

SCHEME OF INSTRUCTION & EXAMINATION
B.E. (Electrical and Electronics Engineering) II – SEMESTER
 (Common for EEE & EIE)

S. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration In Hrs	
Theory Courses										
1	MC801PO	Indian Constitution	2	-	-	2	30	70	3	-
2	BS203MT	Mathematics-II	3	1	-	4	30	70	3	4
3	BS202PH	Engineering Physics	3	1	-	4	30	70	3	4
4	ES301EE	Basic Electrical Engineering	3	1	-	4	30	70	3	4
5	ES302CS	Programming for Problem Solving	3	-	-	3	30	70	3	3
Practical / Laboratory Courses										
6	BS251PH	Physics Lab	-	-	3	3	25	50	3	1.5
7	ES354EE	Basic Electrical Engineering Lab	-	-	2	2	25	50	3	1
8	ES351CS	Programming for Problem Solving Lab	-	-	2	2	25	50	3	1
9	ES353CE	Engineering Graphics	-	-	6	6	50	50	3	3
Total			14	03	13	30	275	550		21.5

HS: Humanities and Social Sciences BS: Basic Science ES: Engineering Science
 MC: Mandatory Course PC: Professional Core PE: Professional Elective
 L: Lecture T: Tutorial P: Practical D: Drawing
 CIE: Continuous Internal Evaluation SEE: Semester End Evaluation (Univ. Exam) EE: Electrical Engg.

Note:

1. Each contact hour is a clock hour.
2. The duration of the practical class is two hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

Course Code	Course Title				Core/Elective		
MC801PO	Indian Constitution				Mandatory		
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	2	-	-	-	30	70	-
Course Objectives <ul style="list-style-type: none"> ➤ To create awareness among students about the Indian Constitution. ➤ To acquaint the working conditions of union, state, local levels, their powers and functions. ➤ To create consciousness in the students on democratic values and principles articulated in the constitution. ➤ To expose the students on the relations between federal and provincial units. ➤ To divulge the students about the statutory institutions. Course Outcomes After completing this course, the student will <ol style="list-style-type: none"> 1. Know the background of the present constitution of India. 2. Understand the working of the union, state and local levels. 3. Gain consciousness on the fundamental rights and duties. 4. Be able to understand the functioning and distribution of financial resources between the centre and states. 5. Be exposed to the reality of hierarchical Indian social structure and the ways the grievances of the deprived sections can be addressed to raise human dignity in a democratic way. 							

UNIT-I

Evolution of the Indian Constitution: 1909 Act, 1919 Act and 1935 Act. Constituent Assembly: Composition and Functions; Fundamental features of the Indian Constitution.

UNIT-II

Union Government: Executive-President, Prime Minister, Council of Minister.

State Government: Executive: Governor, Chief Minister, Council of Minister.

Local Government: Panchayat Raj Institutions, Urban Government.

UNIT-III

Rights and Duties: Fundamental Rights, Directive principles, Fundamental Duties.

UNIT-IV

Relation between Federal and Provincial units: Union-State relations, Administrative, legislative and Financial, Inter State council, NITI Ayog, Finance Commission of India.

UNIT-V

Statutory Institutions: Elections-Election Commission of India, National Human Rights Commission, National Commission for Women.

Suggested Readings:

1. D.D. Basu, Introduction to the constitution of India, Lexis Nexis, New Delhi
2. Subhash Kashyap, Our Parliament, National Book Trust, New Delhi
3. Peu Ghosh, Indian Government & Politics, Prentice Hall of India, New Delhi
4. B.Z. Fadia & Kuldeep Fadia, Indian Government & Politics, Lexis Nexis, New Delhi

Course Code	Course Title					Core / Elective	
BS203MT	Mathematics – II (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	1	-	-	30	70	4

Course Objectives

- To study matrix algebra and its use in solving system of linear equations and in solving eigen value problems
- To provide an overview of ordinary differential equations
- To study special functions like Legendre and Beta Gamma functions
- To learn Laplace Transforms and its properties

Course Outcomes

The students will able to

1. Solve system of linear equations and eigen value problems
2. Solve certain first order and higher order differential equations
3. Solve basic problems of Beta Gamma and Legendre's Function.
4. Apply Laplace Transforms; solve ordinary Differential Equations by using it.

Unit-I

Matrices: Rank of a matrix, Echelon form, System of linear equations, Linearly dependence and independence of vectors, Linear transformation, Orthogonal transformation, Eigen values, Eigenvectors, Properties of eigen values, Cayley - Hamilton theorem, Quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation, Nature of quadratic forms.

Unit-II

Differential Equations of First Order: Exact differential equations, Integrating factors, Linear differential equations, Bernoulli's, Riccati's and Clairaut's differential equations, Orthogonal trajectories of a given family of curves.

Unit-III

Differential Equations of Higher Orders: Solutions of second and higher order linear homogeneous equations with constants coefficients, Method of reduction of order for the linear homogeneous second order differential equations with variable coefficients, Solutions of non-homogeneous linear differential equations, Method of variation of parameters, solution of Euler-Cauchy equation.

Unit-IV

Special Function: Gamma Functions, Beta Functions, Relation Between Beta and Gamma Function, Error Functions. Power Series Method, Legendre's Differential Equations and Legendre's Polynomial $P_n(x)$, Rodrigue's Formula (without proof).

Unit-V

Laplace Transforms: Laplace Transforms, Inverse Laplace Transforms, Properties of Laplace Transforms and inverse Laplace Transforms, Convolution Theorem (without proof). Solution of ordinary Differential Equations using Laplace Transforms.

Suggested Readings:

1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 4th Edition, 2014.
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley, 9th Edition, 2012.
3. Dr.B.S. Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition, 2014.
4. B.V. Ramana, Higher Engineering Mathematics, 23rd reprint, 2015.
5. N. Bali, M. Goyal, A text book of Engineering Mathematics, Laxmi publications, 2010
6. H.K. Dass, Er.Rajnish Varma, Higher Engineering Mathematics, Schand Technical 3rd Edition.

Course Code	Course Title					Core / Elective	
BS202PH	Engineering Physics (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	1	-	-	30	70	4
Course Objectives <ul style="list-style-type: none"> ➤ Aware of limits of classical free electron free theory and to apply band theory of solids ➤ Acquire knowledge on various properties of semiconductors. ➤ Grasp the intricacies in semiconductor-optical interaction Course Outcomes <ol style="list-style-type: none"> 1. Distinguish materials based on band theory of solids 2. Classify semiconductors on the basis doping and to estimate conductivity and learn transport phenomenon in semiconductors 3. Appreciate use of optical absorption by semiconductors. 							

Unit – I

Crystallography: Introduction, Types of crystal systems, Bravais lattices, Lattice planes and Miller Indices (Cubic system), Inter planar spacing (Cubic system), Bragg's law, Powder diffraction method.

Crystal Defects: Classification of point defects, Concentration of Schottky defects in metals and ionic crystals, Concentration of Frankel defects, Line defects, Screw and Edge dislocations, Burger's vector

Unit – II

Band Theory of Solids & Semiconductors: Classical free electron theory (qualitative), Kronig Penney model (qualitative treatment), Energy band formation in solids, Intrinsic and Extrinsic semiconductors, Concept of a hole, Carrier concentration and conductivity in intrinsic semiconductors, Formation of P-N junction diode and its I – V characteristics, Thermistor and its characteristics, Hall effect and its applications.

Dielectric Materials: Dielectrics, Types of polarizations, Electronic, Ionic, Orientational and Space charge polarizations, Expression for Electronic polarizability, Frequency and temperature dependence of dielectric polarizations, Determination of dielectric constant by capacitance Bridge method, Ferro electricity, Barium titanate, Applications of Ferroelectrics.

Unit – III

Wave Mechanics: Matter waves –de-Broglie wavelength, properties of wave function, Physical significance, Schrodinger time dependent and time in-dependent wave equation. Particle in a 1-D box. **Electromagnetic theory:** Basic laws of electricity and magnetism, Maxwell's equations in integral and differential forms, Conduction and displacement current, Relation between D, E and P – **Electromagnetic waves:** Equation of plane wave in free space, Poynting theorem.

Unit – IV

Magnetic Materials: Classification of magnetic materials: dia, para, ferro, antiferro and ferrimagnetic materials, Weiss molecular field theory of ferromagnetism, Magnetic domains, Hysteresis curve, soft and hard magnetic materials, Ferrites: Applications of ferrites.

Superconductivity: Introduction, General properties of super conductors, Meissner effect, Type I and Type II superconductors, BCS theory (qualitative), Introduction to High T_c superconductors, Applications of superconductors.

Unit – V

Lasers: Characteristics of Lasers, spontaneous and stimulated emission of radiation, Einstein's Coefficients, population inversion, Ruby Laser, Helium Neon Laser, Semi-Conductor Laser and applications of lasers.

Fiber Optics: Introduction, Propagation of light through an optical fiber, Acceptance angle, Numerical aperture

(NA), Types of Optical fibers and Refractive index profiles, Fiber drawing process (double Crucible Method), Losses in optical fibers, applications of optical fibers.

Suggested Reading:

1. B.K. Pandey and S. Chaturvedi Engineering Physics Cengage Learning 2012.
2. A.K. Bhandhopadhya, Nano Materials, New Age International, 1st Edition, 2007.
3. M.S. Avadhanulu and P.G. Kshirusagar, Engg. Physics, S. Chand & Co. 1st Edition, 1992.
4. C.M. Srivastava and C. Srinivasan – Science of Engg Materials, New Age International.
5. R.K Gaur and S.L Gupta- Engineering Physics, Dhanpathrai Publications, New edition.
6. Sanjay D Jain & Girish G Sahasrabudhe -Engineering Physics, University Press.

Course Code	Course Title					Core / Elective	
ES301EE	Basic Electrical Engineering (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	1	-	-	30	70	4
Course Objectives							
<ul style="list-style-type: none"> ➤ To provide an understanding of basics in Electrical circuits. ➤ To explain the working principles of Electrical Machines and single phase transformers. 							
Course Outcomes							
<ol style="list-style-type: none"> 1. To analyse Electrical circuits to compute and measure the parameters of Electrical Energy. 2. To comprehend the working principles of Electrical DC Machines. 3. To Identify and test various Electrical switchgear, single phase transformers and assess the ratings needed in given application. 4. To comprehend the working principles of electrical AC machines. 							

Unit-I

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.

Unit-II

AC Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, and RL, RC, RLC combinations (series only). Three phase balanced circuits, voltage and current relations in star and delta connections.

Unit-III

Transformers and 3-ph Induction Motors: Transformers: Electromagnetic induction, Faradays laws, statically induced emf, Lenz law, BH characteristics, ideal and practical transformer, losses and efficiency, Auto-transformer and three-phase transformer connections.

Three Phase Induction motor: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, squirrel cage IM, slip-ring IM, Applications.

Unit-IV

Single-phase induction motor & DC Machines: Single-phase induction motor: Construction and principle of operation, Capacitor start & capacitor run motor, applications.

DC Generators: Dynamically induced emf, Flemming's Right hand and Left hand rules, Construction and principle of operation of DC generator, EMF equation, Types of DC Generators, OCC characteristics, applications.

DC Motors: principle of operation of DC Motor, Types of DC motors, applications.

Unit-V

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Suggested Reading:

1. N.K. De, "Basic Electrical Engineering", Universities Press, 2015.
2. J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics" S.K. Kataria & Sons Publications, 2002.
3. J.B. Gupta, "Utilization of Electric Power and Electric Traction" S.K. Kataria & Sons Publications, 2010.

4. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, "Basic Electrical Engineering" Tata McGraw Hill, Publications, 2009.
5. Hughes, "Electrical Technology", VII Edition, International Student -on, Addison Welsey Longman Inc., 1995.

Course Code	Course Title					Core / Elective	
ES302CS	Programming for Problem Solving (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	-	-	-	30	70	3
Course Objectives <ul style="list-style-type: none"> ➤ To introduce the basic concepts of Computing environment, number systems and flowcharts ➤ To familiarize the basic constructs of C language – data types, operators and expressions ➤ To understand modular and structured programming constructs in C ➤ To learn the usage of structured data types and memory management using pointers ➤ To learn the concepts of data handling using pointers Course Outcomes The students will able to <ol style="list-style-type: none"> 1. Formulate simple algorithms for arithmetic and logical problems. 2. Translate the algorithms to programs (in c language). 3. Test and execute the programs and correct syntax and logical errors. 4. Implement conditional branching, iteration and recursion. 5. Decompose a problem into functions and synthesize a complete program using divide and conquer approach. 6. Use arrays, pointers and structures to formulate algorithms and programs. 7. Apply programming to solve matrix addition and multiplication problems and searching and 8. sorting problems. 9. Apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration. 							

Unit - I

Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.).

Idea of Algorithm: steps to solve logical and numerical problems.

Representation of Algorithm: Flowchart / Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Unit - II

Control Structures: Arithmetic expressions and precedence, Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching.

Arrays: Arrays (1-D, 2-D), Character arrays and Strings.

Unit - III

Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble and Selection), Finding roots of Equations. **Functions:** Functions (including using built in libraries), Parameter passing in functions, call by value. **Passing arrays to functions:** idea of call by reference.

Unit - IV

Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series. **Structure:** Structures, Defining structures and Array of Structures.

Unit - V

Pointers - Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation), **Introduction to File Handling.**

Suggested Readings:

1. Byron Gottfried, Schism's Outline of Programming with C, McGraw-Hill.

2. A.K. Sharma, Computer Fundamentals and Programming in C, Universities Press, 2nd Edition, 2018.
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.
4. Brian W. Kernighan and Dennis M. Ritchie, the C Programming Language, Prentice Hall of India.

Course Code	Course Title					Core / Elective	
BS251PH	Physics Lab (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
BS202PH	-	-	-	3	25	50	1.5
Course Objectives							
<ul style="list-style-type: none"> ➤ Make precise measurements using basic physical principles and acquire skills to handle the instruments ➤ Relates the theoretical Knowledge to the behavior of Practical Physical world. ➤ Analyze errors in the experimental data. ➤ Plot graphs between various physical parameters. 							
Course Outcomes							
<ol style="list-style-type: none"> 1. Conduct experiments, take measurements independently. 2. Write appropriate laboratory reports. 3. Compute and compare the experimental results and draw relevant conclusions. 4. Use the graphical representation of data and estimate results from graphs 							

List of Experiments:

1. To determine the Dielectric constant and Phase transition temperature of Lead Zirconium Titanate (PZT).
2. To draw the I - V Characteristics of P-N Junction diode and to evaluate the resistance.
3. To find the values of Electrical conductivity and energy gap of Ge crystal.
4. Determination of rigidity of modulus of Torsion pendulum.
5. Determination of carrier concentration, Mobility and Hall Coefficient of Ge crystal using Hall Effect Experiment.
7. To determine the constants of A, B and α using Thermistor characteristics.
8. To draw the curve between the magnetizing field and the intensity of magnetization of the specimen (soft iron rod) and to find out
 - i) Coercivity ii) Retentivity and iii) Hysteresis loss.
9. To draw the I - V Characteristics of a solar cell and to calculate the i) Fill factor Efficiency and ii) Series resistance.
10. To Determine the Numerical aperture (NA) of Optical fiber.
11. To determine the wave length of the given Laser source.

Note: Minimum eight experiments should be conducted in the semester.

Suggested Reading:

1. N.K. De, “Basic Electrical Engineering”, Universities Press, 2015.
2. J.B. Gupta, “Fundamentals of Electrical Engineering and Electronics” S.K. Kataria & Sons Publications, 2002.
3. J.B. Gupta, “Utilization of Electric Power and Electric Traction” S.K. Kataria & Sons Publications, 2010.

Course Code	Course Title					Core / Elective	
ES354EE	Basic Electrical Engineering Lab (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
ES301EE	-	-	-	2	25	50	1
Course Objectives <ul style="list-style-type: none"> ➤ To impart the practical knowledge and analysis of on electrical circuits, theorems and transformers. ➤ To impart the practical knowledge on testing of DC and AC Machines and the usage of common electrical measuring instruments. Course Outcomes <ol style="list-style-type: none"> 1. Get an exposure to common electrical components and their ratings. 2. Analyze the performance of DC and AC Circuits. 3. Analyze the performance of DC and AC Machines. 4. Comprehend the usage of common electrical measuring instruments. 5. Test the basic characteristics of transformers and electrical machines. 							

Suggested List of Laboratory Experiments/Demonstrations:

Demonstration of Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.

1. Verification of KVL and KCL, superposition theorem (with DC excitation)
2. Verification of Thevenin's and Norton's theorems (with DC excitation)
3. Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification of phase differences between current and voltage and Power factor calculation.
4. Transformers: Observation of the no-load current waveform on an oscilloscope (non-sinusoidal wave-shape due to B-H curve nonlinearity should be shown along with a discussion about harmonics).
5. Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
6. Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line- line voltage, phase-to-neutral voltage, line and phase currents).
7. Measurement of phase voltage/current, line voltage/current and power in a balanced three-phase circuit connected in star and delta.

Demonstration of cut-out sections of machines: dc machine, induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single-phase induction machine.

8. OCC characteristics of DC Generator
9. Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change of phase-sequence of connections.
10. Power factor improvement of Induction Motor using static capacitors
11. Load Test of DC Motor

Note: Minimum eight experiments should be conducted in the semester

Suggested Reading:

1. J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics" S.K. Kataria & Sons Publications, 2002.
2. J.B. Gupta, "Utilization of Electric Power and Electric Traction" S.K. Kataria & Sons Publications, 2010
4. Satish Kumar Peddapelli, G. Sridhar, "Electrical Machines – A Practical Approach", De Gruyter Publications, 2020.
5. Hughes, "Electrical Technology", VII Edition, International Student -on, Addison Welsey Longman Inc., 1995.

Course Code	Course Title					Core / Elective	
ES351CS	Programming for Problem Solving Lab (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
ES302CS	-	-	-	2	25	50	1
Course Objectives <ul style="list-style-type: none"> ➤ Understand the fundamentals of programming in C Language. ➤ Write, compile and debug programs in C. ➤ Formulate solution to problems and implement in C. ➤ Effectively choose programming components to solve computing problems Course Outcomes <i>The students will able to</i> <ol style="list-style-type: none"> 1. Choose appropriate data type for implementing programs in C language. 2. Design and implement modular programs involving input output operations, decision making and looping constructs. 3. Implement search and sort operations on arrays. 4. Apply the concept of pointers for implementing programs on dynamic memory management and string handling. 5. Design and implement programs to store data in structures and files. 							

Programming Exercise:

1. Finding maximum and minimum of given set of numbers, finding roots of quadratic equation.
2. Sin x and Cos x values using series expansion.
3. Conversion of binary to decimal, octal, hexadecimal and vice versa.
4. Generating Pascal triangle, pyramid of numbers.
5. Recursion: factorial, Fibonacci, GCD.
6. Matrix addition and multiplication using arrays, linear search and binary search using recursive and non-recursive procedures.
7. Bubble sort and selection sort.
8. Programs on pointers: pointer to arrays, pointer to functions.
9. Functions for string manipulations.
10. Programs on structures and unions.
11. Finding the number of characters, words and lines of given text file.
12. File handling programs

Suggested Readings:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. A.K. Sharma, Computer Fundamentals and Programming in C, Universities Press, 2018.
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
4. Brian W. Kernighan and Dennis M. Ritchie, the C Programming Language, Prentice Hall of India.

Course Code	Course Title					Core / Elective	
ES353CE	Engineering Graphics (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	6	-	50	50	3
Course Objectives							
<ul style="list-style-type: none"> ➤ To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability ➤ To prepare you to communicate effectively ➤ To prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice. 							
Course Outcomes							
The students will able to							
<ol style="list-style-type: none"> 1. Introduction to engineering design and its place in society 2. Exposure to the visual aspects of engineering design 3. Exposure to engineering graphics standards 4. Exposure to solid modelling 5. Exposure to computer-aided geometric design 6. Exposure to creating working drawings 7. Exposure to engineering communication 							

Sheet No	Description of the Topic	Contact Hours	
		Lecture	Drawing
1	Principles of Engineering Graphics and their significance, usage of drawing instruments.	1	
2	Conic Sections – I Construction of ellipse, parabola and hyperbola given focus and eccentricity.	1	2
3	Conic Sections – II Construction of ellipse (given major and minor axis), parabola (given base and height), rectangular hyperbola.		2
4	Cycloids (cycloid & epicycloid)	1	2
5	Involutes (involute of triangle, square & circle)		2
6	Scales (plain & diagonal scales)	1	2 + 2
7	Introduction to AutoCAD Basic commands and simple drawings.		2 + 2
8	Orthographic Projection Projections of points situated in different quadrants.	1	2
9	Projections of straight lines – I Line parallel to both the reference planes, line perpendicular or inclined to one reference plane.	1	2
10	Projections of straight lines – II Line inclined to both the reference planes.	1	2
11	Projections of planes – I Perpendicular planes	1	2
12	Projections of planes – II Oblique planes		2
13	Projections of solids – I Polyhedra and solids of revolution, Projections of solids in simple position.	1	2

Faculty of Engineering, O.U. AICTE Model Curriculum with effect from Academic Year 2020-21

14	Projection of solids – II Projections of solids when the axes inclined to one or both the reference planes.	1	2 + 2
15	Section of solids – I When the sectional plane is parallel or perpendicular to one reference plane.	1	2
16	Section of solids – II When the sectional plane is inclined to one reference plane.		2
17	Development of surfaces – I Prisms and Cylinders	1	2
18	Development of surfaces – II Pyramids and Cones		2
19	Intersection of surfaces – I Intersection of cylinder and cylinder	1	2
20	Intersection of surfaces – II Intersection of cylinder and cone		2
21	Isometric projection – I planes and simple solids	1	2
22	Isometric projection – II combination of two or three solids		2
23	Conversion of Isometric Views to Orthographic Views	1	2
24	Floor plans of 2 or 3 rooms including windows, doors, and fixtures such as WC, bath, sink, shower, etc.	1	2

NOTE:

- i. At least 20 sheets must be covered.
- ii. Sheet number 1 to 6 (Graph sheets / drawing sheets)
- iii. Sheet number 7 to 24 (AutoCAD drawings).

Suggested Reading:

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. S.N Lal, Engineering Drawing with Introduction to Auto CAD, Cengage Learning India Pvt Lid, New Delhi, 2018.
4. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication.
5. Narayana, K.L. & P Kanniah (2008), Text book on Engineering Drawing, Scitech Publishers.
6. (Corresponding set of) CAD Software Theory and User Manuals.