavelength of spectral lines using plane transmission grating.
2. Determination of Curie temperature of a ferromagnetic material by studying the variation of loop area with temperature.

**Text Books**


1. A Text book of Engineering Physics-M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy (S Chand).
2. Applied Physics for Engineers- Neeraj Mehta (PHI Learning).
3. Engineering Physics-H.K. Malik and A.K. Singh (McGrawHill)


**Reference Books**


1. Concepts of Modern Physics – Aurthur Beiser (McGraw Hill).
2. Solid State Physics- S. O. Pillai (New Age Int.)
3. Electromagnetic Field Theory- Rakhesh Singh Kshetrimayum (Cengage Learning)


**NPTEL Web Links**

1. https://youtu.be/TcmGYe39XG0 https://youtu.be/R-x9KdNjQmo
2. https://youtu.be/2CsMpEBl5QY https://youtu.be/-ap00IUJm7k

## JAS 102/ JAS 202 APPLIED CHEMISTRY

**Course Outcomes**

**CO1:** Analyse the principles, types and diverse applications of sensors and displaysystems

**CO2:** Understand Battery Fundamentals and Corrosion Mechanisms

**CO3:** Acquire the fundamentals of material science and computational chemistry

**CO4:** Enumerate the properties, synthesis and applications of industrially important polymers and nanomaterials

**CO5:** Sustainable technologies such as green chemistry, green fuels and E-Wastemanagement

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Sensors & Display Systems:** Introduction - Definition and concept of Transducer, Actuators and Sensors. Working principle and applications of Electrochemical sensors, Thermometric Sensor (Flame photometer), Conductometric sensors (conductometry), and Optical sensors (colorimetry). Disposable sensors (DS)- Definition and advantages of DS over Classical sensors<br>**Display Systems:** Photoactive and electroactive materials - Definition and General working principle for all display devices. Optoelectronic devices based on photoactive and electroactive materials with applications-OLED, AMOLED and QLED's | **08 Hrs** |
| **Unit II** | **Energy storage systems:** Batteries, construction, working and applications of Lithium-Polymer, Lithium-ion and Sodium-ion batteries.<br>**Corrosion Science:** Introduction, electrochemical theory of corrosion, differential metal and differential aeration corrosion, Factors affecting corrosion-Nature of metal, Nature of corrosion product, Relative areas of anode and cathode, pH, temperature.<br>**Corrosion control:** Control of corrosion by (I) cathodic protection (Impressed current method and sacrificial anodic method), (II) Anodizing (anodizing of Al) and (III) Metallic coating (Galvanizing and tinning). | **06 Hrs** |
| **Unit III** | **Conductors, Insulators and Semiconductors:**<br>Introduction to conductors, insulators and Semiconductors. Mechanism of conduction in conductors, insulators and Semiconductors based on Molecular Orbital Theory<br>Electronic grade silicon-Introduction, Production of electronic grade silicon-Czochralski process (CZ) and Float Zone (FZ) methods. Construction working of Photovoltaic Cell and applications.<br>**Computational Chemistry:** Molecular geometry input using cartesian coordinates and internal coordinates, geometry of CH4 and NH3 molecules using structure drawing software programs like chemdraw /Chemsketch | **06 Hrs** |
| **Unit IV** | **Nanomaterials:** Introduction, size dependent properties (Surface area, Electrical, Optical and Catalytic properties). Synthesis of nanomaterials: Top down and bottom-up approaches, Synthesis by Sol-gel, and precipitation method, Nanoscale materials: Fullerenes, Carbon nanotubes and graphene – properties and applications.<br>**Polymers**: Importance of polymers in Industry. conducting polymers – Synthesis and conducting mechanism of Polyacetylene and commercial applications. Introduction of Biodegradable polymers, Synthesis of Polylactic acid (PLA) and their application. | **08 Hrs** |
| **Unit V** | **Green Chemistry:** Introduction, Basic principles of Green chemistry - explanation with examples, Environmental Impact of green chemistry on society | **08 Hrs** |

| | | |
|---|---|---|
| | **Green Fuels:** Hydrogen-production (Photo electrocatalytic and photo catalytic water splitting) and applications in hydrogen fuel cells. Construction, working and applications of Methanol- Oxygen fuel cell (H2SO4 as electrolyte).<br>**E-Waste Management:** Introduction, sources, types, effects of e-waste on environmental and human health, major methods of disposal, advantage of recycling. Extraction of copper and gold from e-waste. | |

APPLIED CHEMISTRY PRACTICALS

**Preamble**:Chemistry lab aims to create opportunities to provide students with hands-on experience of laboratory experiments, which could bridge the gap between theoretical concepts and their applications in everyday life

**List of experiments**

1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry).
2. Estimation of acids in acid mixture Conductrometrically.
3. Determination of acid concentration and pKa of vinegar using pH sensor (Glass electrode).
4. Estimation of iron in TMT bar by diphenyl amine/external indicator method.
5. Determination of rate of corrosion of mild steel by weight loss method.
6. Estimation of total hardness of water by EDTA method.
7. Estimation of total alkalinity of industrial feed water by neutralization titration method.
8. Synthesis of Iron-oxide Nanoparticles.
9. Determination of Viscosity coefficient of Polymer (Ostwald's viscometer).
10. Synthesis of thermosetting polymer (Bakelite/ Polyurethane)

**Demonstration Experiments (Not to be part of Examination):**

1. Chemical Structure drawing using software: Chem Draw or ACD / Chem Sketch
2. Construction of photo voltaic cell.
3. Synthesis of Biodiesel.
4. Electrolysis of water

**Text Books**


1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. A Text Book of Engineering Chemistry, Sunita Rattan, Kataria Publication(Reprint 2024)
3. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd.,12th Edition, 2011.
4. A text book of Engineering Chemistry- R.V. Gadag and A Nityananda Shetty.
5. Engineering Chemistry, (6th Edition), Mahesh B and Roopashree B. Sunstar publisher, Bengaluru
6. O.G. Palanna, "Engineering Chemistry", Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint (2015- Edition).
7. R.V. Gadag & A. Nityananda Shetty., "Engineering Chemistry", I K International Publishing House Private Ltd. New Delhi (2015- Edition).


**Reference Books**


1. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSC Publishing, 2005.
2. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition,1996.
3. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.

4. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
5. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley– Blackwell, 2012
6. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The National Academies Press. doi: 10.17226/4782.
7. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers,4th Edition,2021
8. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition,2002.

**NPTEL Web Links**

1. https://youtube.com/playlist?list=PLjyncIQ8ELldNpupdiO79WFp7hJhHYGGK&si=wQNLUX7SX_uWObuN
2. https://youtube.com/playlist?list=PLgMDNELGJ1CbufZjqWa8uoSlQWKqVwPN7&si=fV5RZGehujbW9_t0
3. https://ndl.iitkgp.ac.in/
4. https://www.youtube.com/watch?v=faESCxAWR9k
5. https://nptel.ac.in/courses/104103019
6. https://youtu.be/iszbux-yXdM?si=-xMfoQGxlbQgx8eT
7. Chemguide.co.uk

## JAS 103 PRACTICAL LINEAR ALGEBRA

CO1: Understand and apply the fundamental concepts of linear algebra including system of linear equations.
CO2: Compute and analyze the row space, column space and null space of matrices and understand their relevance in various engineering problems.
CO3: Utilize knowledge of linear transformations, matrix representations and solve practical problems.
CO4: Compute eigen values and eigenvectors and apply these concepts in fields such as computer science and data analysis.
CO5: Understand and apply the concept of orthogonality and utilize inner product space and normed space to solve problems involving vector spaces and subspaces

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit – I** | **Introduction to linear systems:** Complex matrices, Hermitian, Skew-Hermitian, Unitary matrices, Elementary transformation, Inverse of a matrix, Echelon forms, Rank of matrix, Solution of linear systems.<br>Lab Tutorials:<br>• Plotting and visualizing data<br>• Solving linear systems using "rref" and "linsolve"<br>• Implementing row reduction and echelon form | **08 Hrs** |
| **Unit – II** | **Vector Spaces:** Introduction to vector spaces, Subspaces, Linear independence, Spanning sets, Basis and dimension, Row space, column space and null space<br>• Analysing solution sets<br>• Basis and dimension calculation<br>• Visualizing vector spaces | **08 Hrs** |

| | | |
|---|---|---|
| **Unit – III** | Linear Transformation and Matrix Representation: Linear transformation, Matrix representation of a linear transformation, Rank Nullity theorem, Composition and inverse of linear transformation, Coordinate vectors, Change of basis.<br>**Lab Tutorials:** Implementing and visualizing linear transformation | **08 Hrs** |
| **Unit – IV** | **Eigenvalues and Eigenvectors:** Characteristic equation, Cayley-Hamilton theorem, Eigenvalues and eigenvectors, Applications of eigenvalues and eigenvectors, Diagonalization, Similarity of matrices.<br>**Lab Tutorials:**<br>Computing eigenvalues and eigenvectors<br>Diagonalization and its applications | **08 Hrs** |
| **Unit – V** | **Inner Product Spaces:** Quadratic form, Reduction and classification of quadratic form, Inner product space and Normed space, Orthogonality, Orthogonal projections, Gram- Schmidt process, Singular value decomposition.<br>• Working with inner products and norms<br>• Orthogonal projections and Gram-Schmidt process<br>• Exploring Singular Value Decomposition | **08 Hrs** |

**Text Books**


1. Linear Algebra by S. K. Jain, A. Gunawardena, and P. B. Bhattacharya, New Age International Publishers.
2. Linear Algebra by E. Balagurusamy, Tata McGraw-Hill Education.
3. Schaum's Outline of Linear Algebra by Frank Ayres Jr. and Robert M. Stern.


**Reference Books**


1. Linear Algebra and its Applications by David C. Lay, Steven R. Lay, and Judi J. McDonald (Indian Edition), Pearson Education India.
2. Linear Algebra: A Geometric Approach by S. Kumaresan, Prentice-Hall of India.
3. MATLAB Programming for Engineers by Stephen J. Chapman (Adapted by B. Sarvesh), Cengage Learning India.
4. Let Us C by Yashavant Kanetkar by BPB Publications.
5. Numerical Linear Algebra by Lloyd N. Trefethen and David Bau, SIAM (Society for Industrial and Applied Mathematics).
6. Linear Algebra with Applications in R by Peter H. Hilton and David A. W. K.Edwards, Wiley Publication.
7. Hands-On Mathematica: The Practical Guide to Mathematica by Gordon W.Fuller, Springer

# JCS 101 COMPUTATIONAL THINKING FOR PROBLEM SOLVING

## Course Outcome:

CO1: Understand and explain the components of computer systems and the foundational concepts of computational thinking, including problem decomposition andalgorithmic efficiency.
CO2: Apply various operators and construct complex conditional statements in C to solve computational problems effectively.
CO3: Implement and utilize loops and arrays in C to manage and manipulate data efficiently, including nested loops and multidimensional arrays.
CO4: Develop programs using built-in and user-defined functions and apply basic searching and sorting algorithms to organize data.
CO5: Utilize pointers, dynamic memory allocation, file handling, macros, and command- line arguments to enhance the functionality and efficiency of C programs

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Components of Computer Systems:** Memory, Processor, I/O Devices, Storage, concepts of system software: Operating System, Assembler, Compiler, Interpreter, Loader and Linker<br>**Foundation of computational Thinking**: Definition and importance of computational thinking, Real-world applications of computational thinking, Problem definition, Problem decomposition, Algorithmic Thinking Algorithm, divide and conquer approach, Flowchart, concept of Pseudo Code with Examples, From Algorithms to Programs, Source Code, algorithm efficiency (time and space complexity).<br>**Programming Basics:** Structure of C Program, Writing and Executing the First C-Program, Syntax and Logical Errors in Compilation, Object code and Executable Code , Standard I/O in C, Fundamental Data types, identifiers, Variables and Memory Locations, Storage Classes | **8 Hrs** |
| **Unit II** | **Operators and Solving Expressions:** Operators and Expression Using Numeric and Relational Operators, Mixed Operands, implicit and explicit type Conversion, Logical Operators, Bit Operations, Assignment Operator, Operator precedence and Associativity.<br>**Conditional Statements:** if, else and else if statements, switch statements, nested if-else, and their replacement by Switch statements, and various programs based on conditional statements | **8 Hrs** |
| **Unit III** | **Loops:** Need of loops, while, do While and for Loops, nested loops, Multiple Loop Variables, Use of Break, Continue Statements and goto statements.<br>**Concept of Arrays:** Notations for 1-D, 2-D and n-D arrays and their representation, Manipulating Array Elements, Character Arrays and Strings, String and String functions. Functions: Introduction to Function, Types of Functions, Functions using Array, Passing Parameters to Functions, Call by Value, Call by Reference, concept of Recursion techniques | **8 Hrs** |
| **Unit IV** | **Basic of Searching and Sorting Algorithms:** Searching techniques: linear search, binary search, hashing, Sorting Algorithms: Bubble Sort, Insertion and Selection Sort.<br>**Structure and Union:** Introduction to Structure, union, structure vs union, Enumerated Data types, Array of Structures, and various programs based on loops, arrays, and structures**.** | **6 Hrs** |

| | | |
|---|---|---|
| **Unit V** | **Pointers:** Introduction, Declaration, Introduction to Dynamic Memory Allocation (Malloc, Calloc, Realloc, Free),Use of Pointers in Self-Referential Structures, Basics of Linked List and node creation<br>**File Handling and Macros:** File I/O Functions, Standard C Preprocessors, programs based on file handling, Defining and Calling Macros, functions vs macros, types of macros | **6 Hrs** |

**COMPUTATIONAL THINKING FOR PROBLEM SOLVING PRACTICALS**

**Preamble**: The objective of the course is to introduce the basic ideas and concepts of programmingusing C as a basic language. This will help students to design and implement cross- platform programming concepts as well

**List of experiments**

1. WAP to calculate the area and circumference of a circle.
2. WAP that calculates the Simple Interest and Compound Interest. The Principal,Amount, Rate of Interest and Time are entered through the keyboard.
3. WAP that accepts the temperature in Centigrade and converts into Fahrenheit usingthe formula C/5=(F-32)/9.
4. WAP that swaps values of two variables using a third variable.
5. WAP that checks whether the two numbers entered by the user are equal or not.
6. WAP to find the greatest of three numbers.
7. WAP that tells whether a given year is a leap year or not.
8. WAP that accepts marks of five subjects and finds percentage and prints gradesaccording to the following criteria:

   Between 90-100% ----- Print 'A'
   80-90%---------- Print 'B'
   60-80%---------- Print 'C'
   Below 60% ----------Print 'D'
9. WAP that takes two operands and one operator from the user, perform the operation, and prints the result by using Switch statement.
10. WAP to find the factorial of a given number using normal and recursivefunctions.
11. WAP to print sum of even and odd numbers from 1 to N numbers.
12. WAP to print the Fibonacci series using normal and recursive functions.
13. WAP to check whether the entered number is prime or not.
14. WAP to print Armstrong numbers from 1 to 100.
15. WAP to convert binary number into decimal number and vice versa.
16. WAP that inputs two arrays and saves sum of corresponding elements of these arrays in a third array and prints them.
17. WAP to search an element in a array using Linear Search.

18. WAP to sort the elements of the array in ascending order using Bubble Sorttechnique.
19. WAP to add and multiply two matrices of order mxn.
20. WAP to transpose a matrix of order mxn.
21. WAP that finds the sum of diagonal elements of a mxn matrix.
22. WAP to implement strlen (), strcat (), strcpy (), strcmp () using the concept ofFunctions and pointers.
23. WAP to swap two elements using the concept of pointers.
24. WAP C Program to Calculate Difference between Two Time Periods.
25. C Program to Store Information of Students dynamically Using Structure
26. WAP to compare the contents of two files and determine whether they are sameor not.
27. WAP to check whether a given word exists in a file or not. If yes, then find thenumber of times it occurs.
28. WAP to square of a given number using macro.

**Text books**

1. Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill.
**2.** The C programming by KRernighan Brain W. and Ritchie Dennis M., Pearson Education.

**Reference Books**

1. Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison- Wesley, 2006.
2. Let Us C By Yashwant P. Kanetkar.
3, Expert C Programming by Peter van der Linden,Pearson.

**Web References**

1. https://archive.nptel.ac.in/courses/106/105/106105171/
2. https://archive.nptel.ac.in/courses/106/104/106104128/
3. https://www.mooc-list.com/tags/c-programming
4. https://www.coursera.org/courses?query=c%20programming

# JEE 102 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

**Course Outcomes**

**CO1:** Understand the fundamental concepts of Electric Power Generation and Distribution.

**CO2:** Apply the concepts of network theorems in solving DC circuits and introduce the AC circuits.

**CO3:** Outline the concept of PN Junction diode and Power supply.

**CO4:** Discuss the concepts of BJT and introduce the power amplifiers.

**CO5:** Study and analyse operational amplifier and its applications.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Electrical Power Generation:** Sources of energy – Types of renewable and non-renewable Energy sources.<br>**Wind Power Generation:** Principle of conversion, advantages and disadvantages of wind power plants.<br>**Solar Power Generation:** Principle of conversion, Different types of PV cells, I-V and P-V characteristics only, Advantages and disadvantages of solar plants.<br>**Power distribution:** Introduction to power transmission and distribution. Power rating of household appliances like PCs, laptop, printer.<br>**Batteries:** Types, performance of EV batteries like lithium-ion, lead-acid, and nickel-metal hydride | 8 Hrs |
| Unit – II | **DC Circuits:**Electric Circuit Components: Resistor, Inductor, Capacitor. Ohm's Law, Kirchhoff's Laws, Energy sources, Nodal and Mesh analysis, Superposition Theorem, Thevenin Theorem and Norton's Theorem with independent sources only.<br>**AC circuits:** AC Circuits and Parameters, Waveforms, Average value, RMS Value, power calculations.Steady state analysis of RLC circuits (Series – Parallel combination). | 10 Hrs |
| Unit – III | **P-N junction diode and Power supply:** P-N junction diode, symbol, V-I Characteristics, Diode applications: Half wave, Full wave rectifiers, filter circuits (capacitor), Voltage regulator (IC) Power supply | 06 Hrs |
| Unit – IV | **BJT and amplifiers:** Principle of Operation, Common Emitter, Common Base and Common Collector configurations and characteristics, Concept of biasing (voltage divider biasing), Amplifying action of common Emitter amplifier. BJT as a switch. Introduction to power amplifiers (Class A, Class AB, Class B and Class C). | 10 Hrs |
| Unit – V | **Operational amplifiers:** OP-AMP basics, PIN Diagram (IC 741), Characteristics of Idealand practical OP-AMP, Inverting Amplifier, Non-Inverting Amplifier,Unity follower, Adder, Subtractor, Integrator, Differentiator, Comparator | 06 Hrs |

**Text Books**


1. Basic Electrical and Electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education, 2nd Edition, 2020.
2. Electronic Devices and Circuit Theory, Robert L. Boylestad, Pearson Education India, 11th Edition, 2021.

**Reference Books**


1. M.V.R. Koteswara Rao, "Energy Resources: Conventional & Non-Conventional" BSP Publications,2nd Edition, 2019
2. Basic Electrical and Electronics Engineering-S.K. Bhattacharya, Pearson India, 2nd Edition, 2017.
3. Integrated Electronics, Millman and Halkias, Mc.Graw Hill Publications, 2/E, 2017
4. Electronics Fundamentals and Applications, D Chattopadhyay and P.C. Rakshit, NewAge International Publications, Sixteenth Edition, 2020.


**Web References**

1. NPTEL Course link: https://nptel.ac.in/courses/122106025
2. NPTEL Course link: https://archive.nptel.ac.in/courses/108/105/108105112/

## JME 101 ELEMENTS OF MECHANICAL ENGINEERING

**Course Outcomes**

CO1: Identify various energy resources, different types of turbines and energy conversion systems.
CO2: Illustrate the construction details and working of internal combustion engines and refrigerator
CO3: Compare various joining and machining process and choose appropriate machine tool for engineering application.
CO4: Identify various Advanced Manufacturing Processes and Additive Manufacturing for various real-life applications
CO5:Illustrate the working principle of Mechatronics, Robotics, Automation and concept of Industry 4.0 with their advantages, scope and Industrial applications

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Energy:**Introduction to Mechanical Systems and Thermal Engineering. Sources and classification of energy sources, Non-renewable and Renewable Energy Resources. Brief Description and Utilization of Solar Energy, Wind Energy, Tidal Energy and Nuclear Energy.<br>**Hydraulic Turbines:** Classification of hydraulic turbines, working of Pelton, Francis and comparison between impulse and reaction turbines | 8 Hrs |
| Unit – II | **Internal Combustion Engines:** Construction and working of IC engines, 2 stroke Petrol and 4 stroke Petrol and Diesel engine. Simple problems on Power and Efficiency calculations. Comparison between IC Engines and Electric Vehicles.<br>**Refrigeration:** Refrigeration effect, working principle of Vapour Compression refrigeration systems, ton of refrigeration, COP, refrigerants and their properties | 06 Hrs |

| | | |
|---|---|---|
| **Unit – III** | **Introduction to Manufacturing Processes & its Classifications**<br>**Joining Processes:** Welding- Principle of welding, Types of welding -Arc welding, Gas welding, Working of Arc and Gas Welding, Brief description of Soldering and Brazing<br>**Machining Processes:**Construction and working of Centre Lathe and its classification. Lathe operations Turning, Facing, Knurling, Thread cutting, Taper Turning. Construction and working of drilling machine and its classification. Working of Bench drilling machine its operations | **06 Hrs** |
| **Unit – IV** | **Advanced Manufacturing** Processes: Introduction to Advanced Manufacturing Processes and its classifications. Principle and working of Electron Beam Machining and Laser Beam Machining**.**<br>**Additive Manufacturing:** History and Advantages of Additive Manufacturing. Types of Additive Manufacturing Technologies. Basic principles & working of Stereolithography and Fused Deposition Modeling (3D Printers). Applications of Additive Manufacturing | **10 Hrs** |
| **Unit – V** | **Introduction to Mechatronics:** Systems of Mechatronics, Scope, Advantages and disadvantages of Mechatronics, Introduction to autotronics, bionics, and avionics and their applications**.**<br>**Automation and Robotics:** Automation: Definition, types –Fixed, Programmable & Flexible automation, NC/ CNC machines: Basic elements with simple block diagrams, advantages and disadvantages Robotics - Definition of Robot, applications, advantages and disadvantages of robots.<br>**Introduction to Industry 4.0:** General framework, The Basic Characteristics of Industry 4.0, Pillars of the Industry 4.0 Framework and Application areas | **08 Hrs** |

**Text Books**


1. Basic Mechanical Engineering, G Shanmugam, S Ravindran, McGraw Hill
2. Kalpakjian and Schmid, Manufacturing processes for engineering materials (5th Edition)- Pearson India, 2014.
3. Manufacturing Technology by P.N. Rao., MCGRAW HILL INDIA


**Reference Books**


1. V K Jain: Advanced Machining Processes, Allied Publishers, Mumbai, 2002.
2. Understanding Additive Manufacturing, by- Andreas Gebhardt, Hanser.
5. Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing, by- Ian Gibson , DSavid W. Rosen , Brent Stucker, Springer.


**Web/Digital resources:** 1. LearnMech 2. ASME 3. iMechanica 4. Coursera - shorturl.at/kGIOR 5. edX 6. Swayam.ac.in 7. Nptel.ac.in - shorturl.at/kACLW

## JHS 101 ENGLISH FOR TECHNICAL COMMUNICATION

**Course Outcome:**

**CO1:** Memorize and repeat the recordings to improve their listening and speaking skills.

**CO2:** Identify proper words to summarize the recordings and write grammatically andlogically correct statements.

**CO3:** Use the techniques of reading and write paragraphs in an organized manner.

**CO4:** Implement their understanding of the concepts of communication and use their communicative competencies in different social and cultural context.

**CO5:** Distinguish themselves by strengthening their discourse competencies andpresentation skills.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Text :** Emerging Technologies-Trends & Impact<br>Listening: Listening as a process, difference between listening & hearing, Types oflistening, Three As of Listening. Qualities of a good listener<br>**Speaking:** Phonetics: English Sounds: Vowels: Monophthong & diphthong, Consonants: classification based on the place and manner of articulation<br>Stress/Accent: Primary and SecondaryIntonation: Rising and Falling<br>**Lab Practice: Experiment 1:** Listening to the recordings on the aforementioned topics & record their videos and answer the questions given based on the recordings.<br>**Experiment 2:** Listening to an expert talk on the topic by an expert and record the same | 6 Hrs |
| Unit – II | **Text:** Engineering Ethics<br>Vocabulary: Synonyms, Antonyms, Homonyms, Homophones, Affixation (Prefix &Suffix)<br>**Word Formation:** Rules of Word Formation: Derivations, Polysemy, Compounding,Conversion, reduplication, blending & clipping<br>**Writing:** Linking statements: Parts of Speech (Noun, Pronoun, Verb, Adverb, Adjective, Prepositions, conjunctions, Interjections & Articles) Phrases, clauses, and Tenses.<br>**Removing ambiguities from the sentences:** Use of Dangling Participle, Split Infinitive,Squinting Construction<br>**Lab Practice**:Experiment: Listening to the articles on the aforementioned topics and write & speak 20-25 grammatically correct and cohesive statements. | 06 Hrs |
| Unit – III | **Text**: Environmental Consciousness (SDG 15)<br>**Reading:** Techniques of Reading: Intensive-extensive, Silent-loud, Fast **Reading:** Skimming & Scanning, Slow Reading: Churning & Assimilation.<br>**Writing:** Paragraph Development Methods: Inductive, Deductive, Linear, spatial, Chronological, exposition and Interrupted ways.<br>**Lab Practice:** Experiment: Read the aforementioned topics using the techniques of reading & write cohesive paragraph**.** | 06 Hrs |

| | | |
|---|---|---|
| **Unit – IV** | **Text:** Environmental Consciousness (CSR)<br>**Communication Concepts:** Meaning, Process, Levels: Intrapersonal, interpersonal & Organizational, Communication Barriers: Psychological barriers, Physical barriers, cultural barriers, language barriers, attitudinal barriers, gender barriers, physiological barriers.<br>Communicative Competencies: Socio cultural Competencies.<br>**Lab Practice: Experiments:**<br>1. Group discussion on Corporate Social responsibilities.<br>**2.** Debate for handling Corporate Social responsibilities | **6 Hrs** |
| **Unit – V** | Text: Case Studies-<br>1. Re branding Godiva<br>2. Barrack Obama's re branding plan: Attack, Orate,Repeat.<br>3. Communicative Competencies: Discourse competencies.<br>**Perceptive Communication:** Working on Communication Styles by understanding purpose, Analyzing audience & locale, Collecting material, Organizing and sequencing the data, Making Visuals.<br>**Factors affecting the presentation:** Kinesics, Paralinguistic aspects, Proxemics &Chronemics<br>**Lab practice:** Experiments:<br>1. Role Play based on Case studies from the business world.<br>2. Presentation | **06 Hrs** |

**Reference Books:**


1. Technical Communication: Principles and Practice, Third Edition, Ed. By Meenakshi Raman & Sangeeta Sharma, Oxford University Press, 2018, New Delhi.
2. Mindscapes-English for Technologists and Engineers, Orient Black swan, 2012.
3. Personality Development & Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
4. Personality: Theory and Research" by Daniel Cervone and Lawrence A. Pervin,Wiley, 2019
5. A Course in Phonetics and Spoken English by J.Sethi & P. V. Dhamija, Prentice Hall,India, 1999

# JHS 104 SPORTS AND YOGA

**Course Outcomes**

**CO1:** Introduce students to the benefits and fundamental concepts of sports and yoga

**CO2:** Promote physical fitness, mental well-being and holistic health

**CO3:** Develop basic skills and techniques in selected sports and yoga practices.

**CO4:** Promote a healthy lifestyle and stress management techniques

**CO5:** Foster an understanding of the importance of physical activity and its impact onoverall health

CO6: To instill discipline, teamwork, and ethical values through sports and yoga.

| UNITS | Syllabus Part A: Sports | No of Hours |
|---|---|---|
| Unit – I | **UNIT-I – Introduction:**<br>Introduction and Definition of Sports<br>Importance of sports in education<br>Physical and mental benefits of sports | |
| Unit – II | **Basic Rules and Techniques of Selected Sports:**<br>Popular Indoor and Outdoor sports (Choose 2-3) (e.g., Badminton, Table Tennis Basketball, Volleyball)<br>Rules of the game, Basic skills, and techniques<br>Practice and demonstration | |
| | **Syllabus Part B: Yoga** | |
| Unit – I | **Introduction:**<br>Introduction, Definition, History and philosophy of yoga<br>Aims and Objectives of Yoga<br>Need, Benefits and Importance of Yoga in Physical Education and Sports | |
| Unit – II | **Foundation of Yoga**<br>Introduction of Patanjali Yoga, The Astanga Yoga: Yama, Niyama, Asana,Pranayama, Pratyahara, Dharana, Meditation (Dhyana) and Samadhi.<br>Yoga in the Bhagavadgita - Karma Yoga, Raja Yoga, Jnana Yoga and Bhakti Yoga | **6 Hrs** |
| Unit – III | **Asanas, Kriyas, Bandhas and Mudras.**<br>Effect of Asanas and Pranayama on various system of the body<br>Classification of asanas with special reference to physical education and sports<br>Standing Asanas, Sitting Asanas & Surya Namaskar: 12 count<br>Types of Bandhas and mudras, Types of Kriy | **06 Hrs** |

# JAS 204 PROBABILITY AND STATISTICS

## Course Outcome:

**CO1:** Understand and apply basic probability concepts and solve Real-world problems using probability and random variables.

**CO2:** Understand and utilize different types of probability distributions to model and solve practical problems in various fields, such as engineering, economics, and natural sciences.

**CO3:** Apply curve fitting techniques to data sets, and assess the goodness of fit and perform regression analysis to model relationships between variables and make predictions based on data.

**CO4:** Develop the ability to formulate and test hypotheses using various statisticalmethods.

**CO5:** Apply statistical quality control techniques and perform time series analysis to monitor, control, and improve process

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Fundamentals of Probability and random variable:** Introduction to probability, Sample space, Events, Probability axioms, Mutually exclusive events, Addition & Multiplication rule for probabilities, Conditional Probability, Independent events, Baye's theorem, Random variables: Discrete random variables, Probability mass functions (PMF), Continuous random variables, Probability density functions (PDF), Expectation and variance of random variable | 9 Hrs |
| Unit – II | **Probability Distributions:** Cumulative distribution function (CDF), Joint distributions, Marginal distributions, Conditional distributions, Moments of random variables, Skewness and Kurtosis, Binomial distribution, Poisson distribution, Normal distribution and their applications. | 9 Hrs |
| Unit – III | **Regression Analysis:** Curve fitting, Method of least squares, Fitting of straight lines, Fitting of second degree parabola, Exponential curves, Geometric curves, Correlation, Rank correlation, linear regression | 06 Hrs |
| Unit – IV | **Statistical Inference:** Introduction of sampling theory, Hypothesis, Null hypothesis, Alternative hypothesis, Type I and Type II errors, Level of significance, Confidence limits, Hypothesis testing: Z-tests (one-sample, two-sample), t-tests (one-sample, two- sample), Chi-squared tests (goodness of fit, independence), F-test. | 8 Hrs |
| Unit – V | **Statistical Quality Control and Time Series Analysis:** Statistical Quality Control (SQC): Control charts for variables (X and R Charts), Control charts for attributes (p, np and C charts), ANOVA (Analysis of Variance: one way), Time series analysis | 06 Hrs |

**Text Books**


1. Fundamentals of Mathematical Statistics by S. C. Gupta and V. K. Kapoor, SultanChand & Sons.
6. Mathematical Statistics by J. N. Kapur, S. Chand Publishing.
2. Applied Statistics and Probability for Engineers" by Douglas C. Montgomery and George C. Runger.


**Reference Books**


1. Probability and Statistics for Engineering and the Sciences by Jay L. Devore,Cengage Learning.
2. Introduction to the theory of statistics by Alexander M. Mood, Franklin A.Graybill, and Duane C. Boes, McGraw-Hill Education.
3. Probability, Statistics and Random Processes by T. Veerarajan, Tata McGraw-HillEducation.
7. Probability and Statistics for Engineers by J. Ravichandran, Wiley India.
3. Mathematical Statistics with Applications by Dennis D. Wackerly, William,Mendenhall, and Richard L. Scheaffer, Cengage Learning.

# JHS 202 ENTREPRENEURSHIP & BUSINESS BASICS

**Course Outcome:**

**CO1:** Describe distinct entrepreneurial traits**.**

**CO2:** Recognise the process and nature of entrepreneurship.

**CO3:** Identify the different ways in which entrepreneurs manifest in start-ups.

**CO4:** Comprehend the entrepreneurial process for initiating new venture creation.

**CO5:** Design strategies for the successful implementation of innovative ideas of newventures**.**

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit – I** | Concept and Definitions Entrepreneurship, Traits and Qualities of Entrepreneurs, Entrepreneurship process; Theories of entrepreneurship; Factors affecting the emergence of entrepreneurship; Role of an entrepreneur in economic growth as an innovator | **6 Hrs** |
| **Unit – II** | Classification and Types of Entrepreneurs: Social Entrepreneurship; Corporate Entrepreneurs, Family Business: Concept, structure, and kinds of family firms; Culture and evolution of family firm; Managing Business, Industry Types:-Primary- Secondary- Tertiary. | **6 Hrs** |
| **Unit – III** | Resources mobilization, types of resources, Process of resource mobilization, Arrangement of funds, Traditional sources of financing, Venture capital, Angel investors, Business Incubators | **6 Hrs** |
| **Unit – IV** | Difference between Private Company and Public Company, Role of Sole Trading company and Partnership Firm, Distinguish between Partnership Co-operative society and Joint Stock Companies. Benefits of E- Business. Limitations of E-Business:- Meaning of online transaction and Types of On-line payment mechanism | **6Hrs** |

**Text Book**


1. Barringer, B.R., & Ireland, R.D. (2015). *Entrepreneurship*. Pearson.
2. Gersick, K. E., Davis, J. A., Hampton, M. M. & Lansberg, I. (1997). Generation to generation:
3. Life cycles of the family business. Boston, United States: Harvard Business School Press.


**Reference Books**


1. Hisrich, R.D., Manimala, M.J., Peters, M.P., & Shepherd, D.A. (2013). Entrepreneurship. Delhi, India: Tata McGraw Hill.
2. Kuratko D.F., & Rao, T. V. (2012). Entrepreneurship: A South-Asian Perspective. The 4- hour work week by Timothy Ferris.

## JCS 202 DATA STRUCTURES

**Course Outcome:**

**CO1:** Able to prove correctness of algorithm with inductive proofs and analyzing worst-case execution times with asymptotic analysis.

**CO2:** Implement linear and non-linear data structures.

**CO3:** Able to solve real world problems by selecting appropriate data structures.

**CO4:** Analyze and implement various sorting and searching algorithms.

**CO5:** Implementation of Trees and Graphs and perform various operations on thesedata structures.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Introduction:** Basic Terminology, Elementary Data types and Organization, running time of program, Time and Space Complexity, Asymptotic notations: Big Oh, Big Theta and Big Omega, Time-Space trade-off, Abstract Data Types (ADT).<br>**Concepts of Arrays**: Single and Multidimensional Arrays, Row Major Order, and Column Major Order, Accessing of elements of array and derivation of Index Formulae, Insertion and deletion operations, Sparse Matrices and their representations | **8 Hrs** |
| **Unit II** | **Stacks and Queues:** Introduction to data structures like Stacks and Queues. Operations on Stacks and Queues, Array representation of Stacks, Applications of Stacks: recursion, Polish expression and conversion of infix expression to prefix and Postfix expression, Operations of Queues, Representations of Queues, Priority queues<br>**Linked Lists:** Singly linked lists, Representation of linked list, Operations of Linked list such as Traversing, Insertion and Deletion, Searching, Applications of Linked List. Concepts of Circular linked list and doubly linked list and their Applications. Stacks and Queues as linked list. | **8 Hrs** |
| **Unit III** | **Searching and sorting Techniques:** Concept of Searching, Sequential search, Index Sequential Search, Binary Search. Concept of Hashing & Collision resolution Techniques used in Hashing. Sorting: Quick Sort, Merge Sort, and Heap Sort | **8 Hrs** |
| **Unit IV** | **Trees:** Definition and traversals: pre-order, post order, in order. Common types and properties of binary trees, Operation of Insertions , Deletion, Searching & Modification of data in Binary Search, Huffman coding using binary trees | **6 Hrs** |
| **Unit V** | **Graphs**: Basic Definition and Terminology, Representation of Graphs: Adjacency Matrices and List Representations of Graphs, Graph Traversal: Breadth First Search (BFS), Depth First Search (DFS), Minimum Spanning Tree: Prim's, Kruskal's | **6 Hrs** |
| **DATA STRUCTURES PRACTICALS** | | |
| **Preamble**: The objective of the course is to introduce the basic ideas and concepts of Data Structure. This will help students to design and implement real world problem solutions using different Data Structure approaches and algorithm concepts | | |

**List of experiments**

1. Write a program to implement linear search, Binary search.
2. Write a program to implement, Insertion Sort and Selection Sort.
3. Write a program to implement quick Sort with a given list of integers inascending orders.
4. Write a program to implement Heap Sort with a given list of integers inascending orders.
5. Write a program to implement Merge Sort with a given list of integers inascending orders
6. Write a program to implement stack using Array.
7. Write a program to implement stack using Linked Lists.
8. Write a program to implement Queue and circular queue using Array
9. Write a program to implement Queue and circular queue LinkedLists
10. Write a program to implement a single link list and its operations.
11. Write a program to implement double link list and circular and its operations
12. Write a program to implement Binary Tree and its Traversal.
13. Write a Program to implement Breadth First Search and Depth First Search.
14. Write a program to implement Minimum cost Spanning tree

**Text Books**


1. Lipschutz, "Data Structures" Schaum's Outline Series, Tata McGraw-hill Education (India) Pvt. Ltd.
2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd Delhi India.


**Reference Books:**


1. Thareja, "Data Structure Using C" Oxford Higher Education.
2. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, "Data Structures Using C and C++", PHI Learning Private Limited, Delhi India.
3. Michael T. Goodrich, Roberto Tamassia, David M. Mount "Data Structures and Algorithms in C++",Wiley India. P. S. Deshpandey, "C and Data structure", Wiley Dreamtech Publication.
4. Cracking the Coding Interview",Gayle Laakmann McDowell,Career Cup.


**Web References**

1. https://nptel.ac.in/courses/106102064
2. https://onlinecourses.swayam2.ac.in/cec19_cs04/preview
3. https://www.coursera.org/learn/data-structures
4. https://www.my-mooc.com/en/categorie/algorithms-and-data-structures

# JCS 203 OBJECT ORIENTED PROGRAMMING USING C++

**Course Outcome:**

**CO1:** Able to understand and design the solution to a problem using object-oriented Programming concepts.

**CO2:** Able to reuse the code with extensible Class types, User-defined operators and function Overloading.

**CO3:** Achieve code reusability and extensibility by means of Inheritance and Polymorphism.

**CO4:** Implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems.

**CO5:** Able to understand and design the solution for the exception being raised.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Introduction to Object Oriented Programming**: What is an object, Classes, methods and messages, abstraction and encapsulation, inheritance, abstract classes and Polymorphism. C++ overview. First C++ Program, Basic C++ syntax, Object Oriented Programming. | **8 Hrs** |
| **Unit II** | **Operators and Functions in C++:** Tokens, Keywords, Identifiers and constants, Operators in C++, Scope resolution operator, Expressions and their types, Special assignment expressions, Function prototyping, Call by reference, Return by reference, Inline functions, Default arguments, Function overloading | **8 Hrs** |
| **Unit III** | **Constructor and Inheritance :** Introduction to constructor**,**Derived class Constructors, copy constructor,Types of Inheritance, Defining Derived classes, Single Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance | **8 Hrs** |
| **Unit IV** | **Virtual Functions and Polymorphism**: Static and Dynamic binding, virtual functions, Dynamic binding through virtual functions, Overloading operator,Virtual function call mechanism, Pure virtual functions, Abstract classes, Virtual destructors | **8 Hrs** |
| **Unit V** | **Error and Exception Handling :** Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Rethrowing an exception, Catching all exceptions. Introduction to template and Generic class functions | **8 Hrs** |

**OBJECT ORIENTED PROGRAMMING USING C++ PRACTICALS**

**Preamble**: The objective of the course is to introduce the basic ideas and concepts of Object Oriented Programming using C++. This will help students to design and implement real world problem solutions using classes and different object oriented programming approaches

**List of experiments**

1. Write a C++ program to generate the first n terms of the sequence.
2. Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
3. Write a C++ program to find both the largest and smallest number in a list of integers.
4. Write a Program to illustrate New and Delete Keywords for dynamic memory allocation
5. Write a program Illustrating Class Declarations, Definition, and Accessing Class Member

6. Program to illustrate default constructor, parameterized constructor and copy constructors.
7. Write a Program to Demonstrate the i) Operator Overloading ii) Function Overloading.
8. Write a Program to Demonstrate Friend Function and Friend Class.
9. Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.
10. Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are: a) Reading a matrix. b) Addition of matrices. c) Printing a matrix. d) Subtraction of matrices. e) Multiplication of matrices.
11. Write a Program to illustrate New and Delete Keywords for dynamic memory allocation
12. Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
13. Write a Program to illustrate default constructor, parameterized constructor and copy constructors.
14. Write C++ programs that illustrate how the following forms of inheritance are supported: a) Single inheritance b) Multiple inheritance c) Multi level inheritance d) Hierarchical inheritance.

**Text Books**


1. C++: THE COMPLETE REFERENCE ,by Herbert Schildt.
2. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd , Fourth Edition 2010


**Reference Books**


1. Object Oriented Programming With C++ 1/Ed By Thareja
2. Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.
3. Object Oriented Programming in C++, 4e,Robert Lafore
4. C++ Programming: An Object-Oriented Approach (Paperback, Behrouz A. Forouzan,Richard F. Gilberg


**Web Resources**

1. https://archive.nptel.ac.in/courses/106/105/106105151/
2. https://nptel.ac.in/courses/106105151
3. https://www.coursera.org/learn/cs-fundamentals

# JEC 201 DIGITAL LOGIC DESIGN

**Course Outcome:**

**CO1:** Discuss the concepts of number systems and binary arithmetic.
**CO2:** To understand the representation of Boolean functions.
**CO3:** To discuss the minimization of Boolean functions using K-Map.
**CO4:** Ability to understand, apply and design various combinational circuits.
**CO5:** Analysis and design of various sequential circuits like registers and counters

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Number System:** Digital Systems, Binary number system,Fixed point and floating-pointnumber representation, IEEE Floating point Number Representation, Number base conversion, Octal and Hexadecimal numbers.Signed magnitude numbers, Complements | 8 Hrs |
| Unit – II | **Binary arithmetic:** Addition, Subtraction, Multiplication and Division, Floating Point arithmetic,BCD codes,Grey codes, Excess-3 codes, ASCII codes.. | 6 Hrs |
| Unit – III | **Boolean functions and their representation:** Basic Theorems and Properties of Boolean algebra, Boolean functions, Canonical and standard forms, Min Terms and Max Terms, Digital Logic gates.<br>**Gate Level Minimization:** The Karnaugh map methodup to fivevariables, SOP and POS simplifications, don't care condition, NAND and NOR implementation | 10 Hrs |
| Unit – IV | **Combinational Circuits**: Introduction to combinational circuits, Half adder, Full adder, Decoder, Encoder, Multiplexer, Demultiplexer. | 6Hrs |
| Unit – V | **Sequential Circuits:** Introduction to sequential circuits, Flip-flops: RS, T,D, JK and Master slave Flipflops with their truth tables,shift registers:SISO,SIPO,PISO,PIPO, counters up to 3 bits(up/down). | 6Hrs |

**Text Book**


1. Digital Logic & Computer Design, M Morris Mano, Pearson Education India, 2016.


**Reference Books**


1. Modern Digital Electronics, R.P. Jain, Fifth Edition, 5th Edition, TMH Publications.
2. Digital Electronics, James Bignell and Robert Donovan, Fifth Edition, Cengage Learning,2013
3. Fundamentals of Logic Design, Roth and Kinney, 7th edition, Cengage learning, 2014.
4. Digital Logic Applications and Design, John M Yarbrough, Thomson Learning 2001 ISBN 981- 240-062-1.


**Web Resources:**

1. NPTEL course link: https://nptel.ac.in/courses/117105080
2. https://www.youtube.com/watch?v=s6eELXJuLTc (Floating Point Numbers)
3. https://www.youtube.com/watch?v=03fhijH6e2w(Floating Point Arithmetic )

# JME 202 COMPUTER AIDED ENGINEERING GRAPHICS LAB

**Course Outcome:**

CO1:Classify the systems of projection with respect to the observer, object and referenceplanes.

CO2:Develop and interpret orthographic projections of Points, Lines and Planes and solids using CAD software

CO3: Make use of engineering drawing principle's to convert orthogonal projections (2D) to isometric projections (3D) and Vice-Versa in AutoCAD

## COMPUTER AIDED ENGINEERING GRAPHICS PRATICALS

**Preamble**: The objective of the course is to introduce the basic ideas and concepts Engineering Graphics and Design. This will help students to improve the problem solving and thinking in different directions

**List of experiments**

1. Introduction to Engineering Graphics: Principles of Engineering Graphics and their significance
2. Orthographic Projection: Methods of projection, Principles of Orthographic projection, First angle versus Third angle of projection
3. Projection of Points: Projections of points when they are situated in different quadrants.
4. Projections of Lines: Projections of a line parallel to one of the reference planes and inclined to the other, line inclined to both the reference planes
5. Projections of Planes: Projection of polygonal surface and circular lamina locatedin first quadrant inclined to one or both reference planes
6. Projections of Solids: Classification of solids, Projection of solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method..
7. Isometric Projection: Isometric Projection: Isometric scales, Isometric projections of simple and combination of solids.
8. Introduction to Computer Aided Design Introduction to AutoCAD: Basic commands for 2D drawing: Line, Circle, Polyline, Rectangle, Hatch, Fillet Chamfer, Trim, Extend, and Offset, Dim style, etc. Transformation of Projections: Conversion of Isometric Views to Orthographic Views and Vice-Versa in AutoCAD. Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint

**Reference Books:**


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, Pearson Education
3. Agrawal B. & Agrawal C.M. (2012), Engineering Graphics, TMH Publication
4. Engineering Graphics & Design, A.P. Gautam & Pradeep Jain, Khanna Publishing House
5. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers

# JHS 203 VALUE EDUCATION

**Course Outcome:**

**CO1:** Explain the values fundamentals for ethical living in society

**CO2:** Demonstrate harmony and confidence towards duty in society

**CO3:** Develop the personality to work with universal way of living with associates and nature

**CO4:** Interpret human rights for welfare and integration of citizen of the nation

**CO5:** Correlate beliefs and self management for healthy mindful living

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit – I** | **Values and self-development:** Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation, Standards and principles, Value judgments**.** | **5 Hrs** |
| **Unit – II** | **Importance of cultivation of values:** Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National Unity, Patriotism, Love for nature, Discipline | **5 Hrs** |
| **Unit – III** | **Personality and Behaviour Development:** Personality and Behaviour Development Soul and Scientific attitude, Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness, avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, doing best for saving nature | **8 Hrs** |
| **Unit – IV** | **Human Rights and Rules: Human Rights** – Universal Declaration of Human Rights – Human Rights violations, National Integration – Peace and non-violence – Dr. A P J Kalam's ten points for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building. | **6 Hrs** |
| **Unit – V** | **Character and Competence:** Holy books vs Blind faith, Self-management and good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of Women, all religions and same message, mind your Mind, Self-control, Honesty, Studying effectively | **6Hrs** |

**Reference Books:**


1. Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University Press, New Delhi
2. T. Anchukandam and J. Kuttainimathathil(Ed) Grow Free Live Free, Krisitu Jyoti Publications, Bangalore (1995)

# DETAILED SYLLABUS

**B.Tech. First Year**

**Electronics and Communication Engineering (ECE) /**

**Robotics and Artificial Intelligence (RAI)**

## Effective from the Session

## 2024-2025

## JAS 101/ JAS 201 APPLIED PHYSICS

**Course Outcomes**

**CO1:** Understand the fundamental concepts of wave-particle duality, Heisenberg uncertainty principle, Schrödinger's wave equation, and their applications in quantum mechanics.

**CO2:** Derive and apply Maxwell's equations to analyse electromagnetic wave propagation in different medium, displacement current, poynting vector, and energy density in various media.

**CO3:** Describe and analyse crystal structures, lattice parameters, Miller indices, and the principles of X-ray diffraction using Bragg's law, and their applications in material science.

**CO4:** Understand the electronic, dielectric and magnetic properties of materials.

**CO5:** Discuss the principle and working of LASER and optical fibre and to examine their industrial and scientific applications.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Quantum Mechanics:** Introduction to Quantum Mechanics, Black body radiation, Plank's hypothesis, Wave-particle duality, de-Broglie matter waves, Heisenberg uncertainty principle and its applications, Wave function and its significance, Probability density and normalization with examples, Schrödinger's wave equation (Time dependent and time independent), particle in one dimensional potential box, Eigen values and Eigen function, Applications of Quantum mechanics (Quantum Computing). | 08 Hrs |
| Unit – II | **Electromagnetic Theory:** Basic concepts of Electromagnetism, Gauss Law of electrostatics, Gauss law in magnetostatics, Faraday's laws of induction, Continuity equation, Displacement Current & modified ampere's circuital law, Maxwell's equations and its physical significance. EM Wave equation and its propagation characteristics in free space and conducting medium, Poynting vector (Qualitative). | 08 Hrs |
| Unit – III | **Crystal Structures and X-ray Diffraction:** Introduction to Crystal Structures: symmetry, space lattice, basis and unit Cell, Bravais Lattices: Seven Crystal Systems, Fourteen Bravais Lattices, Atomic Arrangements in Cubic Structures: Coordination Number, Atomic Radius, Packing Faction, Voids space, Density, Lattice Planes and Miller Indices, X-ray Diffraction by Crystals: Bragg's law, Characterization of Nanoparticles using X-Ray Diffraction | 06 Hrs |
| Unit – IV | **Properties of Materials:** Electronic Properties: Band theory of solids, energy band structure of conductor, insulators and semi-conductors: Fermi Dirac distribution function, Fermi level. Dielectric Properties: Dielectric constant and polarization mechanisms in dielectrics, Types of polarization: electronic, ionic, orientation, and space charge, temperature and frequency dependence of total polarization, internal fields of solids. Magnetic Properties: Magnetization and magnetic moment in materials, Dia, para and ferromagnetism and their applications, Langevin's theory for Diamagnetic materials (Qualitative). | 08 Hrs |

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|---|---|---|
| **Unit – V** | **Laser and Fibre Optics:** Laser: Spontaneous and Stimulated Emission, Population Inversion, Einstein's Coefficients, Elements of Laser, Construction and Working of He-Ne Lasers, Applications of Laser. Fiber Optics: Fundamental Ideas about Optical Fiber, Propagation Mechanism, Acceptance Angle and Numerical Aperture, Single Mode and Multi-Mode optical fibers, Communication Systems (schematic diagram). | **06 Hrs** |

**APPLIED PHYSICS PRACTICALS**

**Preamble**: The Applied Physics course provides students with a strong foundation in the fundamentals of physics and serves as a basis for various engineering disciplines. This course is designed to develop a scientific perspective in students and equip them with hands-on experience in engineering education

**List of experiments**

1. To determine the Energy band gap of a given semiconductor material using four probe method.
2. To study the variation of Magnetic field along the axis of current carrying coil and then to estimate the Radius of coil.
3. To verify the Stefan's law by electrical method.
4. To determine the Specific resistance of a given wire using Carey foster's bridge.
5. Evaluating Optical Flatness of Surfaces Using Newton's Rings Interference Pattern.
6. Measurement of Electro Chemical Equivalent of copper.
7. Determination of the dielectric constant of the dielectric material used in a capacitor by charging and discharging of the capacitor.
8. Determination of Charge density, charge velocity and Hall coefficient of a given p-type semiconductor by Hall Effect method.
9. Determination of the relative permeability, retentivity, coercivity, and energy loss of a magnetic material by studying its magnetization (B-H) curve.
10. To determine the Numerical aperture, Angle of divergence and Attenuation coefficient of a given optical fiber cable.

**Demonstration Experiments (Not to be part of Examination)**

3. To determine the wavelength of spectral lines using plane transmission grating.
4. Determination of Curie temperature of a ferromagnetic material by studying the variation of loop area with temperature.

**Text Books**


4. A Text book of Engineering Physics-M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy (S Chand).
5. Applied Physics for Engineers- Neeraj Mehta (PHI Learning).
6. Engineering Physics-H.K. Malik and A.K. Singh (McGrawHill)


**Reference Books**


4. Concepts of Modern Physics – Aurthur Beiser (McGraw Hill).
5. Solid State Physics- S. O. Pillai (New Age Int.)
6. Electromagnetic Field Theory- Rakhesh Singh Kshetrimayum (Cengage Learning)


**NPTEL Web Links**

3. https://youtu.be/TcmGYe39XG0 https://youtu.be/R-x9KdNjQmo
4. https://youtu.be/2CsMpEBl5QY https://youtu.be/-ap00IUJm7k

# JAS 102/ JAS 202 APPLIED CHEMISTRY

**Course Outcomes**

**CO1:** Analyse the principles, types and diverse applications of sensors and displaysystems

**CO2:** Understand Battery Fundamentals and Corrosion Mechanisms

**CO3:** Acquire the fundamentals of material science and computational chemistry

**CO4:** Enumerate the properties, synthesis and applications of industrially important polymers and nanomaterials

**CO5:** Sustainable technologies such as green chemistry, green fuels and E-Wastemanagement

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Sensors & Display Systems:** Introduction - Definition and concept of Transducer, Actuators and Sensors. Working principle and applications of Electrochemical sensors, Thermometric Sensor (Flame photometer), Conductometric sensors (conductometry), and Optical sensors (colorimetry). Disposable sensors (DS)- Definition and advantages of DS over Classical sensors<br>**Display Systems:** Photoactive and electroactive materials - Definition and General working principle for all display devices. Optoelectronic devices based on photoactive and electroactive materials with applications-OLED, AMOLED and QLED's | **08 Hrs** |
| **Unit II** | **Energy storage systems:** Batteries, construction, working and applications of Lithium-Polymer, Lithium-ion and Sodium-ion batteries.<br>**Corrosion Science:** Introduction, electrochemical theory of corrosion, differential metal and differential aeration corrosion, Factors affecting corrosion-Nature of metal, Nature of corrosion product, Relative areas of anode and cathode, pH, temperature.<br>**Corrosion control:** Control of corrosion by (I) cathodic protection (Impressed current method and sacrificial anodic method), (II) Anodizing (anodizing of Al) and (III) Metallic coating (Galvanizing and tinning). | **06 Hrs** |
| **Unit III** | **Conductors, Insulators and Semiconductors:**<br>Introduction to conductors, insulators and Semiconductors. Mechanism of conduction in conductors, insulators and Semiconductors based on Molecular Orbital Theory<br>Electronic grade silicon-Introduction, Production of electronic grade silicon-Czochralski process (CZ) and Float Zone (FZ) methods. Construction working of Photovoltaic Cell and applications.<br>**Computational Chemistry:** Molecular geometry input using cartesian coordinates and internal coordinates, geometry of CH4 and NH3 molecules using structure drawing software programs like chemdraw /Chemsketch | **06 Hrs** |
| **Unit IV** | **Nanomaterials:** Introduction, size dependent properties (Surface area, Electrical, Optical and Catalytic properties). Synthesis of nanomaterials: Top down and bottom-up approaches, Synthesis by Sol-gel, and precipitation method, Nanoscale materials: Fullerenes, Carbon nanotubes and graphene – properties and applications. | **08 Hrs** |

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|---|---|---|
| | **Polymers**: Importance of polymers in Industry. conducting polymers – Synthesis and conducting mechanism of Polyacetylene and commercial applications. Introduction of Biodegradable polymers, Synthesis of Polylactic acid (PLA) and their application. | |
| **Unit V** | **Green Chemistry:** Introduction, Basic principles of Green chemistry - explanation with examples, Environmental Impact of green chemistry on society<br>**Green Fuels:** Hydrogen-production (Photo electrocatalytic and photo catalytic water splitting) and applications in hydrogen fuel cells. Construction, working and applications of Methanol- Oxygen fuel cell (H2SO4 as electrolyte).<br>**E-Waste Management:** Introduction, sources, types, effects of e-waste on environmental and human health, major methods of disposal, advantage of recycling. Extraction of copper and gold from e-waste. | **08 Hrs** |

APPLIED CHEMISTRY PRACTICALS

**Preamble**:Chemistry lab aims to create opportunities to provide students with hands-on experience of laboratory experiments, which could bridge the gap between theoretical concepts and their applications in everyday life

**List of experiments**

11. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry).
12. Estimation of acids in acid mixture Conductrometrically.
13. Determination of acid concentration and pKa of vinegar using pH sensor (Glass electrode).
14. Estimation of iron in TMT bar by diphenyl amine/external indicator method.
15. Determination of rate of corrosion of mild steel by weight loss method.
16. Estimation of total hardness of water by EDTA method.
17. Estimation of total alkalinity of industrial feed water by neutralization titration method.
18. Synthesis of Iron-oxide Nanoparticles.
19. Determination of Viscosity coefficient of Polymer (Ostwald's viscometer).
20. Synthesis of thermosetting polymer (Bakelite/ Polyurethane)

**Demonstration Experiments (Not to be part of Examination):**

1. Chemical Structure drawing using software: Chem Draw or ACD / Chem Sketch
2. Construction of photo voltaic cell.
3. Synthesis of Biodiesel.
4. Electrolysis of water

**Text Books**


1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. A Text Book of Engineering Chemistry, Sunita Rattan, Kataria Publication(Reprint 2024)
3. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd.,12th Edition, 2011.
4. A text book of Engineering Chemistry- R.V. Gadag and A Nityananda Shetty.
5. Engineering Chemistry, (6th Edition), Mahesh B and Roopashree B. Sunstar publisher, Bengaluru

6. O.G. Palanna, “Engineering Chemistry”, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint (2015- Edition).
7. R.V. Gadag & A. Nityananda Shetty., “Engineering Chemistry”, I K International Publishing House Private Ltd. New Delhi (2015- Edition).

**Reference Books**

9. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSC Publishing, 2005.
10. Corrosion Engineering, M. G. Fontana, N. D. Greene, McGraw Hill Publications, New York, 3rd Edition,1996.
11. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
12. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
13. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley– Blackwell, 2012
14. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The National Academies Press. doi: 10.17226/4782.
15. Polymer Science, V R Gowariker, N V Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers,4th Edition,2021
16. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1st Edition,2002.

**NPTEL Web Links**

8. https://youtube.com/playlist?list=PLjyncIQ8ELldNpupdiO79WFp7hJhHYGGK&si=wQNLUX7SX_uWObuN
9. https://youtube.com/playlist?list=PLgMDNELGJ1CbufZjqWa8uoSlQWKqVwPN7&si=fV5RZGehujbW9_t0
10. https://ndl.iitkgp.ac.in/
11. https://www.youtube.com/watch?v=faESCxAWR9k
12. https://nptel.ac.in/courses/104103019
13. https://youtu.be/iszbux-yXdM?si=-xMfoQGxlbQgx8eT
14. Chemguide.co.uk

# JAS 105 LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

## Course Outcome:

**CO1:**Understand and apply the fundamental concepts of linear algebra including system of Linear equations and analyze eigenvalues, eigenvectors of matrices.
**CO2:**Identify and describe vector space, subspaces and represent the matrix linear transformations.
**CO3:**Understand and apply the concept of orthogonality and utilize inner products space and normed space to solve problems involving vector spaces and subspaces.
**CO4:**Apply differential equations to model and solve real-world problems in engineering and science.
**CO5:** Understand various methods to solve second order linear differential equation with its applications.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Linear Systems and Matrices:** Complex matrices, Hermitian, Skew-Hermitian, Unitary matrices, Elementary transformation, Inverse of a matrix, Echelon forms, Rank of matrix, Solution of linear systems, Characteristic equation, Cayley-Hamilton theorem, Eigenvalues and eigenvectors: | **08 Hrs** |
| **Unit II** | **Vector Spaces and Linear Transformations:** Introduction to vector spaces, Subspaces, Linear independence, Spanning sets, Basis and dimension, Row space, Column space, and null space, Rank-Nullity theorem, Linear transformations, Matrix representation of a linear transformation, Inverse of linear transformations | **08 Hrs** |
| **Unit III** | **Inner Product Spaces:** Quadratic form, Reduction and classification of quadratic form, Inner products space and Normed space, Orthogonality, Orthogonal projections, Gram-Schmidt process, Singular value decomposition | **08 Hrs** |
| **Unit IV** | **Ordinary Differential Equation:** Introduction to ordinary differential equation, Order and degree, Exact differential equation, Homogeneous differential equation, Linear differential equations of nth order with constant coefficients, Complementary function, Particular integral, Cauchy-Euler equation, Simultaneous linear differential equations | **08 Hrs** |
| **Unit V** | **Advanced Methods for Solving Second Order Differential Equations:** Solution of second order linear differential equations by changing independent variables, Method of variation of parameters, Series solution method with variable coefficient (Frobenius method), Applications to engineering problems(Mechanical Systems, Electrical Circuits, Simple Harmonic Motion). | **08 Hrs** |

**Text Books**


1. Linear Algebra by S. K. Jain, A. Gunawardena, and P. B. Bhattacharya, New Age International Publishers.
2. Linear Algebra by E. Balagurusamy, Tata McGraw-Hill Education.
3. Ordinary Differential Equations by M. D. Raisinghania, S. Chand Publishing**.**


**Reference Books**


1. Linear Algebra and its Applications by David C. Lay, Steven R. Lay, and Judi J. McDonald (Indian Edition), Pearson Education India.
2. Linear Algebra: A Geometric Approach by S. Kumaresan, Prentice-Hall of India.
3. Higher Engineering Mathematics by B. V. Ramana, Tata Mc Graw- Hill Publishing Company Ltd.
4. Advanced Engineering Mathematics by E. Kreyszig, Volume-II, John Wiley & Sons.
5. A Textbook of Differential Equations by N. M. Kapoor, Pitambar Publishing

## JCS 101 COMPUTATIONAL THINKING FOR PROBLEM SOLVING

**Course Outcome:**

CO1: Understand and explain the components of computer systems and the foundational concepts of computational thinking, including problem decomposition andalgorithmic efficiency.
CO2: Apply various operators and construct complex conditional statements in C to solve computational problems effectively.
CO3: Implement and utilize loops and arrays in C to manage and manipulate data efficiently, including nested loops and multidimensional arrays.
CO4: Develop programs using built-in and user-defined functions and apply basic searching and sorting algorithms to organize data.
CO5: Utilize pointers, dynamic memory allocation, file handling, macros, and command- line arguments to enhance the functionality and efficiency of C programs

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Components of Computer Systems:** Memory, Processor, I/O Devices, Storage, concepts of system software: Operating System, Assembler, Compiler, Interpreter, Loader and Linker<br>**Foundation of computational Thinking**: Definition and importance of computational thinking, Real-world applications of computational thinking, Problem definition, Problem decomposition, Algorithmic Thinking Algorithm, divide and conquer approach, Flowchart, concept of Pseudo Code with Examples, From Algorithms to Programs, Source Code, algorithm efficiency (time and space complexity).<br>**Programming Basics:** Structure of C Program, Writing and Executing the First C-Program, Syntax and Logical Errors in Compilation, Object code and Executable Code , Standard I/O in C, Fundamental Data types, identifiers, Variables and Memory Locations, Storage Classes | **8 Hrs** |
| **Unit II** | **Operators and Solving Expressions:** Operators and Expression Using Numeric and Relational Operators, Mixed Operands, implicit and explicit type Conversion, Logical Operators, Bit Operations, Assignment Operator, Operator precedence and Associativity.<br>**Conditional Statements:** if, else and else if statements, switch statements, nested if-else, and their replacement by Switch statements, and various programs based on conditional statements | **8 Hrs** |
| **Unit III** | **Loops:** Need of loops, while, do While and for Loops, nested loops, Multiple Loop Variables, Use of Break, Continue Statements and goto statements.<br>**Concept of Arrays:** Notations for 1-D, 2-D and n-D arrays and their representation, Manipulating Array Elements, Character Arrays and Strings, String and String functions. Functions: Introduction to Function, Types of Functions, Functions using Array, Passing Parameters to Functions, Call by Value, Call by Reference, concept of Recursion techniques | **8 Hrs** |

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|---|---|---|
| **Unit IV** | **Basic of Searching and Sorting Algorithms:** Searching techniques: linear search, binary search, hashing, Sorting Algorithms: Bubble Sort, Insertion and Selection Sort.<br>**Structure and Union:** Introduction to Structure, union, structure vs union, Enumerated Data types, Array of Structures, and various programs based on loops, arrays, and structures**.** | **6 Hrs** |
| **Unit V** | **Pointers:** Introduction, Declaration, Introduction to Dynamic Memory Allocation (Malloc, Calloc, Realloc, Free),Use of Pointers in Self-Referential Structures, Basics of Linked List and node creation<br>**File Handling and Macros:** File I/O Functions, Standard C Preprocessors, programs based on file handling, Defining and Calling Macros, functions vs macros, types of macros | **6 Hrs** |

**COMPUTATIONAL THINKING FOR PROBLEM SOLVING PRACTICALS**

**Preamble**: The objective of the course is to introduce the basic ideas and concepts of programmingusing C as a basic language. This will help students to design and implement cross- platform programming concepts as well

**List of experiments**

29. WAP to calculate the area and circumference of a circle.
30. WAP that calculates the Simple Interest and Compound Interest. The Principal,Amount, Rate of Interest and Time are entered through the keyboard.
31. WAP that accepts the temperature in Centigrade and converts into Fahrenheit usingthe formula C/5=(F-32)/9.
32. WAP that swaps values of two variables using a third variable.
33. WAP that checks whether the two numbers entered by the user are equal or not.
34. WAP to find the greatest of three numbers.
35. WAP that tells whether a given year is a leap year or not.
36. WAP that accepts marks of five subjects and finds percentage and prints gradesaccording to the following criteria:

    Between 90-100% ----- Print ‘A’

    80-90%---------- Print ‘B’

    60-80%---------- Print ‘C’

    Below 60% ----------Print ‘D’

37. WAP that takes two operands and one operator from the user, perform the operation, and prints the result by using Switch statement.
38. WAP to find the factorial of a given number using normal and recursivefunctions.

39. WAP to print sum of even and odd numbers from 1 to N numbers.

40. WAP to print the Fibonacci series using normal and recursive functions.

41. WAP to check whether the entered number is prime or not.

42. WAP to print Armstrong numbers from 1 to 100.

43. WAP to convert binary number into decimal number and vice versa.

44. WAP that inputs two arrays and saves sum of corresponding elements of these arrays in a third array and prints them.

45. WAP to search an element in a array using Linear Search.

46. WAP to sort the elements of the array in ascending order using Bubble Sorttechnique.

47. WAP to add and multiply two matrices of order mxn.

48. WAP to transpose a matrix of order mxn.

49. WAP that finds the sum of diagonal elements of a mxn matrix.

50. WAP to implement strlen (), strcat (), strcpy (), strcmp () using the concept ofFunctions and pointers.

51. WAP to swap two elements using the concept of pointers.

52. WAP C Program to Calculate Difference between Two Time Periods.

53. C Program to Store Information of Students dynamically Using Structure

54. WAP to compare the contents of two files and determine whether they are sameor not.

55. WAP to check whether a given word exists in a file or not. If yes, then find thenumber of times it occurs.

56. WAP to square of a given number using macro.

**Text books**

3. Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill.

**4.** The C programming by KRernighan Brain W. and Ritchie Dennis M., Pearson Education.

**Reference Books**

3. Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison- Wesley, 2006.

4. Let Us C By Yashwant P. Kanetkar.

3, Expert C Programming by Peter van der Linden,Pearson.

**Web References**

5. https://archive.nptel.ac.in/courses/106/105/106105171/
6. https://archive.nptel.ac.in/courses/106/104/106104128/
7. https://www.mooc-list.com/tags/c-programming
8. https://www.coursera.org/courses?query=c%20programming

# JEE 101/JEE 201 BASICS OF ELECTRICAL ENGINEERING

**Course Outcomes**

**CO1:** Understand the fundamental concepts of Electric Power Generation and Distribution.
**CO2:** Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
**CO3:** Analyse the steady state behaviour of single phase and outline the concepts of three phase AC circuits.
**CO4:** Identify the application areas and performance of transformers and apply the concept of safety measures.
**CO5:** Explain the working principles of DC and AC machines.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Electrical Power Generation:** Sources of energy – Types of renewable and non renewable Energy sources.<br>**Wind Power Generation:** Principle of conversion, advantages and disadvantages of wind power plants.<br>**Solar Power Generation:** Principle of conversion, Different types of PV cells, I-V and P-V characteristics only, Advantages and disadvantages of solar plants.<br>**Power distribution:** Introduction to power transmission and distribution. Power rating of household appliances like PCs, laptop, printer.<br>**Batteries:** Types, Parameters, Comparison of various rechargeable batteries | 8 Hrs |
| Unit – II | **DC Network:** Classification of electrical networks, Kirchhoff's law and their applications for network solutions. Mesh & nodal analysis, source transformation techniques and types of sources both Independent and dependent sources, superposition theorem, Thevenin's and Norton's Theorems.(Without proof) | 8Hrs |
| Unit – III | **AC Circuits:**Sinusoidal waveforms: average value, RMS value, form factor, peak factor. Concept of phasor and phasor representation of sinusoidal varying Voltage and current. Analysis of single-phase AC circuits of R-L-C Series and Parallel circuits, real power, reactive power, apparent power and Power factor,Introduction tothree-phase AC circuits | 8 Hrs |
| Unit – IV | **Transformers**: Magnetic Circuits, Single phase Transformer Construction, principle of working, E.M.F. equation, voltage and current ratios. Losses, regulation and efficiency, Equivalent Circuit.<br>**Safety measures**: Safety, electric shock, electric shock and other hazards of electricity, safety rules, earthing and its types. Introduction to circuit protection devices: fuses, MCB, ELCB and relays | 8 Hrs |
| Unit – V | **DC Machines**: principle of operation, constructional features, Types, emf equation, Torque equation, characteristics of series and shunt motors, applications<br>**Three phase Induction Motor:** Classification, Principle of operation, concept of rotating magnetic field, construction and types, slip and its significance.<br>**Single Phase Induction Motor:** Principle of operation, starting methods | 08 Hrs |

**Text Books**

1. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill,4th Edition. 2019
2. D.C. Kulshershta ,” Basic Electrical Engineering”, McGraw Hill ,2nd edition 2019
3. M.V.R. Koteswara Rao, “Energy Resources: Conventional & Non-Conventional” BSP Publications.2nd Edition 2019
4. Basic Electrical and Electronics Engineering-S.K. Bhattacharya, Pearson India, 2 nd Edition, 2017.

**Reference Books**

1. V. D. Toro, “Electrical Engineering Fundamentals”, Pearson India2nd edition 2015
2. Edward Hughes Revised by John Hiley, Keith Brown and Ian McKenzie Smith "Electrical and Electronic Technology" tenth edition.

**Web References**

1. https://archive.nptel.ac.in/courses/108/105/108105112/
2. https://archive.nptel.ac.in/courses/117/106/117106108/

## JEC 102/JEC 202 BASICS OF ELECTRONICS ENGINEERING

**Course Outcomes:**

**CO1**:Outline the concept of PN Junction diode and power supply.
**CO2:**Discuss the concepts of BJT and introduce the power amplifiers.
**CO3**:Study and analyse FET characteristics.
**CO4**: Discuss the number systems conversions, binary arithmetic and minimize logic functions.
**CO5**: Outline the concept of Operational amplifier and apply to design linear and non-linear applications

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **P-N junction diode and Power supply :** P-N junction diode, symbol, V-I Characteristics, Diode applications: Half wave, Full wave rectifiers, filter circuits (capacitor), Voltage regulator (IC), Power supply | 8 Hrs |
| Unit – II | **BJT and amplifiers :** Principle of Operation, Common Emitter, Common Base and Common Collector configurations and characteristics, Concept of biasing (voltage divider biasing), Amplifying action of common Emitter amplifier. BJT as a switch. Introduction to power amplifiers (Class A, Class AB, Class B and Class C). | 10 Hrs |
| Unit – III | **Field Effect Transistor:** JFET and its Characteristics. MOSFET (MOS) (Depletion and Enhancement) type, JFET as amplifier (Common Source Configuration). | 6 Hrs |

| | | |
|---|---|---|
| **Unit – IV** | **Digital Electronics:** Review of number systems. Boolean algebra, gates and their realization. Combinational logic: representation of logic functions: SOP and POS forms, K-map representations: minimization using K map (up to 5 Variables). Half adder and full adder realization. | **8 Hrs** |
| **Unit – V** | **Operational amplifiers:** OP-AMP basics, PIN Diagram (IC 741), Characteristics of Ideal and practical OP-AMP, Inverting Amplifier, Non-Inverting Amplifier, Unity follower, Adder, Subtractor, Integrator, Differentiator, Comparator. | **08 Hrs** |
| | **Practical for practice:** | |
| | 1. Study of Lab Equipment and Components: CRO, Mustimeter, and Function Generator, Power supply.<br>2. P-N Junction diode: Characteristics of PN Junction diode - Static and dynamic resistance measurement from graph.<br>http://vlabs.iitkgp.ernet.in/be/exp5/index.html<br>3. Characteristics of Zener diode: V-I characteristics of zener diode, Graphical measurement of forward and reverse resistance.<br>http://vlabs.iitkgp.ernet.in/be/exp10/index.html<br>4. Applications of PN Junction diode: Half & Full wave rectifier Measurement of Vrms, Vdc, and ripple factor.<br>http://vlabs.iitkgp.ernet.in/be/exp6/index.html<br>http://vlabs.iitkgp.ernet.in/be/exp7/index.html<br>5. Characteristic of BJT in CE configuration.<br>http://vlabs.iitkgp.ernet.in/be/exp11/index.html<br>6. To study Operational Amplifier as Adder and Subtractor.<br>http://vlabs.iitkgp.ernet.in/be/exp17/index.html | |

**Text Book:**

3. Electronic Devices and Circuit Theory, Robert L. Boylestad, Pearson Education India, 11th Edition, 2021.

**Reference Books**

1. Integrated Electronics, Millman and Halkias, Mc.Graw Hill Publications, 2/E, 2017
2. Electronics Fundamentals and Applications, D Chattopadhyay and P.C. Rakshit, NewAge International Publications,Sixteenth Edition, 2020.

**Web References**

1. NPTEL Course link: https://nptel.ac.in/courses/122106025

# JEC 103 /JEC 203 BASICS OF COMMUNICATION ENGINEERING

**Course Outcomes:**

CO1:To understand the basics of communication system.
CO2:To discuss the need of modulation, understand the concept ofanalog communication.
CO3:To understand the fundamentals of digital communication.
CO4:To discuss the antenna basics and its design parameters.
CO5: Outline the concept of wireless communication and its standards and the basics of Satellite and RADAR

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Introductionof communication system:** Block diagram, type of communication, modes of communication, concept of bandwidth, electromagnetic spectrum and its usage, modulation, need of modulation. Block diagram of basic transmitter and receiver | 8 Hrs |
| Unit – II | **Analog Communication:**Introduction and need of modulation, Amplitude Modulation, DSB, SSB, (with and without carrier),Power calculations, Basic AM modulator and demodulator circuit. Frequency Modulation (FM), Phase Modulation (PM), Carson 's rule, Bandwidth of FM, Armstrong modulator, Foster-Seely discriminator(demodulator). | 8Hrs |
| Unit – III | **Digital Communication:** Block diagram of digital communication system, advantage of digital communication, Modulation Techniques: Amplitude Shift Keying (ASK), Phase Shift Keying (PSK), Frequency Shift Keying (FSK), Comparison of above modulation techniques | 8 Hrs |
| Unit – IV | **Antenna Basics:**Introduction, basic Antenna parameters, patterns, beam area, radiation intensity, beam efficiency, diversity and gain, antenna apertures, effective height, bandwidth, radiation, efficiency.Helical Antenna, Yagi-Uda array. | 6 Hrs |
| Unit – V | **Overview of wireless communication**: Cellular communication, different generations and standards in cellular communication till 6G systems. Wi-fi, Fundamentals of Satellite communication, Block diagram of RADAR Communication Systems | 6 Hrs |

**Text Books:**


1. Electronic Communication Systems, George Kennedy, McGraw Publication, 5th Edition,2011.
2. Antennas and Wave Propagation, K D Prasad, Satya Prakash publication, 1st Edition, 2021.
3. Wireless Communications principle and practice Rappaport, Pearson 3rd ed. (2010)
4. https://onlinecourses.nptel.ac.in/noc22_ee05/preview


**Reference Books**


1. Modern Digital and Analog Communication Systems, B. P. Lathi and Z. Ding, OXFORD, Fourth edition, 2011.
2. Antennas and Wave Propagation, John D Krauss, Ronald J Marhefka and Ahmad S. Khan, Fourth Edition, Tata McGraw Hill, 5th Edition, 2017.
3. Electromagnetic Waves, R.L. Yadava, Khanna Publishing House, Delhi.


**Web Resources**

1. https://onlinecourses.nptel.ac.in/noc22_ee05/preview

# JME 101/JME 201 ELEMENTS OF MECHANICAL ENGINEERING

**Course Outcomes**

CO1: Identify various energy resources, different types of turbines and energy conversion systems.
CO2: Illustrate the construction details and working of internal combustion engines and refrigerator
CO3: Compare various joining and machining process and choose appropriate machine tool for engineering application.
CO4: Identify various Advanced Manufacturing Processes and Additive Manufacturing for various real-life applications
CO5:Illustrate the working principle of Mechatronics, Robotics, Automation and concept of Industry 4.0 with their advantages, scope and Industrial applications

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Energy:**Introduction to Mechanical Systems and Thermal Engineering. Sources and classification of energy sources, Non-renewable and Renewable Energy Resources. Brief Description and Utilization of Solar Energy, Wind Energy, Tidal Energy and Nuclear Energy.<br>**Hydraulic Turbines:** Classification of hydraulic turbines, working of Pelton, Francis and comparison between impulse and reaction turbines | 8 Hrs |
| Unit – II | **Internal Combustion Engines:** Construction and working of IC engines, 2 stroke Petrol and 4 stroke Petrol and Diesel engine. Simple problems on Power and Efficiency calculations. Comparison between IC Engines and Electric Vehicles.<br>**Refrigeration:** Refrigeration effect, working principle of Vapour Compression refrigeration systems, ton of refrigeration, COP, refrigerants and their properties | 06 Hrs |
| Unit – III | **Introduction to Manufacturing Processes & its Classifications**<br>**Joining Processes:** Welding- Principle of welding, Types of welding -Arc welding, Gas welding, Working of Arc and Gas Welding, Brief description of Soldering and Brazing<br>**Machining Processes:**Construction and working of Centre Lathe and its classification. Lathe operations Turning, Facing, Knurling, Thread cutting, Taper Turning. Construction and working of drilling machine and its classification. Working of Bench drilling machine its operations | 06 Hrs |
| Unit – IV | **Advanced Manufacturing** Processes: Introduction to Advanced Manufacturing Processes and its classifications. Principle and working of Electron Beam Machining and Laser Beam Machining**.**<br>**Additive Manufacturing:** History and Advantages of Additive Manufacturing. Types of Additive Manufacturing Technologies. Basic principles & working of Stereolithography and Fused Deposition Modeling (3D Printers). Applications of Additive Manufacturing | 10 Hrs |

| | | |
|---|---|---|
| **Unit – V** | **Introduction to Mechatronics:** Systems of Mechatronics, Scope, Advantages and disadvantages of Mechatronics, Introduction to autotronics, bionics, and avionics and their applications**.**<br>**Automation and Robotics:** Automation: Definition, types –Fixed, Programmable & Flexible automation, NC/ CNC machines: Basic elements with simple block diagrams, advantages and disadvantages Robotics - Definition of Robot, applications, advantages and disadvantages of robots.<br>**Introduction to Industry 4.0:** General framework, The Basic Characteristics of Industry 4.0, Pillars of the Industry 4.0 Framework and Application areas | **08 Hrs** |

**Text Books**


4. Basic Mechanical Engineering, G Shanmugam, S Ravindran, McGraw Hill
5. Kalpakjian and Schmid, Manufacturing processes for engineering materials (5th Edition)- Pearson India, 2014.
6. Manufacturing Technology by P.N. Rao., MCGRAW HILL INDIA


**Reference Books**


3. V K Jain: Advanced Machining Processes, Allied Publishers, Mumbai, 2002.
4. Understanding Additive Manufacturing, by- Andreas Gebhardt, Hanser.
6. Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing, by- Ian Gibson , DSavid W. Rosen , Brent Stucker, Springer.


**Web/Digital resources:** 1. LearnMech 2. ASME 3. iMechanica 4. Coursera - shorturl.at/kGIOR 5. edX 6. Swayam.ac.in 7. Nptel.ac.in - shorturl.at/kACLW

# JME 102 COMPUTER AIDED ENGINEERING GRAPHICS LAB

**Course Outcome:**

CO1:Classify the systems of projection with respect to the observer, object and referenceplanes.
CO2:Develop and interpret orthographic projections of Points, Lines and Planes and solids using CAD software
CO3: Make use of engineering drawing principle's to convert orthogonal projections (2D) to isometric projections (3D) and Vice-Versa in AutoCAD

| **COMPUTER AIDED ENGINEERING GRAPHICS PRATICALS** |
|---|
| **Preamble**: The objective of the course is to introduce the basic ideas and concepts Engineering Graphics and Design. This will help students to improve the problem solving and thinking in different directions |
| **List of experiments** |
| 1. Introduction to Engineering Graphics: Principles of Engineering Graphics and their significance<br>2. Orthographic Projection: Methods of projection, Principles of Orthographic projection, First angle versus Third angle of projection<br>3. Projection of Points: Projections of points when they are situated in different quadrants.<br>4. Projections of Lines: Projections of a line parallel to one of the reference planes and inclined to the other, line inclined to both the reference planes<br>5. Projections of Planes: Projection of polygonal surface and circular lamina locatedin first quadrant inclined to one or both reference planes<br>6. Projections of Solids: Classification of solids, Projection of solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method..<br>7. Isometric Projection: Isometric Projection: Isometric scales, Isometric projections of simple and combination of solids.<br>**8.** Introduction to Computer Aided Design Introduction to AutoCAD: Basic commands for 2D drawing: Line, Circle, Polyline, Rectangle, Hatch, Fillet Chamfer, Trim, Extend, and Offset, Dim style, etc. Transformation of Projections: Conversion of Isometric Views to Orthographic Views and Vice-Versa in AutoCAD. Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint |

**Reference Books:**


6. Bhatt N.D., Panchal V.M. & Ingle P.R. (2014), Engineering Drawing, Charotar Publishing House.
7. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
8. Agrawal B. & Agrawal C.M. (2012), Engineering Graphics, TMH Publication
9. Engineering Graphics & Design, A.P. Gautam & Pradeep Jain, Khanna Publishing House
10. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers

# JHS 104 SPORTS AND YOGA

**Course Outcomes**

**CO1:** Introduce students to the benefits and fundamental concepts of sports and yoga

**CO2:** Promote physical fitness, mental well-being and holistic health

**CO3:** Develop basic skills and techniques in selected sports and yoga practices.

**CO4:** Promote a healthy lifestyle and stress management techniques

**CO5:** Foster an understanding of the importance of physical activity and its impact onoverall health

CO6: To instill discipline, teamwork, and ethical values through sports and yoga.

| UNITS | **Syllabus Part A: Sports** |
|---|---|
| Unit I | **UNIT-I – Introduction:**<br>Introduction and Definition of Sports<br>Importance of sports in education<br>Physical and mental benefits of sports |
| Unit II | **Basic Rules and Techniques of Selected Sports:**<br>Popular Indoor and Outdoor sports (Choose 2-3) (e.g., Badminton, Table Tennis Basketball, Volleyball)<br>Rules of the game, Basic skills, and techniques Practice and demonstration |
| | **Syllabus Part B: Yoga** |
| Unit I | **Introduction:** Introduction, Definition, History and philosophy of yoga<br>Aims and Objectives of Yoga<br>Need, Benefits and Importance of Yoga in Physical Education and Sports |
| Unit II | **Foundation of Yoga** Introduction of Patanjali Yoga, The Astanga Yoga: Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Meditation (Dhyana) and Samadhi. Yoga in the Bhagavadgita - Karma Yoga, Raja Yoga, Jnana Yoga and Bhakti Yoga |
| Unit III | **Asanas, Kriyas, Bandhas and Mudras.**<br>Effect of Asanas and Pranayama on various system of the body<br>Classification of asanas with special reference to physical education and sports Standing Asanas, Sitting Asanas & Surya Namaskar: 12 count<br>Types of Bandhas and mudras, Types of Kriy |

# JAS 206 STATISTICS AND INTEGRAL TRANSFORMS

## Course Outcome:

**CO1:** Understand the concept of statistical measures and various discrete, continuous distributions.

**CO2:** Analyze and interpret the results of regression models and curve fitting in the context of real-world data and problems.

**CO3:** Apply statistical inference methods to real-world engineering and quality control problems.

**CO4:** Apply the Laplace transform to solve ordinary and simultaneous differential equations and also use it in practical engineering and scientific problems.

**CO5:** Apply Fourier and Z-transforms to solve differential and difference equations, and analyse signals and systems

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Statistical Measures and Probability Distributions:** Measure of central tendency, Moments, Skewness and kurtosis, Random variables: Discrete and continuous, Expected value, Variance, Probability mass function (PMF) and probability density function (PDF), Discrete and continuous probability distribution: Binomial, Poisson and Normal. | 8 Hrs |
| Unit – II | **Curve Fitting and Regression Techniques:** Curve fitting, Method of least squares, Fitting of straight lines, Fitting of second degree parabola, Exponential curves,Geometric curves, Correlation and Rank correlation, Linear regression | 6 Hrs |
| Unit – III | **Statistical Inference:** Introduction of Sampling Theory, Hypothesis, Null hypothesis, Alternative hypothesis, Type I and Type II errors, Testing a hypothesis, Level of significance, Confidence limits, Test of significance of single mean and difference of means, t-test, Z-test and Chi-square test,Statistical quality control (SQC), Control charts, Control charts for variables (X and R Charts), Control charts for attributes (p, np and C charts). | 08 Hrs |
| Unit – IV | **Laplace Transform:** Laplace transform, Existence theorem (without proof), Properties of Laplace transform, Laplace transform of derivatives and integrals, Unit step function, Laplace transform of periodic function, Inverse Laplace transform, Convolution theorem(without proof), Application of Laplace transform to solve ordinary differential equations. | 10 Hrs |
| Unit – V | **Fourier transform and Z-transform:** Integral Transform, Complex Fourier transform and its properties,Fourier cosine transform, Fourier sinetransform,Modulation theorem, Inverse Fourier transform, Convolution theorem, Z-transform and its properties,Application to solve difference equationsupto second order. | 8 Hrs |

## Text Books


1. Fundamentals of Mathematical Statistics by S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons.
2. Mathematical Statistics by J. N. Kapur, S. Chand Publishing.
3. Integral Transforms by A.R. Vashistha and R.K. Gupta, Krishna Prakashan Media (P) Ltd.

**Reference Books**


1. Probability and Statistics for Engineering and the Sciences by Jay L. Devore, Cengage Learning.
2. Introduction to the Theory of Statistics by Alexander M. Mood, Franklin A. Graybill, and Duane C. Boes, McGraw-Hill Education.
3. Probability, Statistics and Random Processesby T. Veerarajan, Tata McGraw-Hill Education.
4. Probability and Statistics for Engineersby J. Ravichandran, Wiley India.
5. Advance Engineering Mathematics by R. K. Jain & S. R. K. Iyenger, Narosa Publishing House.
6. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
7. Mathematics for Engineers by K. S. Bhatia, CBS Publishers & Distributors.
8. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley Publication.
9. The Laplace Transform: Theory and Applications by David K. W. Wong, World Scientific Publishing Company.
10. The Fourier Transform and Its Applications by Ronald N. Bracewell, McGraw-Hill Education.


## JCS 202 DATA STRUCTURES

**Course Outcome:**

**CO1:** Able to prove correctness of algorithm with inductive proofs and analyzing worst-case execution times with asymptotic analysis.

**CO2:** Implement linear and non-linear data structures.

**CO3:** Able to solve real world problems by selecting appropriate data structures.

**CO4:** Analyze and implement various sorting and searching algorithms.

**CO5:** Implementation of Trees and Graphs and perform various operations on thesedata structures.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Introduction:** Basic Terminology, Elementary Data types and Organization, running time of program, Time and Space Complexity, Asymptotic notations: Big Oh, Big Theta and Big Omega, Time-Space trade-off, Abstract Data Types (ADT).<br>**Concepts of Arrays**: Single and Multidimensional Arrays, Row Major Order, and Column Major Order, Accessing of elements of array and derivation of Index Formulae, Insertion and deletion operations, Sparse Matrices and their representations | **8 Hrs** |
| **Unit II** | **Stacks and Queues:** Introduction to data structures like Stacks and Queues. Operations on Stacks and Queues, Array representation of Stacks, Applications of Stacks: recursion, Polish expression and conversion of infix expression to prefix and Postfix expression, Operations of Queues, Representations of Queues, Priority queues<br>**Linked Lists:** Singly linked lists, Representation of linked list, Operations of Linked list such as Traversing, Insertion and Deletion, Searching, Applications of Linked List. Concepts of Circular linked list and doubly linked list and their Applications. Stacks and Queues as linked list. | **8 Hrs** |

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|---|---|---|
| **Unit III** | **Searching and sorting Techniques:** Concept of Searching, Sequential search, Index Sequential Search, Binary Search. Concept of Hashing & Collision resolution Techniques used in Hashing. Sorting: Quick Sort, Merge Sort, and Heap Sort | **8 Hrs** |
| **Unit IV** | **Trees:** Definition and traversals: pre-order, post order, in order. Common types and properties of binary trees, Operation of Insertions , Deletion, Searching & Modification of data in Binary Search, Huffman coding using binary trees | **6 Hrs** |
| **Unit V** | **Graphs**: Basic Definition and Terminology, Representation of Graphs: Adjacency Matrices and List Representations of Graphs, Graph Traversal: Breadth First Search (BFS), Depth First Search (DFS), Minimum Spanning Tree: Prim's, Kruskal's | **6 Hrs** |

**DATA STRUCTURES PRACTICALS**

**Preamble**: The objective of the course is to introduce the basic ideas and concepts of Data Structure. This will help students to design and implement real world problem solutions using different Data Structure approaches and algorithm concepts

**List of experiments**

15. Write a program to implement linear search, Binary search.
16. Write a program to implement, Insertion Sort and Selection Sort.
17. Write a program to implement quick Sort with a given list of integers inascending orders.
18. Write a program to implement Heap Sort with a given list of integers inascending orders.
19. Write a program to implement Merge Sort with a given list of integers inascending orders
20. Write a program to implement stack using Array.
21. Write a program to implement stack using Linked Lists.
22. Write a program to implement Queue and circular queue using Array
23. Write a program to implement Queue and circular queue LinkedLists
24. Write a program to implement a single link list and its operations.
25. Write a program to implement double link list and circular and its operations
26. Write a program to implement Binary Tree and its Traversal.
27. Write a Program to implement Breadth First Search and Depth First Search.
28. Write a program to implement Minimum cost Spanning tree

**Text Books**


3. Lipschutz, "Data Structures" Schaum's Outline Series, Tata McGraw-hill Education (India) Pvt. Ltd.
4. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd Delhi India.


**Reference Books:**


5. Thareja, "Data Structure Using C" Oxford Higher Education.
6. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, "Data Structures Using C and C++", PHI Learning Private Limited, Delhi India.

7. Michael T. Goodrich, Roberto Tamassia, David M. Mount "Data Structures and Algorithms in C++",Wiley India. P. S. Deshpandey, "C and Data structure", Wiley Dreamtech Publication.
8. Cracking the Coding Interview",Gayle Laakmann McDowell,Career Cup.

**Web References**

5. https://nptel.ac.in/courses/106102064
6. https://onlinecourses.swayam2.ac.in/cec19_cs04/preview
7. https://www.coursera.org/learn/data-structures
8. https://www.my-mooc.com/en/categorie/algorithms-and-data-structures

## JCS 204 INTRODUCTION TO PYTHON PROGRAMMING

**Course Outcome:**

**CO1:** Apply the syntax of Python Programming Language.

**CO2:** Implement various mutable and immutable data structures.

**CO3:** Demonstrate Python functions to facilitate code reuse and manipulate strings.

**CO4:** Demonstrate the use of built-in functions to navigate the file system.

**CO5:** Apply python packages and libraries.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| **Unit I** | **Introduction to Python Basics:**Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program<br>**Python Program Flow Control Conditional blocks:** if, else and else if, Simple for loops in python, For loop using ranges, string, list and dictionaries. Use of while loops in python, Loop manipulation using pass, continue, break and else. Programming using Python conditional and loop blocks | **6 Hrs** |
| **Unit II** | **Python Complex data types:** Using string data type and string operations, Defining list and list slicing, Use of Tuple data type, String, List, Set and Dictionary, Manipulations Building blocks of python programs, string manipulation methods, List manipulation. Dictionary manipulation, Programming using string, list and dictionary in-built functions | **6 Hrs** |
| **Unit III** | **Functions:** Def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, Introduction to functional programming and Lamda function , map, filter and reduce , Iterator and Generator in Python, Exception Handling | **6 Hrs** |
| **Unit IV** | **Python File Operations:** Reading files, Writing files in python, Understanding read functions, read, readline, readlines. Understanding write functions, write and writelines Manipulating file pointer using seek Programming, using file operations | **8 Hrs** |

**PYTHON PROGRAMMING PRACTICALS**

**Preamble**: Explore the basic concepts of python programming for various applications.

**List of experiments**

1) Execution of expressions involving arithmetic, relational, logical, and bitwise operators
2) A) Write a python Program to read a number and display corresponding day using if_elif_else?
   B) To write a python program to compute the GCD of two numbers
   C) To write a python program first n prime numbers
3) Write a python program to demonstrate the looping mechanism like while loop, For loop and nested loops
4) To write a python program to perform Matrix Addition and Multiplication
5) To write a python program merge sort.
6) To write a python program Linear and Binary search
7) Write a Python function to produce the outputs such as:

a)
```
*
```
b)
```
* * *
```
c)
```
* * * * *
```
d)
```
 * * *
```
e)
```
  *
```

(b)
```
    1
   232
  34543
 4567654
567898765
```

8) Create a list and perform the following methods.

1) Insert (), 2) remove (), 3) append() , 4) len (), 5) pop() , 6)clear()

9) Create a dictionary and apply the following methods 1) Print the dictionary items 2) access items 3) useget () 4) change values 5) use len ()

10) Write a program to create a menu with the following options.

1. TO PERFORM ADDITITON
2. TO PERFORM SUBSTRACTION
3. TO PERFORM MULTIPICATION
4. TO PERFORM DIVISION

Accepts users input and perform the operation accordingly. Use functions with arguments.

A) Write a program to find sum of the numbers for the elements of the list by using reduce ()?

B) Write a program for map () function to double all the items in the list?

11) Write a Python function that takes a string as an input from the user and determines whether it is palindrome or not.

12) Write a Python function that takes a string as an input from the user and displays its

reverse.

13) Write a Python program to use a lambda function for adding 4 numbers.

14) A) Write a python program to print date, time using date and time functions

B) Write a python program which accepts the radius of a circle from user and computes the area (use math module)

C) Write a python program to create a package (Engg), subpackage (years),modules (sem) and create staff and student function to module?

D) Using a numpy module create array and check the following: 1. List with type float 2. 3*4 array with all zeros 3. From tuple 4. Random values

E) Using a numpy module create an array and check the following: 1. Type of array 2. Axes of array 3. Shape of array4. Type of elements in array.

F) Write a function that reads a file file1 and displays the number of words and the number of vowels in the file.

G) Write a Python function that copies the content of one file to another.

**H)** Write a Python function to handle user exception of a given problem.

**Text books**


1. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
2. John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013


**Reference Books**


1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, ―Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.2015.
4. Kenneth A. Lambert, ―Fundamentals of Python: First Programs‖, CENGAGE Learning, 2012.
5. Charles Dierbach, ―Introduction to Computer Science using Python: A Computational Problem Solving Focus, Wiley India Edition, 2013.
6. Paul Gries, Jennifer Campbell and Jason Montojo, ―Practical Programming: AnIntroduction to Computer Science using Python 3‖, Second edition, Pragmatic Programmers, LLC, 2013


**Web Resources**

1. https://programming-24.mooc.fi/
2. https://www.my-mooc.com/en/mooc/python-programming-essentials
3. https://onlinecourses.nptel.ac.in/noc24_cs57/preview
4. https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

## JHS 101 /201 ENGLISH FOR TECHNICAL COMMUNICATION

**Course Outcome:**

**CO1:** Memorize and repeat the recordings to improve their listening and speaking skills.

**CO2:** Identify proper words to summarize the recordings and write grammatically andlogically correct statements.

**CO3:** Use the techniques of reading and write paragraphs in an organized manner.

**CO4:** Implement their understanding of the concepts of communication and use their communicative competencies in different social and cultural context.

**CO5:** Distinguish themselves by strengthening their discourse competencies andpresentation skills.

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Text :** Emerging Technologies-Trends & Impact<br>Listening: Listening as a process, difference between listening & hearing, Types oflistening, Three As of Listening. Qualities of a good listener<br>**Speaking:** Phonetics: English Sounds: Vowels: Monophthong & diphthong, Consonants: classification based on the place and manner of articulation<br>Stress/Accent: Primary and SecondaryIntonation: Rising and Falling<br>**Lab Practice: Experiment 1:** Listening to the recordings on the aforementioned topics & record their videos and answer the questions given based on the recordings.<br>**Experiment 2:** Listening to an expert talk on the topic by an expert and record the same | 6 Hrs |
| Unit – II | **Text:** Engineering Ethics<br>Vocabulary: Synonyms, Antonyms, Homonyms, Homophones, Affixation (Prefix &Suffix)<br>**Word Formation:** Rules of Word Formation: Derivations, Polysemy, Compounding,Conversion, reduplication, blending & clipping<br>**Writing:** Linking statements: Parts of Speech (Noun, Pronoun, Verb, Adverb, Adjective, Prepositions, conjunctions, Interjections & Articles) Phrases, clauses, and Tenses.<br>**Removing ambiguities from the sentences:** Use of Dangling Participle, Split Infinitive,Squinting Construction<br>**Lab Practice**:Experiment: Listening to the articles on the aforementioned topics and write & speak 20-25 grammatically correct and cohesive statements. | 06 Hrs |
| Unit – III | **Text**: Environmental Consciousness (SDG 15)<br>**Reading:** Techniques of Reading: Intensive-extensive, Silent-loud, Fast **Reading:** Skimming & Scanning, Slow Reading: Churning & Assimilation.<br>**Writing:** Paragraph Development Methods: Inductive, Deductive, Linear, spatial, Chronological, exposition and Interrupted ways.<br>**Lab Practice:** Experiment: Read the aforementioned topics using the techniques of reading & write cohesive paragraph**.** | 06 Hrs |

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| **Unit – IV** | **Text:** Environmental Consciousness (CSR)<br>**Communication Concepts:** Meaning, Process, Levels: Intrapersonal, interpersonal & Organizational, Communication Barriers: Psychological barriers, Physical barriers, cultural barriers, language barriers, attitudinal barriers, gender barriers, physiological barriers.<br>Communicative Competencies: Socio cultural Competencies.<br>**Lab Practice: Experiments:**<br>3. Group discussion on Corporate Social responsibilities.<br>**4.** Debate for handling Corporate Social responsibilities | **6 Hrs** |
| **Unit – V** | Text: Case Studies-<br>4. Re branding Godiva<br>5. Barrack Obama's re branding plan: Attack, Orate,Repeat.<br>6. Communicative Competencies: Discourse competencies.<br>**Perceptive Communication:** Working on Communication Styles by understanding purpose, Analyzing audience & locale, Collecting material, Organizing and sequencing the data, Making Visuals.<br>**Factors affecting the presentation:** Kinesics, Paralinguistic aspects, Proxemics &Chronemics<br>**Lab practice:** Experiments:<br>3. Role Play based on Case studies from the business world.<br>**4.** Presentation | **06 Hrs** |

**Reference Books:**


8. Technical Communication: Principles and Practice, Third Edition, Ed. By MeenakshiRaman & Sangeeta Sharma, Oxford University Press, 2018, New Delhi.
9. Mindscapes-English for Technologists and Engineers, Orient Black swan, 2012.
10. Personality Development & Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
11. Personality: Theory and Research" by Daniel Cervone and Lawrence A. Pervin, Wiley, 2019
12. A Course in Phonetics and Spoken English by J.Sethi & P. V. Dhamija, Prentice Hall,India, 1999

# JHS 203 VALUE EDUCATION

**Course Outcome:**

**CO1:** Explain the values fundamentals for ethical living in society

**CO2:** Demonstrate harmony and confidence towards duty in society

**CO3:** Develop the personality to work with universal way of living with associates and nature

**CO4:** Interpret human rights for welfare and integration of citizen of the nation

**CO5:** Correlate beliefs and self management for healthy mindful living

| UNITS | Syllabus | No of Hours |
|---|---|---|
| Unit – I | **Values and self-development:** Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation, Standards and principles, Value judgments**.** | 5 Hrs |
| Unit – II | **Importance of cultivation of values:** Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National Unity, Patriotism, Love for nature, Discipline | 5 Hrs |
| Unit – III | **Personality and Behaviour Development:** Personality and Behaviour Development Soul and Scientific attitude, Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness, avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, doing best for saving nature | 8 Hrs |
| Unit – IV | **Human Rights and Rules: Human Rights** – Universal Declaration of Human Rights – Human Rights violations, National Integration – Peace and non-violence – Dr. A P J Kalam's ten points for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building. | 6 Hrs |
| Unit – V | **Character and Competence:** Holy books vs Blind faith, Self-management and good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of Women, all religions and same message, mind your Mind, Self-control, Honesty, Studying effectively | 6Hrs |

**Reference Books:**


3. Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University Press, New Delhi
4. T. Anchukandam and J. Kuttainimathathil(Ed) Grow Free Live Free, Krisitu Jyoti Publications, Bangalore (1995)