**OP Jindal University
Raigarh-Chhattisgarh**

UNIVERSITY OF STEEL TECHNOLOGY
AND MANAGEMENT

*Scheme and Syllabus of*
Bachelor of Technology
**School of Engineering**
Session- 2021-2025

## Program Outcomes

**PO-1:** Knowledge and Problem Solving: Acquire in-depth scientific knowledge of their discipline both in theory and practical, demonstrate basic skills, investigate, apply, and solve the problems in a variety of contexts related to science and technology.

**PO-2:** Communication and Teamwork: Develop skills to communicate effectively to diverse platforms and contribute meaningfully to different capacities as a leader, team member or individual.

**PO-3:** Modern tools and techniques for Scientific Experiments: Apply modern tools and techniques to carry out scientific experiments accurately, record, analyze and predict the result for valid conclusion with clear understanding of limitations.

**PO-4:** Logical thinking: Develop logical thinking and expertise with precision, analytical mind, innovative thinking, clarity of thought, and systematic approach for proving or disproving the facts after mathematical formulation. with precision, analytical mind, innovative thinking, clarity of thought, expression, and systematic approach

**PO-5:** Skill development and Employability: develop elementary computing and soft skills to prepare students for industry, entrepreneurship and higher education with precision, analytical mind, innovative thinking, clarity of thought, expression, and systematic approach.

**PO-6:** Ethics and citizenship: Able to recognize different value systems and ethical principles; and commit to professional ethics, norms, and responsibilities of the science practice and act with informed awareness to participate in civic life activities.

**PO-7:** Society, Environment and Sustainability: Enhance ability to elicit views of others and understand the impact of various solutions in the context of societal, economic, health, legal, safety and environment for sustainable development.

**PO-8:** Life-long learning: Acquire fundamental knowledge for lifelong learning to participate in the extensive context of socio-technological change as a self-directed member and a leader.


## Programme Specific Outcome (PSO)

**PSO_1:** Design and develop infrastructural facility using concepts of Mathematics, Civil Engineering and other related disciplines to meet end users' objectives.

**PSO_2:** Test and analyze the quality of various civil engineering materials and to integrate the same to assure quality in construction.

**PSO_3:** Ensure the holistic growth through the awareness of effective communication, ethical responsibilities and physical/mental fitness.

**PSO_4:** Build a solid foundation in the domain of Civil Engineering for developing analytical, technical, professional & management skills

| Programme: | B.Tech | Semester : | I |
|---|---|---|---|
| Name of the Course: | Mathematics-I | Course Code: | SOE-B-FY101 |
| Credits : | 5 | No of Hours : | 50 |
| Max Marks: | 100 | | |

**Course Description:**
Learning Objective 1. Find the Rank and Inverse of matrix by using Elementary Transformations. 2. Solve systems of linear equations (homogeneous & non-homogeneous), Eigen values and Eigen vectors of matrix. 3. Find the nth derivative by using Leibmitz's, Taylor's and Maclaurin's Theorem. 4. Differentiation of functions having more than one variable. 4. Integration of functions having nth power, double and triple integral and applications. 5. Gradient, divergence and curl, line integral, Surface integral and Volume integral. 6. Relation between line integral, Surface integral and Volume integral.

**Course Outcomes:**
On successful completion of this course, students will be able to:

| CO1 | Find Rank and Inverse of matrix by using Elementary Transformations and Solve systems of linear equations |
|---|---|
| CO2 | Understand applications in Engineering Problems |
| CO3 | Understand Successive Differentiation, Leibmitz's Theorem for nth derivative of two functions. |
| CO4 | Understand Taylor's and Maclaurin's Theorem and tracing of curves. |
| CO5 | Understand Limits, continuity and differentiability of function of several variables. |
| CO6 | Understand Partial derivatives, Maxima and minima of function of two or more variables. |
| CO7 | Understand Reduction formulae, Double and triple integrals, Change of order of integrations. Beta and Gamma functions; Applications to area and volume. |
| CO8 | Understand Beta and Gamma functions, Applications to area and volume. |
| CO9 | Understand Gradient, divergence and curl and Properties of gradient, divergence and curl. |
| CO10 | Understand Line integral, Surface integral, Volume integral,  Green's theorem in a plane; Gauss's Divergence theorem; Stoke's theorem. |

**Syllabus**
**Unit 1: Linear Algebra**
Matrix algebra; Elementary transformations; Inverse of a matrix; Rank of matrix; Systems of linear equations (homogeneous & non-homogeneous); Eigen values and Eigen vectors; Cayley-Hamilton theorem; Applications of matrices in Engineering.

**Unit 2: Differential Calculus**

Successive differentiation; Leibnitz's theorem; Taylor's and Maclaurin's series; Radius of curvature; Curve tracing.

**Unit 3: Multivariable Calculus**

Limits, continuity and differentiability of function of several variables; Partial derivatives; Maxima and minima of function of two or more variables; Method of Lagrange's multipliers; Differentiation under integral sign

**Unit 4: Integral Calculus**

Reduction formulae; Double and triple integrals; Change of order of integrations; Beta and Gamma functions; Applications to area and volume

**Unit 5: Vector Calculus**

Scalar and vector point functions; Gradient, divergence and curl; Properties of gradient, divergence and curl; Line integral; Surface integral; Volume integral; Green's theorem in a plane; Gauss's Divergence theorem; Stoke's theorem

**Text Books:**

1. Advanced Engineering. Mathematics by Erwin Kreyszig (8th edition) – John Wiley & Sons.
2. Higher Engineering. Mathematics by B. S. Grewal (38th edition)-Khanna Publishers.
3. Applied mathematics for Engineers & Physicists by Louis A. Pipes – Mc Graw Hill.
4. Advanced Engineering Mathematics by R. K. Jain & S. R. K. Iyengar – Narosa Publishing House.

**Reference Books:**

1. Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.
2. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, Calculus, Eleventh Edition, Pearson.
3. D. Poole, Linear Algebra : A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. Ray Wylie C and Louis C Barret, Advanced Engineering Mathematics, Tata Mc-Graw-Hill; Sixth Edition.
6. P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd.

## CO-PO Correlation

| Course Outcomes | Course Name: MATHEMATICS- I [SOE-B-FY101] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Program Outcomes (POs) | | | | | | | | Program Specific Outcome (PSO) | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 2 | 2 | | 1 | 2 | | 2 | 1 | 2 | 1 | 1 | 2 |
| CO2 | 2 | | | | | 1 | | 2 | 3 | 2 | 2 | 2 |
| CO3 | 1 | | 1 | | 1 | | 1 | | 2 | 2 | 1 | 3 |
| CO4 | 1 | | | | 2 | | | | 1 | 2 | 3 | 4 |
| CO5 | 1 | 2 | 2 | 2 | | | 2 | 1 | 2 | 1 | 1 | 2 |
| CO6 | 1 | | | | 2 | 2 | | | 3 | 2 | 2 | 2 |
| CO7 | 1 | 1 | 1 | | | | | 1 | 2 | 2 | 1 | 3 |
| CO8 | 1 | | 1 | | | 1 | 2 | | 1 | 2 | 3 | 4 |
| CO9 | 2 | | | 1 | 1 | | | 1 | 2 | 1 | 1 | 2 |
| CO10 | 1 | | 1 | | 1 | | 1 | | 3 | 2 | 2 | 2 |

**Note:** 1: Low, 2: Moderate, 3: High.

# OP JINDAL UNIVERSITY

OP Jindal Knowledge Park, Punjipatra, Raigarh-496109

## Department of Civil Engineering

OPJU

UNIVERSITY OF STEEL TECHNOLOGY AND MANAGEMENT

ESTD. 2014

| Programme : | B.Tech. | Semester : | I |
|---|---|---|---|
| Name of the Course: | Engineering Chemistry | Course Code: | SOE-B-FY102 |
| Credits : | 3 | No of Hours : | 45 |
| Max Marks : | 100 | | |

**Course Description:**

This course aims at giving students theoretical understanding about the basic concepts of Chemistry and to acquire the skills required for an engineer. Reaction rates and factors that influence the reactions and the importance & utility related to it is introduced. The importance of water in industrial usage, significance of corrosion control to protect the structures, polymers and their usage as an important material to be studied. The students will gain knowledge about fuel, characteristics and ranking.

**Course Outcomes (CO)**

| Students will be able to | |
|---|---|
| CO 1 | Demonstrate an understanding of scientific facts and concepts, scientific methods and techniques, scientific terminology, and methods of presenting scientific information |
| CO 2 | Apply and use scientific facts and concepts, scientific methods and techniques, scientific terminology to communicate effectively and apply appropriate methods to present scientific information |
| CO 3 | Facilitate the application of chemical principles in engineering and technology for future technopreneurs and researchers |

**Syllabus**

**Unit I: Reaction Kinetics**

Factors affecting rate of reaction (reactant concentrations, temperature, physical states and surface areas, solvent and catalyst); Rate of reaction, mathematical expression, units, instantaneous & average rate; Rate Law-Differential & Integrated Rate law, order and molecularity, determination of rate law- Differential, Integral, Half-life, Initial rate & graphical method, rate constants (up to second order with one reactant only); Half-lives and radioactive decay kinetics (carbon dating); Collision model of reaction kinetics, activation energy, Arrhenius equation; Catalysis.

**Unit II: Corrosion Chemistry**

Corrosion fundamentals (causes, consequences & driving force); Theories of Corrosion: Dry/ Chemical Corrosion & Wet/ Electrochemical corrosion; Forms of corrosion- Galvanic, Concentration Cell / Differential aeration, wire-fence, waterline, pitting, crevice, stress corrosion, corrosion fatigue, microbial & soil corrosion; Factors affecting corrosion: nature of the metal & corroding environment: Corrosion Control- Proper design, materials selection, protective coatings, use of inhibitors, modifying/ alteration of environment, cathodic protection (sacrificial anodic & impressed current cathodic).

### Unit III: Water Chemistry

Introduction, sources of water, impurities present in water & their effect, requirement of boiler feed water; Alkalinity – types & determination (including numerical problems); Hardness - definition, types, determination; Water softening process- Lime and Soda, Zeolite & Ion Exchange Process (including numerical problems)**;** Boiler problems (causes & removal) **-** sludge and scale, caustic embrittlement, boiler corrosion, priming and foaming; Conditioning of boiler feed water (carbonate, phosphate, colloidal & calgon conditioning).

### Unit IV: Fuels Chemistry
Introduction (definition & classification, characteristics, combustion); Calorific value (HCV & LCV) & its determination - by Dulong's formula & Bomb Calorimeter (principle & working); Coal, ranking & analysis - proximate & ultimate analysis and their importance in ranking; Coke, importance as fuel, manufacturing & carbonization- high temp & low temp carbonization.

### Unit V: Polymer Chemistry

Fundamentals (nomenclature, degree of polymerization, monomer units & classification), Polymerization- Addition, Condensation & Co-polymerization; glass transition temperature, tacticity & Ziegler-Natta catalyst; Preparation, properties, and technical application of major polymers (polyethylene, PVC, Teflon, Nylon 6,6, Bakelite); Introduction to Resin, Types of Resins, Thermoplastic & thermosetting Resin, Industrial applications of resin; Elastomers, natural rubber & vulcanization process.

**Textbooks:**
1. Engineering Chemistry by P.C. Jain & Monica Jain, 2008
2. A textbook of Engineering Chemistry by Dara, S.S. & Umare, S.S., S Chand, 2013
3. Engineering Chemistry by Palanna O.G., Mc Graw Hill Edu., 2017

**Reference Books**
1. Chemistry in Engineering and Technology (Vol-2) by J. C. Kuriacose, J. Rajaram (Tata McGraw Hill).
2. Engineering Chemistry by M.M. Uppal, Revised by S.C. Bhatia (Khanna Publishers).
3. Corrosion for Science and Engineering, Trethewey and Chamberlain, 2nd Edition, Pearson Education 1998
4. Corrosion Engineering, Fontana, 3rd Edition, McGraw Hill, 1986
5. Corrosion Engineering, Roberge, McGraw Hill, 2008
6. Principles of Chemistry, Laidler, K.J., Harcourt, Brace & World, New York, 1966
7. Physical Chemistry, Moore, W.J., Prentice-Hall, 1962
8. Inorganic Chemistry, Moeller, T., John Wiley, 1982

## CO - PO Correlation

| Course Name: Engineering Chemistry | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Program Outcome | | | | | | | | PSOs | | | |
| Course Outcomes | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 2 | 1 | | | | | | | 1 | | | |
| CO2 | 1 | 2 | | | | | | | | 2 | | 3 |
| CO3 | | 1 | 1 | | | | | | 2 | | 2 | |

**Note:** 1: Low, 2: Moderate, 3: High.

| Programme: | B.Tech. | Semester : | I |
|---|---|---|---|
| Name of the Course: | Physics-I | Course Code: | SOE-B-FY103 |
| Credits : | 3 | No of Hours : | 45 |
| Max Marks: | 100 | | |

**Course Description:**

Applied Physics is a science course for students interested in the technical fields. This course is designed for the student who needs a broad understanding of physics and the ability to apply those principles in the work force. The Physics-I course is basically fundamentals of electronics, theory and applications of laser, concepts of Newton's law of motion, parameter of Mechanics, interference of light, good conditions for interference and its engineering applications. The purpose of studying Physics-I is to introduce the mind to the scientific method of analysis through which, the practical problems can be identified, explanations generated and logical solutions selected which in essence are requisites for the development of good engineering sense.

**Course Outcomes:**
After Completion of the course Students will be able to:

| CO1 | Understand basics of Solid-State Physics. |
|---|---|
| CO2 | Know the fundamental principles of semiconductors |
| CO3 | Understand the interference from wave optics concepts and know its applications. |
| CO4 | Acquire knowledge and understanding of fundamental principles of modern physics relevant to problems of Electrical and Electronics Engineering |

**Syllabus:**
**Unit I.**
**Solid State Theory:** Formation of energy bands in metals, Classification of solids on the basis of energy band diagram, Conductivity of Semiconductors, mobility in conductor & semiconductor.

**Unit II.**
**Electronics:** Electrons and holes in an intrinsic semiconductors, Donor and acceptor impurities, Fermi level, Carrier densities in semiconductor, Hall effect, Diffusion, Recombination, Junction Diode, PN junction characteristic, Effect of Temperature, Depletion Layer, Breakdown Mechanism: Zener and Avalanche Breakdown, Half wave and full wave rectifiers, filters, Zener diode as a regulator, Transistors (PNP & NPN) Operation, CE, CB, CC configuration.

**Unit III.**

**Lasers:** Principles and working of laser, population inversion, Laser characteristics, components of laser, Einstein's coefficients, He-Ne laser, Ruby laser, Laser applications.

**Unit IV.**

**General Mechanics:** Central and non-central forces, Inverse square force, Potential energy function F = -grad V, equipotential surfaces and meaning of gradient. Conservative and non-conservative forces, Conservation laws of energy & momentum, Harmonic oscillator, damped harmonic motion forced oscillations.

**Unit V.**

**Interference of light:** Superposition of Waves, Conditions for Interference, Methods of formation of coherent sources, Theory of Interference, Fresnel's Biprism, Newton's ring, Diffraction grating, Rayleigh's criterion of resolution, Engineering applications of Interference phenomenon.

**Texts/ References:**
- Beiser, Perspectives in Modern Physics, McGraw Hill, 1969.
- Lengyel, Introduction to Laser Physics, Wiley Interscience 1971.
- E. Siegman, An Introduction to Laser and Masers, McGraw Hill 1971.
- S. H. Patil, Elements of Modern Physics, Tata McGraw Hill, 1989.
- A.K. Ghatak and S. Loknathan, Quantum Mechanics, Theory and Applications, McMillan India, 1984.
- Michael Sayer & Abhai Mansingh, "Measurement, Instrumentation and experiment design in physics and engineering", Prentice Hall of India Pvt. Ltd., New Delhi – 110 001, 2003.
- P. Malvino, "Electronic Principles", Tata McGraw-Hill, 1979.
- H. V. Malmstadt, "Electronics for Scientists", New York : W. A. Benjamin, 1962.
- J. W. Goodman, An Introduction of Fourier Optics, McGraw Hill,N.Y., 1968.

### CO-PO & PSO Correlation

| Course Name: Physics-I (SOE-B-FY103) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Outcomes** | **Program Outcomes** | | | | | | **PSO** | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | |
| CO2 | 3 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | | 1 | | |
| CO3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | | 2 | |
| CO4 | 3 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | | 1 | | 2 |

**Note:** 1: Low 2.: Moderate 3: High

| Programme: | B. Tech | Semester: | I |
|---|---|---|---|
| Name of the Course: | Basic Computing | Course Code: | SOE-B-FY104 |
| Credits: | 4 | No of Hours: | 55 |
| Max Marks: | 100 | | |

**Course Description:**

This course will expose students to developments in computer technology and understand the working of a computer system. It will introduce end-user computing and build problem solving skills by using C programming.

**COURSE OUTCOMES:**

On successful completion of this course, students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Makes students gain a broad perspective about the uses of computers in engineering industry. |
| CO2 | Develops basic understanding of computers, the concept of algorithm and algorithmic thinking. |
| CO3 | Develops the ability to analyze a problem, develop an algorithm to solve it. |
| CO4 | Develops the use of the C programming language to problem solving and develops the basic concepts and terminology of programming in general. |
| CO5 | Introduces the more advanced features of the C language for implementation in diverse platforms. |

**Syllabus:**

**Unit I Introduction to Computers**

Basic Concepts, Evolution, Computer Organization, Peripheral Devices, Software – System Software, Application Software, Computer Languages – Low Level, Machine Level and High-Level Languages, Compiler and Assembler, Microprocessors, Memory, Technological Trends. Algorithms and Flow Chart: Algorithm and its characteristics, flowchart, Algorithm involving Decisions and Loops, Problem solving methods. Pseudo code, top down & bottom-up approaches of program design

**Unit II Introduction to C**

History of C, Features of C Language, Structure of a C program, Basic Input Output Execution of C Program- Compiling, Linking, debugging, and running a program. Variables, Constants and Operators: C character set – Tokens, Constants Keywords, identifiers, and Variables. Data types – Data type Qualifiers, Declaration of variables, Arithmetic, Logical, Assignment, Relational, Increment and Decrement, Conditional, Bit wise, Special Operator, Precedence and Associativity

### Unit III Looping and Functions
Branching & Looping: Introduction – Simple if statement, if-else, else-if ladder, nested if-else, Switch statement, go to statement. Loops - while, do-while, for loop, nested loops infinite loops Functions: Introduction to functions – Declaration, definition and calling of function, Function arguments and return value, scope and lifetime of variables call by value, call by reference. Storage classes. Recursion. Library functions

### Unit IV Arrays and Pointers
Arrays: Declaration and initialization of one dimensional, two dimensional and character arrays, accessing and manipulating array elements, array applications - matrix operations, searching, sorting. String manipulations. Pointers: Pointers concepts, pointers and function arguments, pointer arithmetic

### Unit V Structures and File Handling Structure
Structure declaration, definition, initialization and accessing. Structure Assignment, Nested Structure, Structures and Functions, Structures and arrays. File Handling: Concept of a file – Data Organization, reading, writing, manipulating and troubleshooting, file types, file opening modes.

### Textbooks
1. "Let us C" by Yashvant Kanetkar, BPB Publications.
2. Raja Raman V., "Fundamental of Computers" (4th edition.), Prentice Hall of India, New Delhi.

### Reference Books
1. "C Programming Language" by B. W. Kernighan & D.M. Ritchie.
2. "Programming with C (SCHAUM's Outlines Series)" by Byron Gottfried.

### CO-PO&PSO Correlation

| Course Name: Basic Computing | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Program Outcomes** | | | | | | | | **PSO** | | | |
| Course Outcomes | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 2 | | | 1 | 3 | | | | 1 | | 1 | |
| CO2 | 1 | | 2 | 2 | | | | | | 2 | | 3 |
| CO3 | 3 | | 1 | 1 | 2 | | 2 | | 2 | | 2 | |
| CO4 | 2 | | | 1 | | | | | | 3 | | 1 |
| CO5 | | 1 | | | 1 | | 2 | 3 | | 1 | 2 | |

**Note:** 1: Low, Note – 1: Low , 2: Moderate, 3: High

| Programme: | B. Tech. | Semester : | I |
|---|---|---|---|
| Name of the Course: | Engineering Graphics | Course Code: | SOE-B-FY105 |
| Credits: | 3 | No of Hours : | 50 |
| Max Marks: | 100 | | |

**Course Description:**

The course in Engineering Graphics is aimed at inculcating the ability of imagination in the mind of the students, to improve their visualization skills and logical thinking, to build in them a capability of communicating through this unique language of engineers by learning conventional graphical techniques as well as computer-aided drawing skills, to develop interpretation competencies of professional drawings, to transfer an abstract object onto the paper through drawing.

**Course Outcomes:**

On successful completion of this course, students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Gain knowledge of Fundamentals of Engineering drawing. |
| CO2 | Draw orthographic projections of lines, planes, and solids |
| CO3 | Draw sections of solids and development of lateral surfaces including cylinders, cones, prisms, and pyramids. |
| CO4 | Construct isometric scale, isometric projections, and views. |
| CO5 | Draw projections of lines, planes, solids, and sections of solids including cylinders, cones, prisms, and pyramids using AutoCAD. |

**Syllabus:**

**Unit 1 :**

**Fundamentals of Engineering Drawing**

Introduction to Drawing instruments & their uses, Engineering Lettering, Drawing sheet - Layout of drawing sheets, sizes of drawing sheets, Line – Types of lines and their applications in Engineering Drawing, Dimensioning. Introduction to scales

**Engineering Curves**

Conic sections and Basic construction of Cycloid, Involutes

**Introduction to Computer-Aided Drafting (CAD)**:

Basic Drawing and Editing Commands, Dimensioning, Knowledge of setting up layers, Text. **(To be covered with CAD package)**

**Unit 2 :**

**Projections of Points**

Introduction to projections, Projection of points in all four quadrants.

**Projections of Lines**

Projections of lines (by First angle projection method only) parallel to one or both the reference planes, perpendicular to one of the reference planes. Projections of lines inclined to either horizontal plane or vertical plane and both the planes i.e., oblique lines. Trace of a line.

**Unit 3 :**

**Projection of Planes**

Projections of planes (by First angle projection method only) inclined to either horizontal plane or vertical plane and both the planes i.e., Oblique planes. Use change of positions or Auxiliary plane method.

**Projection of Solids**

Introduction to Solids, Types of Solids, Projection of Solids inclined to one and both the reference plane. Use change of positions or Auxiliary plane method.

**Unit 4 :**

**Section of Solids**

Projections of geometric solids cut by plane perpendicular to at least one reference plane (Exclude Curved section Plane).

**Development of Surfaces**

Methods of development of lateral surfaces of various solids, development of surfaces of cut solids.

**Unit 5 :**

**Orthographic Projection**

Orthographic projections of given pictorial view by First angle method of projections only. Drawing of orthographic projections using Auto CAD **(only for Term Work)**

**Isometric Projection**

Introduction, Isometric scale, Isometric projection and Isometric views of solids and objects.

**Text books:**
1. N. D. Bhatt and V.M. Panchal, Engineering Drawing, Plane and Solid Geometry, Charotor Publication House, Anand, Gujarat, India.
2. Dhaanjay A. Jolhe, Engineering Drawing with an Introduction to Auto CAD, Tata Megraw-hill Publishing Co. Ltd, New Delhi, India.
3. Basant Agrawal and C.M. Agrawal, Engineering Drawing, Tata Megraw-hill Publishing Co. Ltd, New Delhi, India.
4. K. L. Narayana and P.L. Kannaiah, Engineering Drawing, Second Edition, Scitech Publications (India) Pvt. Ltd. Chennai.
5. K. C. John, Engineering Graphics for Degree, PHI Learning Pvt. Ltd. New Delhi, 2009
6. A. R. Bapat, Engineering Graphics, Allied Publications, New Delhi, India.
7. D. N. Johle, Engineering Drawing, S. Chand and Company Ltd., New Delhi, India.

**Reference Books:**
1. W. J. Luzadder, Fundamental of Engineering Drawing, Prentice Hall of India.
2. Basudeb Bhattacharyya, Machine Drawing Include Auto CAD Supplements, Oxford University Press, India.
3. French and Vierck, Graphic Science, Mc- Graw Hill international
4. K. Venugopal, Engineering Drawing and Graphics, New Age Publication.
5. R. K. Dhawan, Engineering Drawing, S. Chand and Company Ltd., New Delhi, India.
6. N. B. Shaha and B. C. Rana, Engineering Drawing, Person Education.

7. C. Jensen, J. D. Helsel and D. R. Short, Engineering Drawing and Design, Tata Megraw-hill Publishing Co. Ltd, New Delhi, India.
8. T. Jeyaproovan, Engineering Drawing and Graphics by using Auto CAD, Vikas Publication house, Pvt. Ltd. New Delhi, India.
9. M. L. Dhabhade, Engineering Graphics, Association of technical Authors, Pune India.
10. B. V. R. Gupta, M. Raja Roy, Engineering Drawing, I. K. International Pvt. Ltd, India.
11. R. K. Dhawan, Engineering Drawing, S. Chand and Company Ltd., New Delhi, India.

## CO-PO&PSO Correlation

| Course Outcome | Course Name: Engineering Graphics | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Program Outcome | | | | | | | | PSO | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 3 | | 2 | 3 | 3 | | | | 1 | 3 | | 3 |
| CO2 | 3 | 3 | 2 | 3 | 2 | | | | | | 1 | 1 |
| CO3 | 3 | 3 | 2 | 3 | 2 | | | | | | 1 | 1 |
| CO4 | 3 | 3 | 2 | 3 | 2 | | | | | | 1 | 1 |
| CO5 | 3 | 2 | 2 | 3 | 3 | | | | | | 1 | 1 |

**Note:** 1: Low 2: Moderate 3: High

| Programme: | B. Tech. | Semester : | I |
|---|---|---|---|
| Name of the Course: | Basic Electrical and Electronics Engineering | Course Code: | SOE-B-FY106 |
| Credits : | 3 | No of Hours : | 45 |
| Max Marks: | 100 | | |

**Course Description:**

The subject curriculum focuses on fundamentals of electrical and electronic circuits. It covers the DC and AC electrical circuit analysis, magnetic circuit analysis and description of basic electronics components and their applications.

**Course Outcomes:**

On successful completion of this course, students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Understand the basic concepts of Core Electrical Engineering subjects. |
| CO2 | Analyse different network theorems. |
| CO3 | Draw phasor diagram for various electrical circuits. |
| CO4 | Understand the fundamental of semiconductor devices. |
| CO5 | Know the different application of transistors. |

**Course Contents:**

**UNIT-1: DC Electrical Circuit Analysis:**

Voltage and current sources, dependent and independent sources, Source Conversion, Star-delta and delta-star conversions, Ohm's Law, Kirchhoff's Laws & their limitations, Nodal analysis, loop analysis and Mesh current methods, Superposition principle, Thevenin's and Norton's theorems, Maximum power transfer theorem.

**UNIT-2: AC Circuits:**

Single- phase AC Circuits: Single phase emf generation, average and effective values of sinusoids, R.M.S. value, form factor and peak factor of AC quantity, Concept of phasor diagram, Concept of Power factor, impedance and admittance, Active, reactive and apparent power, analysis of R-L, R-C, R-L-C series, parallel and series-parallel circuit and Resonance condition.

**UNIT-3: Magnetic Circuits:**

Basic definitions, magnetization characteristics of Ferro magnetic materials, self-inductance and mutual inductance, energy in linear magnetic systems, coils connected in series, AC excitation in magnetic circuits, magnetic field produced by

current carrying conductor, Force on a current carrying conductor. Induced voltage, fundamental laws of electromagnetic Induction, direction of induced E.M.F.

## UNIT-4: Semiconductor Diodes:

Introduction to semiconductor, Formation of P-N Junction, P-N Junction Diodes; Semiconductor Diodes, V-I Characteristics, Effect of Temperature on V-I Characteristics, Ideal Diode, Diode equation, Diode Resistance, Transition and Diffusion Capacitance. Light Emitting Diode, Zener Diode, Photodiode. Applications of Diodes.

## UNIT-5: Transistors:

Transistor: Introduction, Construction, Types: npn and pnp, Current components. Transistor as amplifier, Transistor Characteristics.
Digital logic fundamentals, Boolean Algebra, truth table, Logic Gates.

## Text Books:

1. E. Hughes, Electrical Technology, ELBS, 1997.
2. B L Theraja, Electrical technology, Basic Electrical Engineering, Volume 1, S Chand.
3. Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman & Halkias, TMH.
4. Electronic Devices and Circuit Theory – Boylestad & Nashelsky

## Reference Books:

1. Charles & Sadiku, Fundamentals of Electric circuits, TMH, Third Edition.
2. V. D. Toro, Basic Electrical Engineering, PHI, 2000.

## CO-PO & PSO Correlation:

| Course Name : BEEE (SOE-B-FY106) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Outcomes** | **Program Outcomes** | | | | | | | | **PSOs** | | | |
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **1** | **2** | **3** | **4** |
| **CO1** | 2 | 2 | 2 | | | 2 | | | 3 | | | 1 |
| **CO2** | 3 | 3 | 2 | | | | | | | 2 | | |
| **CO3** | 3 | 3 | 3 | | | | | | 1 | | 2 | |
| **CO4** | 3 | 3 | 3 | | | | | | 1 | | | 2 |
| **CO5** | 3 | 3 | 3 | | | 2 | | | 2 | 3 | 1 | |

**Note:** 1: Low  2.: Moderate 3: High

| Programme: | B. Tech. | Semester : | I |
|---|---|---|---|
| Name of the Course: | Basic Electrical and Electronics Engineering | Course Code: | SOE-B-FY107 |
| Credits : | 1 | No of Hours : | 30 |
| Max Marks: | 50 | | |

**Course Description:**

The response of Electrical Circuit can be verified practically by applying different theorems and fundamental techniques. The students will become sure that the theoretical tricks which they have learned from books are true. The students will become competent in the field of circuit analysis

**Course Outcomes:**

On successful completion of this course, students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Get the basic knowledge about the Electric circuits. |
| CO2 | Understand the basic construction of transistors. |
| CO3 | Get the knowledge about various measuring instruments. |
| CO4 | Know about the components of electronic circuits. |

**Syllabus:**

**List of Experiments:**

1. Study of Electrical Safety precautions.
2. Study of CRO, DSO, Function Generator, Multimeter, Power supply.
3. To verify KCL and KVL.
4. To verify Thevenin's and Norton's Theorem.
5. To verify Superposition Theorem.
6. Determine resonant frequency of series R-L-C circuit.
7. To measure Current, Power, Voltage and Power Factor of series R-L-C Circuit.
8. To measure the armature and field resistance using Ohm's law.
9. Determine the VI Characteristics of PN junction Diode
10. Design and study the characteristics of Common Emitter configuration of NPN transistor
11. Design and Study the characteristics of Common Collector Configuration of NPN transistor
12. Study Different logic gates and verify their truth table.

**Reference Books & Manuals:**

1. Basic Practical in Electrical Engineering: P. S. Dhogal (Author), Standard Publishers Distributors (2004).

**Equipment's/Machine/Software required:** Different types of meters, resistors, DC supply, variac, transformers, rheostat. Some experiments can be done by MATLAB.

### CO-PO & PSO Correlation:

| Course Name : BEEE (SOE-B-FY107) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Program Outcomes** | | | | | | | | **PSOs** | | | |
| **Course Outcomes** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **1** | **2** | **3** | **4** |
| **CO1** | 2 | 2 | 2 | | | 2 | | | 2 | | | |
| **CO2** | 3 | 3 | 2 | | | | | | | 1 | | 2 |
| **CO3** | 3 | 3 | 3 | | | | | | 3 | | | |
| **CO4** | 3 | 3 | 3 | | | | | | | | 1 | |

**Note:** 1: Low  2: Moderate 3: High

| Programme : | B.Tech. | Semester : | I |
|---|---|---|---|
| Name of the Course: | Engineering Chemistry Lab | Course Code : | SOE-B-FY108 |
| Credits : | 1 | No of Hours : | 30 |
| Max Marks : | 50 | | |

**Course Description:**
This Engineering Chemistry Laboratory is common to first year branches of UG Engineering. The course enables students to
- Apply and use knowledge, methods and techniques for analysis
- Develop an ability to analyze, evaluate and synthesize scientific information
- Develop experimental and investigative scientific skills

**Course Outcomes (CO)**

| CO Number | Course Outcome |
|---|---|
| CO 1 | Understand the use of instruments, sensors and methods for analyzing various parameters |
| CO 2 | Collect, process and analyze data using ICT tools |

**List of Experiments**
1. Determination of type and extent of Alkalinity in the given sample of water using hydrochloric acid solution (acid-base titration)
2. Determination of chloride ion content in a given water sample by Mohr's method ($AgNO_3$, Cl- titration)
3. Determination of the Dissolved Oxygen in a given water sample by Wrinkler's method using Std. Sodium thiosuphate solution (iodometric titration)
4. Determination of temporary & permanent hardness in water sample by EDTA method (complexometric titration)
5. Determination of order and rate law expression of acid decomposition of thiosulfate ion solution (kinetics study)
6. Determination of the concentration of unknown solution of an electrolyte by conductivity measurement (using data loggers with conductivity probe and drop counters)
7. Determination of equivalence point and concentration of acid by pH measurement (using data loggers with pH probe and drop counters)
8. Demonstration of different types of Corrosion of metals
9. Kinetics ICT Exercise: Determination of order and rate constant of reaction using a spreadsheet and graphical techniques
10. Acid & Base ICT Exercise: Determination of equivalence point and concentration of acid (or base) using spreadsheet and graphical techniques.

**Text Books:**
1. Laboratory manual on Engineering Chemistry by Dr. Sudha Rani (S. Chand and Company).
2. A Textbook on Experiments and Calculations in Engineering Chemistry by S.S. Dara (Dhanapat Rai Publishing Company Pvt. Ltd.).

3.  Experimental in General Chemistry; C.N.R. Rao & U. C. Agrawal,. East–West Press.

**Reference Books:**

1.  Advance Practical Chemistry, by ILPC, Wilkinson G., Murrillo, C.A. and Bochmann, Wiley.
2.  Svehla, G. Vogel's Qualitative Inorganic Analysis, Pearson Education, 2012.
3.  Mendham, J. Vogel's Quantitative Chemical Analysis, Pearson, 2009.
4.  Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996.Text Book of Chemical Science by F.W. Billmeyer, John Wiley & sons, 1994.
5.  Vogel's Texbook of Quantitative Chemical Analysis (Latest ed.), Revised by G.H. Jeffery, J. Bassett, J. Mendham & R.C. Denney.
6.  Applied Chemistry: Theory and Practice (Latest ed.), by O.P. Vermani and A. K. Narula.

### CO- PO & PSO Correlation

| Course Name: Engineering Chemistry Lab | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Outcomes** | **Program Outcome** | | | | | | | | **PSOs** | | | |
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **1** | **2** | **3** | **4** | **5** |
| **CO1** | 2 | 2 | | | | | | | | 1 | | | |
| **CO2** | 1 | 1 | | | | | | | | | 1 | | |

**Note:** 1: Low  2.: Moderate 3: High.

| Programme: | B.Tech | Semester : | I |
|---|---|---|---|
| Name of the Course: | Spoken English Communication | Course Code: | SOE-B-FY109 |
| Credits : | 2 | No of Hours : | 30 |
| Max Marks: | 50 | | |

**Course Description**

This course examines the process of spoken communication in English language with an emphasis to develop fluency in it. Through individual and group activities, students work on improving pronunciation, practice conversation strategies and delivering oral presentation.

**Course Outcome**

After Completion of the course Students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Reduce anxiety by recognizing and using communication strategies. |
| CO2 | Apply principles of effective and ethical speaking during conversation at the various situations. |
| CO3 | Formulate the speech according to the purpose, audience and time constraints |
| CO4 | To recognize and use effectively non-verbal clues in communication |
| CO5 | Give effective presentation. |

**Syllabus**

**Unit 1: Basics of Communication**

Introduction to Communication, Types of Communication, Barriers to Communication, Listening Skill.

**Unit 2: Grammar in Use**

Sentence Structures, Determiners and Preposition, Modals in Conversational Usage, , Voice, Punctuation.

**Unit 3: Oral Communication**

Speaking: An Overview, Combating Stage Fright, Describing Objects/Situations/People, Delivering Just-a-minute Sessions, Dialog delivery, one to one conversation

**Unit 4: Body Language**

Body Language - the role of body postures, movements, gestures, facial expressions, dress and make up in effective communication, Conduct while facing interviews.

**Unit 5: Professional Presentation**

Presentation, Power point Presentation, Group Discussion, Role Plays, Delivering Different Types of Speeches.

**Texts Books:**
1. A Communicative Grammar of English by Geoffrey N. Leech and Jan Svartvik, Longman
2. Technical Communication for Engineers by Shalini Verma, Vikas Publishing House.
3. A Practical Course in Spoken English by Gangal J.K, Prentice Hall India Learning Private Limited.

**Reference Books:**
1. English for Technical Communication (With CD) by Aysha Viswamohan, McGraw Hill Education.
2. Comprehensive English Grammar by Madan Sood, Goodwill Publishing House.
3. Spoken English by Alison Reid, Goodwill Publishing House.
4. All about Words: An Adult Approach to Vocabulary Building by Nurnberg, M and M. Rosenblum, W.R. Goyal Publishers & Distributors.
5. High School English Grammar and Composition  by WREN & MARTIN , S CHAND PUBLICATION

## CO-PO Correlation

**Course Name: Spoken English Communication (SOE-B-FY109)**

| Course Outcomes | Program Outcomes | | | | | | | | PSO | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1: | | | | 2 | 1 | 1 | 1 | | 1 | | | |
| CO2: | | | | 3 | 1 | 2 | | | | | | |
| CO3: | | | | 3 | 2 | | 2 | | | | 1 | |
| CO4: | | | | 3 | 1 | | 1 | | | | | |
| CO5: | | | | 3 | 1 | 1 | 1 | | | 1 | | |

**Note:**  1: Low  2.: Moderate 3: High.

| Programme: | B.Tech | Semester : | II |
|---|---|---|---|
| **Name of the Course**: | Mathematics-II | **Course Code:** | SOE-B-FY201 |
| **Credits :** | 5 | **No of Hours** | 5 Hrs/Week |
| **Max Marks:** | 100 | | |

**Course Description:**

Learning Objective 1. Evaluate first order differential equations including separable, homogeneous, exact, and linear. 2. Show existence and uniqueness of solutions. 3. Solve second order and higher order linear differential equations. 4. Create and analyze mathematical models using higher order differential equations to solve application problems such as harmonic oscillator and circuits. 5. Solve differential equations using variation of parameters 6. Solve linear systems of ordinary differential equations.

**COURSE OUTCOMES:**

On successful completion of this course, students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Understand ordinary differential equation. |
| CO2 | Understand applications in Engineering Problems |
| CO3 | Understand higher order differential equation with constant coefficient. |
| CO4 | Understand simultaneous linear equations with constant coefficients. |
| CO5 | Understand Linear partial differential equation of first order. |
| CO6 | Understand Non-homogeneous linear partial differential equations |
| CO7 | Understand Euler's Formula, Functions having points of discontinuity Understand Fourier series, Linear and quasi linear equations |
| CO8 | Understand Harmonic analysis. |
| CO9 | Understand Method of separation of variables; Solution of heat equation; |
| CO10 | Understand Wave equation; Laplace equation & Poisson's equation |

**Syllabus:**

**Unit 1: Ordinary Differential Equation of First order**

Review of ordinary differential equation of first order; non linear differential equation of first order and their applications to engineering problems (viz. Simple

electrical circuits, Heat conduction problem, Rate of decay of radio-active material, Chemical reactions and solutions, etc.).

## Unit 2: Differential Equation of Higher order

Linear differential equations of higher order with constant coefficients; Method of variation of parameters; Cauchy's & Legendre's linear equations; simultaneous linear equations with constant coefficients; Applications to engineering problems.

## Unit 3: Partial Differential Equation

Formation of partial differential equation; Linear partial differential equation of first order; Standard forms; Charpit's method; Homogeneous linear partial differential equations with constant coefficients; Non-homogeneous linear partial differential equations.

## Unit 4: Fourier series

Euler's Formula; Functions having points of discontinuity; Change of interval; Even and odd functions; Half range series; Harmonic analysis.

## Unit 5: Application of Partial Differential Equation

Method of separation of variables; Solution of heat equation; Wave equation; Laplace equation & Poisson's equation

### TEXT BOOKS

1. Advanced Engineering. Mathematics by Erwin Kreyszig (8th edition) – John Wiley & Sons.
2. Higher Engineering. Mathematics by B. S. Grewal (38th edition)-Khanna Publishers.
3. Higher Engineering Mathematics by B. V. Rammana-Tata Mc Graw Hill.
4. Advance Engineering Mathematics by R. R. Greenberg- Pearson Publication.
5. Ordinary and Partial Differential Equations by MD Rai Singhania-S. Chand & Sons.

### REFERENCE BOOKS

**1.** Peter V.  O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.
2. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, Calculus, Eleventh Edition, Pearson.
3. D. Poole, Linear Algebra : A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. Veerarajan T., Engineering Mathematics for first year, Tata Mc Graw-Hill, New Delhi, 2008.
5. P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd

**CO-PO Correlation**

| Course Outcomes | Course Name :MATHEMATICS- II [SOE-B-FY201] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Program Outcomes (POs) | | | | | | | | Program Outcomes (POs) | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 2 | 1 | | 2 | 1 | | 1 | 1 | 1 | | | |
| CO2 | 1 | | | | | 1 | | 1 | | | | |
| CO3 | 1 | | 1 | | 1 | | 1 | | | | 1 | |
| CO4 | 2 | | | | 2 | | | | 2 | | 2 | |
| CO5 | 2 | 2 | 2 | 2 | | | 1 | 1 | | 1 | | |
| CO6 | 1 | | | | 2 | 1 | | | 1 | | | 2 |
| CO7 | 2 | 1 | | | | | | 1 | 1 | | | |
| CO8 | 1 | | 1 | | | 1 | 2 | | | | | |
| CO9 | 2 | | | 1 | 1 | | | 1 | | | 1 | |
| CO10 | 1 | | 1 | | 1 | | 1 | | 2 | | 2 | |

**Note:** 1: Low  2.: Moderate 3: High.

| Pr**ogramme**: | **B.Tech.** | **Semester :** | **II** |
|---|---|---|---|
| **Name of the Course**: | **Physics-II** | **Course Code:** | **SOE-B-FY202** |
| **Credits :** | **2** | **No of Hours :** | **30** |
| **Max Marks:** | **100** | | |

**Course Description:**

Applied Physics is a science course for students interested in the technical fields. This course is designed for the student who needs a broad understanding of physics and the ability to apply those principles in the work force. The Physics-II course is basically fundamentals of X-rays, its characteristics, its production method and uses, basics of nuclear energy and nuclear reactor, concepts of relativity its applications, formulation and solving the engineering problems on electromagnetism, Introduction to quantum physics and application in 1D and Various interpretations about the origin of Universe. The purpose of studying Physics-II is to develop the basic knowledge on the development and time-to-time applications of physics in diverse field.

**Course Outcomes:**

After Completion of the course Students will be able to:

| CO Number | Course Outcome |
|---|---|
| **CO1** | Acquire knowledge atomic and nuclear physics and explore their technological applications in diverse fields. |
| **CO2** | Acquire knowledge of basic principles of Relativity and able to differentiate between classical and quantum mechanics. |
| **CO3** | Knowledge of propagation of electromagnetic energy through transmission lines and the design of propagation medium based on the requirements. |
| **CO4** | Gain basic knowledge of quantum mechanics and origin of Universe. |

**Syllabus:**

**Unit I.**

**Atomic & Nuclear Physics:** X-rays, Properties of X-rays, Bragg's law, Bragg's X-ray spectrometer, Characteristic X-ray spectrum, Moseley's law, Daune-Haun't criteria. Nuclei: properties, Mass defect, Binding energy, Criteria of Critical mass, Nuclear cross section, Nuclear fission: Controlled and uncontrolled chain reaction, Nuclear reactor and its site selection, Nuclear fusion, stellar energy(C-N cycle and P-P cycle).

**Unit II.**

**The theory of relativity** Frame of reference, Galileo's Transformations, Michelson-Morley experiment and its negative result, Einstein's theory of relativity ( postulates), Lorentz Transformation, Time dilation, Length contraction, Twin's Paradox, Doppler's effect, Addition of Velocities, Relativistic mass- Variation of Mass with Velocity, Equivalence of mass and energy.

**Unit III.**

**Electromagnetism:** Motion of Charged Particles in crossed electric & magnetic fields, Velocity Selector & Magnetic focusing, Gauss law, continuity equation, in consistency in Ampere's Law, Maxwell's equations (differential and integral forms), propagation of plane electromagnetic waves in conducting and nonconducting medium. Gradient, divergence, and curl of scalar and vector fields, Formulation and solving the engineering problems on electromagnetism.

**Unit IV.**

**Quantum mechanics:** Introduction to quantum physics, black body radiation, photon concept, de Broglie hypothesis, wave-particle duality, verification of matter waves, wave function and its properties, Phase & group velocity, Uncertainty principle, Schrodinger's equation and its application to particle in 1-D box.

**Unit V.**

**Origin of Universe:** Various interpretations about the origin, Big Bang Theory, Large Hadron Collider (LHC) experiment, Hawkins theory about the universe.

**Texts/ References:**

- Beiser, Perspectives in Modern Physics, McGraw Hill, 1969.
- M.A. Preston and R.K. Bhaduri, Structure of the nucleus, Addison- Wesley, 1975.
- M.K. Pal, Theory of Nuclear Structure, Affiliated East West Press, 1982.
- S. H. Patil, Elements of Modern Physics, Tata McGraw Hill, 1989.
- A.K. Ghatak and S. Loknathan, Quantum Mechanics, Theory and Applications, McMillan India, 1984.
- Michael Sayer & Abhai Mansingh, "Measurement, Instrumentation and experiment design in physics and engineering", Prentice Hall of India Pvt. Ltd., New Delhi – 110 001, 2003.
- P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd

### CO-PO & PSO Correlation

| Course Name: Physics-II (SOE-B-FY202) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Outcomes** | **Program Outcomes** | | | | | | | | **PSO** | | | |
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **1** | **2** | **3** | **4** |
| CO1 | 2 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 1 | 1 | | 3 |
| CO2 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | | | 2 | 1 |
| CO3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | | 1 | |
| CO4 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | | 2 | | 2 |

**Note:** 1: Low  2.: Moderate  3: High

| Programme : | B.Tech. | Semester : | II |
|---|---|---|---|
| Name of the Course: | Basics of Civil Engineering | Course Code : | SOE-B-FY204 |
| Credits : | 3 | No of Hours : | 45 |
| Max Marks : | 100 | | |

**Course Description:**

Civil Engineering as a profession; General introduction to history of civil engineering; types and classification of buildings; setting out of buildings; building materials- various types of bricks, various types of cements, natural and fly ash aggregates, cement mortar and concrete, TMT and structural steel; Overview of foundation engineering; Introduction to traffic and transportation engineering; Case studies of some advance technologies in civil engineering.

**Course Outcomes:**

After Completion of the course Students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Explain the importance of civil engineering in the infrastructural development of the society. |
| CO2 | Illustrate the types, uses and properties of various civil engineering materials, foundations, traffic and plans of civil engineering structures. |
| CO3 | Understand the latest technologies in the construction of different civil engineering structures. |

**Syllabus:**

**Unit- I**
**Civil Engineering Materials**
**Masonry Materials:** Types and characteristics of burnt clay and fly ash bricks, AAC blocks, paver blocks; various bonds in masonry.
**Cement:** Raw materials, Initial and final setting times, types and manufacturing process of cements.
**Aggregate:** Coarse and fine aggregates and their characteristics.
**Steel:** Difference among cast-iron, wrought iron, steel, mild steel, tor-steel and 550D grade of steel.
**Mortar and Concrete:** Proportions of cement mortar and concrete and their characteristics, self-healing concrete.
**Activity:** Industrial visit to any one of following (student will submit visit report)
1. Brick manufacturing plant
2. Cement manufacturing plant
3. Steel rolling mill.

**Unit-II**
**Building Plans:** Components of residential, industrial, commercial and public buildings. Concepts of smart buildings and smart city.

**Activity:** Study of architectural principles of any one in following (student will submit a report)
1. Central jail building
2. Church
3. Auditorium
4. Industrial building
5. Power station
6. Software technology park
7. Naya Raipur development authority, smart city

### Unit- III
Basic concepts of transportation and traffic engineering, signage and signals. Kinetic roadway and walk ways, automation in tunnelling and bridge construction.
**Activity:** Case study any one of following (student will submit a report)
1. Warli Bandra sea link
2. Britain France chunnel
3. Pumbam bridge

### Unit-IV
### Civil Engineering Foundations
Various types of foundations for high rise building, bridges, dams, roads.
**Activity:** Case study of any one of following (student will submit a report)
1. Burj Khalifa,
2. Petronas towers
3. Statue of unity
4. Swaminarayan temple of the Bochasanwasi in Dubai
5. Flipkart headquarters at Bangalore

### Unit-V
### Advance Technologies in Civil Engineering
Modular construction, cloud collaboration, supply chain management in civil engineering. Introduction to software in civil engineering, photovoltaic glassing, augmented and virtual reality in civil engineering. Overview of total station and application of drones in civil engineering.
**Activity:** Any one case study in (student will submit a report)
1. Cloud collaboration in civil engineering,
2. Supply chain management in civil engineering,
3. Software application in civil engineering
4. Application of drones in civil engineering

### Text Books:
1. Chen,W.F. and Liew, J.Y.R., The Civil Engineering Handbook, 2nd Ed., CRC Press, Taylors and Francis, (2002).
2. Kandya A.A., Elements of Civil Engineering, Charotar Publishing House, (2015).

### Reference Books:
1. Gopi, S., Basic Civil Engineering, 1st Ed., Pearson Publishers, (2009).
2. Ahuja, T.D. and Birdi, G.S., Civil Engineering (Building Construction), 8th Ed., Rajsons Publications Pvt. Ltd., (2018).

3. Relevant BIS codes and CPWD Manuals.

**Assessment:**

Assessment will be on the basis of Attendance, Class Work, Tutorials, Assignments, Quizzes, Activities and Exams.

## CO-PO&PSO Correlation

| Course Name: Basic Civil Engineering | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Program Outcomes | | | | | | | | PSOs | | | |
| Course Outcomes | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 3 | | 2 | | | 1 | | 1 | 2 | | 1 | 1 |
| CO2 | 3 | | | | | 1 | | | 2 | 2 | | |
| CO3 | 3 | 3 | 2 | | | 1 | | 1 | 2 | | | 2 |

**Note:** 1: Low 2.: Moderate 3: High

| Programme : | B.Tech. | Semester : | II |
|---|---|---|---|
| Name of the Course: | Engineering Mechanics | Course Code: | SOE-B-FY-205 |
| Credits : | 4 | No of Hours : | 50 |
| Max Marks: | 100 | | |

**Course Description:**
This course helps in understanding the various types and system of forces. Resolution and addition of forces. It helps the way to apply the condition of equilibrium in various forces system. It also helps in understanding the friction, centroid, and center of gravity etc. At last, it helps in understanding the concept of kinetics of rigid body and energy principle.

**COURSE OUTCOMES:**
After Completion of the course Students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Understand various force system and apply various concepts to solve problems related with force. |
| CO2 | Understand the different structures like Frame, Trusses, and structures. |
| CO3 | Understand the role of friction and its industrial applications. |
| CO4 | Understand and apply the concept of kinetics and energy principles. |

**Syllabus:**
**UNIT-1:**
Definitions of mechanics, statics, dynamics, characteristics of a force, principle of transmissibility, Composition and resolution of forces, moment of forces.

System of Coplanar forces: Introduction to coplanar & non-coplanar force system. Forces and their components. Moment of the force about a point, couple.
Resultant of coplanar force system: Resultant of concurrent forces, parallel forces, non-concurrent non-parallel system of forces. Varignon's theorem.

**UNIT-II**
Equilibrium of coplanar force system: Meaning of equilibrium, free body diagrams, equilibrium of concurrent, parallel and non-concurrent non-parallel (general ) system of forces. Types of supports, determination of reactions at supports for various types of determinate beams.
Analysis of pin jointed frame / truss: Perfect truss, Imperfect truss, Analysis of truss by method of joints and method of sections.

## UNIT-III: Friction

Definition of friction, force of friction, Limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction and coefficient of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. Equilibrium of bodies on level plane, external force applied on horizontal and inclined up and down. Equilibrium of bodies on inclined plane external forces is applied parallel to the plane, horizontal and inclined to inclined plane.

## UNIT-IV:

Centroid: Definition, centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure.

Centre of Gravity: CG of simple solids such as cylinder, sphere, hemisphere. Cone, cube, and rectangular block. Centre of gravity of composite solids.

Moment of inertia: of plane areas, parallel axis theorem. Introduction to polar moment of inertia, product of inertia and mass moment of inertia. Problems on moment of inertia of composite areas.

## UNIT: V

Kinetics of particles: Newton's laws of motion, D' Alembert's principle, equation of dynamic equilibrium linear motion, curvilinear motion. Kinetics of rigid bodies, D' Alembert's principle for bodies under rotational motion about a fixed axis.

Energy principles: Work done by a force, potential and kinetic energy, power, work energy equation, principle of conservation of energy.

## Text Books:

1. B.C. Punmia-Theory of structures, Laxmi Publication.
2. Engineering Mechanics (Statics and Dynamics) by A.K. Tayal, Umesh Pub.,
3. Engineering Mechanics by K.L. Kumar, Tata McGraw Hill.

## Reference Books

1. Engineering Mechanics (Statics and Dynamics):  R.C. Hibbeler, Pearson
2. Engineering Mechanics: Meriam and Kreige, John Wiley and sons
3. Thermodynamics: Cengel and Boles, TMH
4. Essential of Engg. Mechanics: S. Rajasekharan and G. Shankara Subramaniyam,      Vikas Publications
5. Engineering Mechanics by Beer & Johnson, Tata McGraw Hill
6. Engineering Mechanics by F.L. Harper & Raw Publication.
7. Engineering Mechanics by Shames, Prentice Hall, India.

### CO-PO & PSO Correlation

| Course Outcomes | Course Name: Engineering Mechanics | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Program Outcomes | | | | | | | | PSO | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 2 | | 1 | | | | | 1 | 3 | | 2 | |
| CO2 | 2 | | 1 | | | | | 1 | | 1 | | 1 |
| CO3 | 2 | | 1 | | | | | 1 | 2 | | 3 | |
| CO4 | 2 | | 1 | | | | | 1 | | 2 | | 3 |

**Note:** 1: Low 2.: Moderate 3: High

| Programme : | B.Tech. | Semester : | II |
|---|---|---|---|
| Name of the Course: | Workshop Practice | Course Code: | SOE-B-FY-206 |
| Credits : | 1 | No of Hours : | 30 |
| Max Marks: | 50 | | |

**Course Description:**

It allows to study the basic workshop practices which enables the students to carry out/understand the day-to-day work easily with the application of Engineering knowledge through machine tools and equipment.

**COURSE OUTCOMES:**

After Completion of the course Students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Graduates will gain a strong foundation in machine tool engineering. |
| CO2 | Acquire knowledge and hands-on competence in applying the concepts of manufacturing science in the development of mechanical systems. |
| CO3 | Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular. |
| CO4 | Work effectively with engineering and science teams as well as with multidisciplinary designs. |
| CO5 | Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application. |

**Syllabus:**

| Week | Content | Practical (Hrs) |
|---|---|---|
| 1 & 2 | **CARPENTRY SHOP** <br> 1. Introduction. <br> 2. Various types of woods. <br> 3. Different types of tools, machines and accessories. <br> 4. Demonstration of different wood working tools / machines. <br> 5. Demonstration of different wood working processes, like planning, marking, chiseling, grooving, turning of wood etc. <br> 6. One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc. | 4 |
| 3 & 4 | **WELDINGSHOP** <br> 1. Introduction <br> 2. Types of welding, ARC welding, Gas welding, Gas Cutting. | 4 |

| | | |
|---|---|---|
| | 3. Welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece.<br>4. Different types of flame.<br>5. Elementary symbolic representation,<br>6. Safety precautions in welding safety equipment's and its use in welding processes.<br>7. Demonstration of different welding tools / machines.<br>8. Demonstration on Arc Welding, Gas Welding, gas cutting and rebuilding of broken parts with welding.<br>9. One simple job involving butt and lap joint | |
| 5 & 6 | **MACHINE SHOP**<br>1. Introduction about various machine tools<br>2. Principal parts of a lathe<br>3. Measuring instruments<br>4. Cutting parameters<br>5. Tool materials<br>6. Lathe operations<br>7. Safety precautions<br>8. One simple job involving lathe operations. | 4 |
| 7 | Test and quiz | |

**TEXT BOOKS:**

1. Manufacturing Technology (Vol. – I & II) – P.N. Rao – Tata McGraw Hill Pub. Company, New Delhi.
2. A Text Book of Production Technology (Manufacturing Processes) – P.C. Sharma – S. Chand and Company Ltd., New Delhi.
3. Machine Tool Engineering – G.R. Nagpal – Khanna Publishers, New Delhi.
4. A course in workshop Technology (Vol- I & II) – B.S. Raghuvanshi – Dhanpat Rai & Sons, New Delhi.
5.

**REFERENCES BOOKS:**

1. Kent's Mechanical Engineering Hand book, John Wiley and Sons, New York.
2. Workshop Technology by H.S.Bawa,Tata McGraw Hill Publishers.
3. Workshop Technology by S.K. Hajara Chaudhary, Media Promotors and Publishers.
4. Chapman, W.A.J. and Arnold E., "Workshop Technology" Vol. I & III, Viva Low price student Edition, 1998.
5. Chaudhary, Hajra, "Elements of Workshop Technology" Media Promoters & Publishers, 1997.
6. Raghuwanshi, B.S., "Workshop Technology" Vol I 7 II, Dhanpat Rai and Sons 1998.

**CO-PO/PSO Mapping**

| Course Outcome | Course Name: Workshop Practice | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Program Outcome | | | | | | | | PSO | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 3 | | 2 | 3 | | 1 | 1 | | | 1 | | 2 |
| CO2 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | | 2 | 1 |
| CO3 | 3 | 2 | | 2 | 2 | 1 | | 2 | | 2 | 1 | |
| CO4 | 2 | 3 | 2 | 2 | 3 | 2 | | 3 | 2 | | | 3 |
| CO5 | 2 | 3 | 1 | | | 1 | | 2 | | 3 | 1 | |

**Note:** 1: Low  2.: Moderate 3: High

| Programme : | B.Tech. | Semester : | II |
|---|---|---|---|
| Name of the Course: | Environmental Studies | Course Code : | SOE-B-FY207 |
| Credits : | 2 | No of Hours : | 30 |
| Max Marks : | 50 | | |

**Course Objectives:**

The course will empower the undergraduate students by helping them to Gain in-depth knowledge on natural processes and resources that sustain life. Understand the consequences of human actions on the web of life and quality of human life. Develop critical thinking for shaping strategies for environmental protection, conservation of biodiversity, environmental equity, and sustainable development. Acquire values and attitudes towards understanding complex environmental-economic-social challenges, and active participation in solving current environmental problems and preventing the future ones. Adopt sustainability as a practice in life, society, and industry.

**Course Outcomes (CO)**

| CO Number | Course Outcome |
|---|---|
| CO 1 | Gain in-depth knowledge on natural processes and resources that sustain life. |
| CO 2 | Understand the consequences of human actions on the web of life and quality of human life. |
| CO 3 | Develop critical thinking for shaping strategies for environmental protection, conservation of biodiversity, environmental equity, and sustainable development. |
| CO 4 | Acquire values and attitudes towards understanding complex environmental-economic-social challenges, and active participation in solving current environmental problems and preventing the future ones. |
| CO 5 | Adopt sustainability as a practice in life, society, and industry. |

**Syllabus**

**Unit I: Ecology and Bio-Diversity**

Ecology, Environment & Ecosystem, Biotic & Abiotic Components; Structure & functions of Ecosystem, Productivity, Decomposition, Energy Flow, Nutrient cycling, Food Chain & Food Web, Ecological Pyramids; Ecological succession; Bio-diversity: Concept, Importance, and Threats & Conservation

**Unit II: Environment and Natural Resources**

Earth's Environment: Atmosphere, Lithosphere, Hydrosphere & Biosphere, functions and related problems; Environmental degradation and its causes; Natural resources, Renewable and Non-renewable Resources & associated problems; Study of major Resources on Earth (overview): Forest, Water, Mineral, Food, Energy and Land.

### Unit III: Air Pollution
Classification of air pollutants, sources and effects of CO, SOx, NOx, Hydrocarbons, PM, Acid Rain, Ozone, Photochemical Smog & Peroxy Actyl Nitrate (PAN). Earth's energy balance, Green House Effect, Global warming; Stratospheric Ozone & its Depletion; Lapse rate & Temperature Inversion; Ambient Air Quality standard; Air pollution Control Techniques for Gaseous and Particulate air pollutants & equipment used.

### Unit IV: Water Pollution & Soil Pollution
Point & non-point source; Water pollutants & types, sources and effects; Water Quality measurement, Dissolved Oxygen, BOD & COD; Wastewater Management, Primary, Secondary & Tertiary stages: Objective, Process overview and Equipment used.
Soil formation, composition & profile; Sources of Soil pollution & effect; Solid Waste Management: Objective, Process & Disposal Techniques.

### Unit V: Sustainability & Social issues and Environment
Concept of Sustainable Development (SD), models, indicators and principles of Sustainability. Water conservation- Rain water harvesting, Watershed management. Population Growth, variation among nations, Population explosion, Family Welfare Programme; Environment and human health

### Text Books:
1. Kurian Joseph & R. Nagendran, "Essentials of Environmental Studies", 1st Edition, Pearson Education, 2004.
2. A. K. Dey "Environmental Chemistry" New Age International Publishers..
3. Smriti Srivastava. "Environment & Ecology" S.K. Kataria & Sons, New Delhi.

### References Books:
1. Keerthinarayana & Daniel Yesudian, "Environmental Science and Engineering", 1st Edition, Hi-Tech publications, 2004.
2. Erach Bharucha, "A Text Book for Environmental Studies", Text Book of University Grants Commission, 2004.
3. Peavy, H.S., D.R. Rowe & T. George, "Environmental Engineering", New York: Mc Graw Hill, 1987.
4. Metcalf & Eddy, "Wastewater Engineering: Treatment and Reuse", New Delhi, Tata McGraw Hill, 2003.
5. Principles of Environmental Science Inquiry & Applications by W.P. Cunningham & Mary Ann Cunningham (Tata Mc Graw Hill Publishing Company Ltd.).

## CO- PO & PSO Correlation

| Course Outcomes | Program Outcome | | | | | | | | PSOs | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 1 | | | | | | 1 | | 1 | 2 | | 2 |
| CO2 | | | | | | | 1 | 1 | | 1 | 1 | 3 |
| CO3 | 1 | | 1 | | | 1 | | 1 | 3 | | 2 | |
| CO4 | | | | 1 | | | | 1 | | 3 | | 2 |
| CO5 | | | 1 | | | 1 | | 1 | 2 | | 1 | 1 |

**Note:** 1: Low  2.: Moderate 3: High

Course Name: Environmental Studies

| Programme: | B.Tech. | Semester : | II |
|---|---|---|---|
| Name of the Course: | Physics-II Lab | Course Code: | SOE-B-FY203 |
| Credits : | 1 | No of Hours : | 30 |
| Max Marks: | 100 | | |

**Course Description:**

This course deals with practical knowledge of basic physics including mechanics, optics and electronics.

**Course Outcomes:**

After Completion of the course Students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Gain practical knowledge of mechanics |
| CO2 | Aquire hands-on experience of optics experiments using laser. |
| CO3 | Gain knowledge of measuring moment of inertia of fly wheel, acceleration due to gravity, frequency of AC signal, and viscosity of different liquids. |

**Syllabus:**

At least ten experiments are to be performed by each student from the following list.

1. Determination of wavelength of given light by Newton's ring method.
2. Determination of grating element of diffraction grating using He-Ne laser source.
3. Determination of NA (Numerical Aperture) of an optical fiber.
4. Determination of e/m by Thomson method.
5. Determination of AC frequency using Sonometer.
6. Determination of energy gap of semiconductor diode.
7. To study solar cell characteristics.
8. To study the characteristics of PN junction diode.
9. To determine the divergence of laser beam.
10. To study the Hall effect.
11. To study the transistor characteristics in CE mode.
12. Determination of wavelength of He-Ne laser using diffraction grating.

## CO-PO & PSO Correlation

| Course Name: Physics-II Lab | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Outcomes | Program Outcomes | | | | | | | | PSO | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 2 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 1 | | 2 | |
| CO2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 3 | | 3 | 1 | 2 |
| CO3 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | | 3 | 1 |
| CO4 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | | 2 | | 3 |

**Note:** 1: Low  2.: Moderate 3: High

| Programme: | B. Tech | Semester: | II |
|---|---|---|---|
| Name of the Course: | Introduction to Artificial Intelligence | Course Code: | SOE-B-FY208 |
| Credits : | 3 | No of Hours: | 45 |
| Max Marks: | 100 | | |

**Course Description:**
In this course, students will study the most fundamental knowledge for understanding AI. The course will introduce some basic search algorithms for problem solving, Computing methods like Hard computing & soft computing, various soft computing approaches for learning through neural network. Hands-on with Python programming will enable students to develop AI applications.

**Course Outcomes:**
On successful completion of this course, students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Understand the basics of Artificial Intelligence. |
| CO2 | Understand overview of problem solving through search methods. |
| CO3 | Understand the difference between Hard and Soft computing approaches. |
| CO4 | Understand basic Neural network structure and activation functions. |
| CO5 | Understand how to implement the AI concepts using Python programming. |

**Syllabus:**
**Unit-I Overview and search techniques**
Introduction to AI, AI Definition, Philosophy of AI, Related Fields: Robotics, Machine Learning, Data Science, Deep Learning, Applications: Self Driving Cars, Content Recommendation System, Video/Image processing.AI problem Solving and Games, A* Search.

**Unit- 2 Machine Learning and Knowledge representation Odds and Probability:**
Why probability matters, Various examples like card playing, Dice, Uncertainty in real life like train ticket confirmation. How to deal with uncertainty, Odds and Expected outcomes, Bayes Rule, Prior and Posterior odds: Basic Principles. Application areas of Bayes classification. Knowledge representation in AI, Types of Knowledge in AI

**Unit-III: Advanced Topics in Machine Learning DATA PREPARATION:**
Validation, Dimensionality, Missing, Values, Dimensionality, Encoding, Basics of confusion matrix Classification in Machine Learning, MNIST Data set identification, Supervised, Unsupervised and Reinforced Learning.

**Unit–IV Introduction to Artificial Neural Network Neural Network Basics**
Elements of Neural Network, Why Develop Artificial Neural Networks: Modelling Key features, How Neural networks are Built: Weights and Input, Activation and

Output: Identity Function, Step function, Sigmoid Function. Perceptron, Neural Network, Neural Network classifier. Advanced Neural network techniques: Convolutional Neural Network, Generative adversarial networks (GANs), Deep Learning: It's application on data processing.

**Unit–V Application and Case Studies in AI Case study:**
Auto Driving Cars, Smart Home and IoT Applications, Robotics, Mine Detections, Medical Diagnosis, Applications in multiple domains. Smart City, Implications of AI, Predicting the Future and Social Implications

**Textbooks**
1. Introduction to Artificial Intelligence and Expert Systems by Dan W. Patterson, Prentice Hall of India.
2. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and applications by S. Rajashekran and G.A. Vijayalakshmi, Prentice Hall of India.
3. Python Programming Fundamentals by Nischay Kumar Hegde, Educreation Publishing.
4. A Textbook of Discrete Mathematics by Swapan Kumar Sarkar, S. Chand Publishing.
5. Discrete Mathematics and its Applications by Kenneth H. Rosen, McGraw-Hill Publication.

**Reference Books**
3. Robert J. Schalkoff, "Artificial Neural Networks", McGraw-Hill International Editions, 1997.
4. Principles of Artificial Intelligence by Nils J. Nilsson, Narosa Publishing house.
5. Introduction to Artificial Neural Network by Jacek M. Zurada, West Publishing Company.

### CO-PO Correlation

| Course Name: Basic Computing | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Program Outcomes** | | | | | | | | **PSO** | | | |
| **Course Outcomes** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **1** | **2** | **3** | **4** |
| CO1 | 2 | | | | 3 | | 2 | 1 | 1 | 2 | | 1 |
| CO2 | 1 | | | 2 | | | | 2 | 1 | | 2 | |
| CO3 | 3 | | | 1 | | 2 | | | | 3 | | 2 |
| CO4 | | 1 | 2 | | 3 | | | | | | 3 | |
| CO5 | 3 | | 1 | 2 | | | | 3 | 3 | | | 1 |

**Note:** 1: Low, 2: Moderate, 3: High

| Programme: | B.Tech | Semester : | II |
|---|---|---|---|
| Name of the Course: | Written English Communication | Course Code: | SOE-B-FY209 |
| Credits : | 2 | No of Hours : | 30 |
| Max Marks: | 50 | | |

## Course Description

The purpose of the course is to acquire accuracy and clarity in written communication. It helps to develop written text of varying lengths and styles that communicate effectively accurately and appropriately across various situations.

## Course Outcome

After Completion of the course Students will be able to:

| CO Number | Course Outcome |
|---|---|
| CO1 | Communicate by writing clearly and precisely without errors |
| CO2 | Draft various business correspondence in correct styles and format |
| CO3 | Prepare various forms of the report |
| CO4 | Know the principles of effective written communication |
| CO5 | Develop advance corporate writing skills |

## UNIT 1: Basics of Writing

An introduction to writing: Definition, Characteristics of effective writing, Principles of writings(7C's), Modes of Writing: Narrative, Descriptive, Argumentative, Expository.

## UNIT 2: Grammar in Use

Sentence structure, Subject-Verb concord, Tenses, Voice, Narration, Identifying common errors in writings, Précis writings, Paragraph writings.

## UNIT 3: Letter Writing

Types of letters, Elements of letters, Styles of letter writing, Basics of official correspondence, Preparation of Resume and Job application, Quotation, Order, Complaint letter.

## UNIT 4: Report Writing

Characteristics of good report, Elements of report, Preparation and writings of report, Use of illustrations in reports, Preparation of Bibliography and References.

## UNIT 5: Corporate Writing

Notice, Agenda and Minutes Writing techniques, Tenders, Advertising, Sales Letter

**Texts Books:**

1. **A Communicative Grammar of English by Geoffrey N. Leech and Jan Svartvik, Longman**
2. Effective Technical Communication- M.Ashraf Rizvi Tata McGraw Hill Company limited New Delhi.
3. Developing Communication Skills- Krishna Mohan and Meera Banerjee, Mc Millan India Ltd, New Delhi

**Reference Books:**

1. Introduction to Communication studies- John Fisk, RotledgeLondon
2. Writing Technical Papers- D.H.Menzel, H.M.Jonest. Mc GrawHill . New Delhi.
3. A Remedial English Grammar for Foreign Students- F.T.Wood Mc Millan India Ltd.
4. Living English Structure- W. Stannard Allen, Orient Longman London Fourth edition.
5. Technical Communication for Engineers by Shalini Verma, Vikas Publishing House.

## CO-PO Correlation

| Course Name: Written English Communication (SOE-B-FY209) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Outcomes | Program Outcomes | | | | | | | | PSO | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| CO1 | 1 | | | 2 | 1 | 1 | 1 | | 1 | | | 1 |
| CO2 | | | | 3 | 2 | 1 | 1 | | | | 1 | 2 |
| CO3 | 1 | | 1 | 2 | 2 | 1 | | | | 1 | | |
| CO4 | | | | 2 | 1 | | | | 1 | | 1 | |
| CO5 | | | | 3 | 2 | 2 | 2 | | | 1 | | |

**Note:** 1: Low  2.: Moderate 3: High