The ICFAI University, Raipur

Faculty of Science and Technology

Second Semester, 2024–2025 Course Handouts

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The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
MA121	**Mathematics II**	**3**	**0**	**1**	**4**

Instructor-in-charge: Dr.ANIMESH KUMAR SHARMA

Learning Objectives:
After Successful completion of the course, the student will be able to:
1. Understand basic concept of Linear Algebra
2. Learn the properties of Complex Numbers
3. Applicants of theory of functions of complex variable.
4. Learn about the concepts of C-R Equation
5. Acquire knowledge about applied mathematics

Text Book (s) T1	Higher Engineering Mathematics, B.S. Grewal, J.S.Grewal, J.K.Dhanoa, Khanna Publishers, 44th Edition, 2017
Reference Book (s) R1	Complex Variables and Applications, J. W. Brown, R. V. Churchill, Mc Graw-Hill, 7th Ed , 2003.
Reference Book (s) R2	Complex analysis for Mathematics & Engineering, John H. Mathews & Russel W. Howell, Jones & Bartlett Publishers, 2001.

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch/Sec /Pg Nos of Text Book)
1-4	To understand algebraic and geometric properties of complex numbers	Complex Numbers, argand Plane, De-moivre's theorem, Roots of complex number	Peer teaching	639-642,647-650,651-653 (T1)

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch/Sec /Pg Nos of Text Book)
5-7	To learn the concept of a function of a complex variable and the properties of complex function	Complex Functions ,Exponential function of a complex variable, circular functions, Hyperbolic functions,	Technology based learning	656-661(T1)
8-10		Real and Imaginary parts of circular and hyperbolic functions, Logarithmic function of a complex variable, Summation of series 'C+iS' method	Peer teaching	662-669
11-15	Calculus of Complex functions	Limit of a complex function ,derivative of f(z), C-R equations	Group learning and teaching	672-674
16-19	To learn the concept of Riemann Sphere, C-R equations and harmonic	Analytic functions, Harmonic functions, Orthogonal system, Milne-Thomson's Method	Peer teaching	674-684

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch/Sec /Pg Nos of Text Book)
20-21	To learn the concepts of integrals and anti-derivatives of complex valued functions of a single variable	Complex integrations, (line inegrals), Cauchy theorem, Cauchy Integral Formula(Without proof)	Peer teaching	694-700
22-24	To understand the form of Taylor's and Laurent series for an analytic function of a complex variable	Taylor's and Laurent series, Zero's of analytic function	Peer teaching	704-710
25-28	Develop the skill to find the residues, poles and zeros of analytic functions	Residues, Residue theorem, Poles of analytic Functions	Peer teaching	710-715
29-31	Evaluation of certain types of definite and improper integrals using the theory of residues	Application of residues, Evaluation of real definite integrals	Peer teaching	716-722
32-35	To learn theory of equations	General properties, Intermediate value property, Descarte's rule of signs, Relation between roots and coefficients	Peer teaching	1-5

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch/Sec /Pg Nos of Text Book)
36-39	Develop the skill to find various kind of roots	Transformation of equations, Reciprocal equations	Peer teaching	5-8
39-44	Solution of Cubic and Bi-quadratic equations	Cardon's method, Ferrari's method	Peer teaching	9-15

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	01-19	01-19	CB
Test 2	60 Minutes	20	20-33	20-33	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	01-44	01-44	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 08/01/2025   **Dr.ANIMESH KUMAR SHARMA**
                                                              Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
PH122	**Physics II**	**3**	**1**	**0**	**4**

Instructor-in-charge: Dr.SHRUTIKA TIWARI

Learning Objectives:
After successful completion of the course, the student will be able to:
1. Physics II forms the Second part of a two-semester comprehensive course on core level physics to be taught to all engineering students.
2. The course aims at developing an understanding of the basic principles of physics and the application of concepts to problems of practical interest.
3. The emphasis is on improving the problem solving skills of students

Text Book T1	Robert Resnick, David Halliday and Kenneth S.Krane, Fifth Edition, John Wiley and Sons, 2002
Reference Book R1	Robert Resnick, David Halliday and Jearl Walker, Sixth Edition, John Wiley and Sons, 2001

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Chapter/Sec. /Page Nos. of Text/Ref. Books)
1-8	To discuss electric Charges and the fundamental electric force	Coulomb's law, continuous charge distributions. Electric field of point charges, continuous charge distributions, field lines, point charge and dipole in an	a. Group Learning and Teaching.	25.4, 25.5, 26.1 – 26.7, 27.1 - 27.6

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Chapter/Sec. /Page Nos. of Text/Ref. Books)
		electric field. Flux of a vector field, flux of electric field, Gauss' law, its applications, Gauss' law and conductors.		
9-13	To study electrostatics using energy concepts	Electric potential, potential due to point charges and continuous charge distribution, calculating field from potential, potential from field, equipotential surfaces, potential of a charged conductor. Types of materials, conductor in an electric field, insulator in an electric field, Ohm's law.	c. Technology based Learning.	28.1 – 28.9, 29.1 – 29.6
14-20	Definition of Capacitance and magnetic field on moving charges	Capacitance, Capacitors in series and parallel, Energy storage in an electric field, Capacitor with Magnetic interactions, magnetic poles, force on a moving charge, force on a	a. Group Learning and Teaching	30.1 – 30.6, 32.1 – 32.6

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Chapter/Sec. /Page Nos. of Text/Ref. Books)
		current carrying wire, Hall effect, torque on a current loop		
21-31	To study magnetic fields due to moving charges and currents	Magnetic field due to moving charge, due to current, parallel currents, field of a solenoid, Ampere's law. Faraday's law, Lenz' law, motional emf, induced electric fields, Magnetic dipole and force on a magnetic dipole in a non-uniform field, Magnetization, Gauss' law for magnetism, Inductance, Energy storage in a magnetic field	a. Group Learning and Teaching	33.1 – 33.5, 34.1 – 34.4, 34.6, 35.1, 35.2, 35.4, 35.7
32-40	To study displacement currents and Maxwell's equations and light	Equations of electromagnetism, Maxwell's equations, induced magnetic fields and displacement currents, Concept of photons, Thermal radiation, photoelectric	a. Group Learning and Teaching	38.1-38.3, 45.1-45.3, 46.1-46.7 (Excluding 46.3), 47.4, 47.5

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Chapter/Sec. /Page Nos. of Text/Ref. Books)
		effect, Matter waves, de Broglie's hypothesis, experimental verification by Davisson and Germer experiment, uncertainty Principle, Bohr's Model of the hydrogen atom, Atomic Spectra		

Physics V Lab

S.No	Name of the Experiment
1	To determine the dispersive power of prism using spectrometer
2	To determine the wavelength of a monochromatic light using Newton‴s Ring method
3	To find the grating element using spectrometer
4	To study the AC waveform using CRO
5	To study LCR resonance circuit
6	To study the characteristics of a solar cell
7	To study Magnetic field along the axis of current carrying coil - Stewart and Gee‴s method
8	To determine the Hall voltage developed across the sample material.
9	To draw the static current-voltage (I-V) characteristics of a junction diode.
10	To verify Newton's Law of Cooling of different materials and different liquids.

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	18-02-2025	1-20	CB
Test 2	60 Minutes	20	08-04-2025	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-05-2025	1- 40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 10/01/2025   **Dr.SHRUTIKA TIWARI**
                                                                Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
ES123	**Environmental Science**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.PRATIK KUMAR JAGTAP

Learning Outcomes:

1. Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.

2. To describe the challenges of maintaining Soil quality and solid waste Management

3. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

4. Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.

5. Understanding of earth processes, evaluating alternative energy systems, pollution control and mitigation, natural resource management, and the effects of global warming and climate change

Text Book (s) T1	Principles of Environmental Science and Engineering, P. Venugopala Rao PHI Learning private limited, Publication)
Text Book (s) T2	A Textbook of Environmental Chemistry and Pollution Control by S.S. Dara (S. Chand and Company)
Reference Book R1	Masters, G.M. Introduction to Environment Engineering and Science (Prentice Hall of India)
Reference Book R2	Environmental Chemistry by A.K. Dey (Eastern Ltd.).
Reference Book R3	Environmental Chemistry by B.K. Sharma (Krishna Prakashan).

Lecture-Wise-Plan:

Lecture Nos.	Learning objectives	Topics to be covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Ch./Sec. / Page Nos. of Text Book)
1-3		Definition, Characteristics of Ecosystem: Structure of Ecosystem	Peer teaching	T1:40-44
4-6	Observe and describe habitats within ecosystems	Function of ecosystem, Food chain, Food web, Trophic level, Energy flow, ecological pyramids.	Technology based Learning	T1: 46-54
7-9		Types of ecosystems: Aquatic ecosystems Terrestrial ecosystems	Technology based Learning	T1:59-71
10-11	Natural Resources	Water Resources – Availability and Quality aspects. Mineral Resources, Soil, Material cycles-Carbon, Nitrogen and Sulphur Cycles. Energy -	Group Learning and Teaching	T2 110-120
12-14		Different types of energy, Conventional and Non-Conventional sources - Hydro Electric, Fossil Fuel based,	Peer teaching	
15-18			Group Learning and Teaching	T2: 132-147

Lecture Nos.	Learning objectives	Topics to be covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Ch./Sec. / Page Nos. of Text Book)
		Nuclear, Solar, Biomass and Geothermal energy and Bio-gas. Gas Hydrates, Hydrogen as an alternative future source of Energy.		
19 -21		Definition, Sources (Point and non-point). Classification of Water Pollutants.	Peer teaching	R2: 201-220
22-25	Water pollution	Surface water pollution Heavy Metal pollution: Sources/Causes, Effects and Control Measures with reference to Cadmium, Chromium, Lead and Mercury.	Project based Learning.	R2: 12.11.1 - 12.11.12
26-27		Groundwater pollution: Sources/Causes, Effects and Control Measures with reference to Nitrate, Fluoride and Arsenic.	Group Learning and Teaching	T1: 251-252

Lecture Nos.	Learning objectives	Topics to be covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Ch./Sec. / Page Nos. of Text Book)
28-30		Wastewater Engineering: Primary, Secondary and Tertiary Waste water treatment, Water Softening.	Project based Learning.	T1: 153-162
31- 33		Introduction- definition- classification of air pollutants- air quality standards. Sources, Analysis,	Group Learning and Teaching	T1: 125-131
34-37	Air pollution	Secondary [photochemical smog, acid rain, ozone, PAN (Peroxy Acetyl Nitrate)], Green-house effect, ozone depletion, atmospheric stability and temperature inversion.	Peer teaching	R2:146-172
38-40		Effects and control measures for Sox, NOx, PM and CO.	Technology based Learning	T2 27-45

Lecture Nos.	Learning objectives	Topics to be covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Ch./Sec. / Page Nos. of Text Book)
		Land Pollution, Lithosphere, Pollutants & their origin and effect, collection of solid waste	Peer teaching	R2:172-185
	Land & Noise Pollution	Solid waste management, recycling and reuse of solid waste and their disposal techniques (open dumping, sanitary land filling, thermal, composting).	Group Learning and Teaching	T2 68-76
		Noise Pollution: Definitions of sound and noise. Sources of noise – Transport, neighborhood industrial and indoor. Noise, Vibration and Harshness. Decibel scale.	Project based Learning.	R2:166-178

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	10	18-02-2025	1-12	CB
Test 2	60 Minutes	10	08-04-2025	13-28	OB
Project Work	Throughout the Semester	10	**	---	Working models & Presentation
Comprehensive Exam	3 Hours	70	07-05-2025	1- 40	CB

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Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

  Date: 09/01/2025   Dr.PRATIK KUMAR JAGTAP
                                                                    Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
ES124	**Engineering Mechanics**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.HEMANT KUMAR DEWANGAN

Learning Outcomes:

After successful completion of the course student will be able to:

1. Solve for the resultants of any force system and determine equivalent force system.

2. Determine displacement of completely constrained bodies by principles of virtual work and solve the mechanics problems associated with friction force.

3. Calculate the centroid, first moment and second moment of area.

4. Find the velocity and acceleration of rigid bodies in rectilinear and curvilinear motion.

5. Analyze the forces acting on rigid body during translation motion.

Text Book T1	Engineering Mechanics (Statics & Dynamics): A.K.Tayal, Umesh pub., Delhi
Reference Book R1	Engineering Mechanics (Statics & Dynamics): N.H.Dubey, Mc Graw Hill Education pub., Chennai
Reference Book R2	S.S. Bhavikatti : Engineering Mechanics, New Age Pub., Fourth Edition.
Reference Book R3	S. Timoshenko and D.H. Youngh : Engineering Mechanics
Swayam Link	https://www.classcentral.com/course/swayam-engineering-mechanics-14036

Lecture-Wise-Plan:

Lecture Nos.	Learning Objectives	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference
1-4	Introduction to Engineering Mechanics	Classification of Mechanics, Statics, Dynamics: kinetics & kinematics	Peer Teaching	T1, Ch-01, pg.1-2
		Different laws of mechanics: Newton's law, law of transmissibility of forces	Peer Teaching	T1, Ch-01, pg.2-6
		parallelogram law of forces, Free Body Diagram	Peer Teaching	T1, Ch-02, pg.8-21
5-8	Equilibrium of forces and couple	Equivalent Force System and Equilibrium, Conditions of equilibrium	Peer Teaching	T1, Ch-02, pg.22-27
		System of Forces, application of solving simple problems	Peer Teaching	T1, Ch-02, pg.26-27
		Different types of problem to be solved	Peer Teaching	T1, Ch-02, pg.27-45
9-16	Shear Force and Bending Moment Diagram	Types of supports for beams, Beams subjected to concentrated loads and uniformly distributed loads	Peer Teaching	T1, Ch-10
		Shear force and bending moment at any section of a	Peer Teaching	R1, Ch-10

Lecture Nos.	Learning Objectives	Topics to be covered	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference
		beam Analytical methods and graphical methods		
		Force polygon and couple polygon. Reactions at supports.	Peer Teaching	R2, Ch-07
		Various problems involved	Peer Teaching	R3, Ch-08
17		Introduction, Engineering Structures	Peer Teaching	T1, Ch-9, pg.193
18		Rigid or Perfect Truss	Peer Teaching	T1, Ch-9, pg.194
19	Analysis of Plane Trusses	Truss: Determination of Axial Forces in the Members, Method of Joints	Peer Teaching	T1, Ch-9, pg.195
20		Various problems involved	Peer Teaching	T1, Ch-9, pg.195-199
21		The Method of Sections	Peer Teaching	T1, Ch-9, pg.200-215
22		Various problems involved	Peer Teaching	T1, Ch-9, pg.216-219

Lecture Nos.	Learning Objectives	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference
23	Friction	Introduction to Friction, Dry Friction,	Peer Teaching	T1, Ch-6, pg.122-124
24		Rolling Resistance, Force of Friction on a Wheel	Peer Teaching	T1, Ch-6, pg.125-147
25		Application of Friction: Belt and Rope Drive	Peer Teaching	T1, Ch-7, pg.148-149
26		Belt Friction, Centrifugal Tension	Peer Teaching	T1, Ch-7, pg.154-157
27		Initial Tension in the Belt and Power Transmitted by the Belt	Peer Teaching	T1, Ch-7, pg.158-165
28	Curvilinear Motion of a Particle	Kinematics: Introduction, Position Vector, Velocity and Acceleration	Peer Teaching	T1, Ch-15, pg.379
29		Components of Motion: Rectangular Components	Peer Teaching	T1, Ch-15, pg.380
30		Components of Acceleration and Component of Motion	Peer Teaching	T1, Ch-15, pg.382-396
31		Kinetics: Introduction, Equation of Motion	Peer Teaching	T1, Ch-15, pg.399-400

Lecture Nos.	Learning Objectives	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference
32		D'Alembert's principle, Working Concept-Curvilinear Motion, Motion of Vehicles	Peer Teaching	T1, Ch-15, pg.401-415
33		Introduction, work of a force, energy of a particle, and energy and its different types	Peer Teaching	T1, Ch-16, pg.428-433
34	Kinetics of a Particle: Work and Energy	Principle of Work and Energy, Work and Energy Principle of for a system of Particles	Peer Teaching	T1, Ch-16, pg.433-436
35		Potential Energy and Conservative Forces	Peer Teaching	T1, Ch-16, pg.437
36		Principle of Conservation of Energy, Power	Peer Teaching	T1, Ch-16, pg.438-439
37		Introduction, Principle of Impulse and momentum	Peer Teaching	T1, Ch-17, pg.457-458
38	Kinetics of Particle: Impulse and Momentum	Conservation of momentum, Problems to be solved	Peer Teaching	T1, Ch-17, pg.459-466
39		Angular Momentum, Conservation of Angular Momentum	Peer Teaching	T1, Ch-17, pg.467-469

Lecture Nos.	Learning Objectives	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference
40		Problems to be solved	Peer Teaching	T1, Ch-17, pg.471

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	17-02-2025	1-20	CB
Test 2	60 Minutes	20	17-04-2025	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	05-05-2025€	1- 40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Mr.HEMANT KUMAR DEWANGAN**
                                                Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
TA125	**Engineering Graphics**	**2**	**2**	**0**	**4**

Instructor-in-charge: Mr.DILIP MISHRA

Scope & Objective of the course:
1. To understand the standards and conventions followed in preparation of engineering drawings.
2. Will enable the students to & the concepts of orthographic and isometric projections.
3. To develop the ability of conveying the engineering information through drawings & to make them understand the relevance of engineering drawing to different engineering domains.
4. The course will help them to develop the ability of producing engineering drawings using drawing instruments and enable them to use computer aided drafting packages for the generation of drawings

Text Book T1	Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005- Charotar Publishing House, Gujarat..
Text Book T2	Engineering Graphics – K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore.
Reference Book R1	Engineering Drawing-by N.S.Parthasarathy & Vela Murali, Oxford University Press, 2015

Lecture-Wise-Plan:

Lecture No.	Topic	Description	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference/ Text Book
1	Importance of Engineering Drawing	Overview of engineering drawing, significance in	a. Group Learning and Teaching.	T1, PP 1–3

Lecture No.	Topic	Description	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference/ Text Book
		design and communication.		
2	Scales: Representative Fraction	Definition and significance of representative fraction in scales.	b. Technology based Learning.	T1, PP 4–7
3	Types of Scales	Types such as plain and diagonal scales, their uses and construction.	a. Group Learning and Teaching	T1, PP 7–12
4	Conic Sections: Ellipse, Parabola, Hyperbola	Basics and construction of conic sections.	e. Project based Learning.	T1, PP 23–25
5	Conic Sections: Ellipse, Parabola, Hyperbola	Basics and construction of conic sections.	a. Group Learning and Teaching	T1, PP 26–28
6	Cycloidal Curves: Cycloid, Epicycloid, Hypocycloid	Construction and applications of cycloidal curves.	a. Group Learning and Teaching	T1, PP 28–30
7	Cycloidal Curves: Cycloid, Epicycloid, Hypocycloid	Construction and applications of cycloidal curves.	b. Technology based Learning.	T1, PP 31–33
8	Involute	Drawing and practical use of involute curves.	a. Group Learning and Teaching	T1, PP 34–36

Lecture No.	Topic	Description	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference/ Text Book
9	Introduction to Projection	Principles, methods, and symbols of projection.	b. Technology based Learning.	T1, PP 36–38
10	Planes of Projection & Four Quadrants	Understanding projection planes and quadrant division.	b. Technology based Learning.	T1, PP 39–41
11	First and Third Angle Projections	Detailed study and distinction between first and third-angle projections.	a. Group Learning and Teaching	T1, PP 50–53
12	First and Third Angle Projections	Detailed study and distinction between first and third-angle projections.	e. Project based Learning.	T1, PP 53–56
13	Projection of Points	Projection of points in different quadrants.	a. Group Learning and Teaching	T1, PP 57–59
14	Projection of Lines: Parallel and Perpendicular Cases	Projections when lines are parallel/perpendicular to the planes.	a. Group Learning and Teaching	T1, PP 61–63
15	Projection of Lines: Parallel and Perpendicular Cases	Projections when lines are parallel/perpendicular to the planes.	a. Group Learning and Teaching.	T1, PP 64–66
16	Projection of Lines: Inclined Cases	Lines inclined to one or both the planes with simple problems.	e. Project based Learning.	T1, PP 67–69

Lecture No.	Topic	Description	Teaching learning strategies: **a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.**	Reference/ Text Book
17	Projection of Lines: Inclined Cases	Lines inclined to one or both the planes with simple problems.	a. Group Learning and Teaching	T1, PP 70–72
18	Projection of Planes: Introduction	Types and principles of plane projection.	b. Technology based Learning.	T1, PP 73–75
19	Projection of Planes in Standard Positions	Perpendicular and parallel cases of planes relative to reference planes.	e. Project based Learning.	T1, PP 80–82
20	Projection of Planes in Standard Positions	Perpendicular and parallel cases of planes relative to reference planes.	e. Project based Learning.	T1, PP 83–85
21	Projection of Planes: Inclined Cases	Projections of planes inclined to one or both planes.	b. Technology based Learning.	T1, PP 86–88
22	Projection of Planes: Inclined Cases	Projections of planes inclined to one or both planes.	e. Project based Learning.	T1, PP 95–97
23	Projection of Planes: Inclined Cases	Projections of planes inclined to one or both planes.	e. Project based Learning.	T1, PP 98–100
24	Introduction to Solids	Overview of types and properties of solids.	e. Project based Learning.	T1, PP 101–103
25	Projections of Solids: Simple Positions	Projections when solid axes are parallel/perpendicular to reference planes.	a. Group Learning and Teaching	T1, PP 104–106

Lecture No.	Topic	Description	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference/ Text Book
26	Projections of Solids: Simple Positions	Projections when solid axes are parallel/perpendicular to reference planes.	e. Project based Learning.	T1, PP 110–112
27	Projections of Solids: Inclined Cases	Solids with axes inclined to one or both reference planes.	a. Group Learning and Teaching	T1, PP 120–123
28	Projections of Solids: Inclined Cases	Solids with axes inclined to one or both reference planes.	e. Project based Learning.	T1, PP 124–126
29	Sections of Solids	Types of section planes, true shape, and sectional views of solids.	e. Project based Learning.	T1, PP 127–129
30	Sections of Solids	Types of section planes, true shape, and sectional views of solids.	a. Group Learning and Teaching	T1, PP 130–132
31	Introduction to Development of Surfaces	Basics and importance of surface development in engineering applications.	e. Project based Learning.	T1, PP 150–152
32	Development of Lateral Surfaces: Cube, Prisms, Cylinders	Practical methods for developing surfaces of these shapes.	e. Project based Learning.	T1, PP 153–155
33	Development of Lateral Surfaces: Cube, Prisms, Cylinders	Practical methods for developing surfaces of these shapes.	a. Group Learning and Teaching	T1, PP 156–159

Lecture No.	Topic	Description	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference/ Text Book
34	Development of Lateral Surfaces: Pyramids & Cone	Techniques for development of these shapes.	e. Project based Learning.	T1, PP 170–172
35	Development of Lateral Surfaces: Pyramids & Cone	Techniques for development of these shapes.	b. Technology based Learning.	T1, PP 173–175
36	Introduction to Isometric Projection	Understanding isometric axes, lines, and planes.	e. Project based Learning.	T1, PP 176–178
37	Isometric Scale	Construction and use of isometric scales.	b. Technology based Learning.	T1, PP 179–181
38	Isometric View of Simple Objects	Drawing isometric projections for basic objects.	e. Project based Learning.	T1, PP 182–184
39	Introduction to CAD	Overview, benefits, and limitations of CAD systems.	a. Group Learning and Teaching	T1, PP 185–187
40	CAD Software and Basic Commands	Introduction to AutoCAD and essential commands for drawing.	c. Technology based Learning	T1, PP 188–190
41	Concept of Layers and Dimensioning	Working with layers, dimensioning, and adding text in CAD.	c. Technology based Learning	Various

Lecture No.	Topic	Description	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference/ Text Book
42	Creation of 2D Drawings	Practical session on creating two-dimensional drawings in AutoCAD.	c. Technology based Learning	Various

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	19-02-2025	1-15	CB
Test 2	60 Minutes	20	09-04-2025	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	12-05-2025	1-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 02/01/2025   Mr.DILIP MISHRA
                                                                  Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
TA126	**Computer Graphics**	**3**	**1**	**0**	**4**

Instructor-in-charge: Dr.B RAVI KIRAN

Learning Outcomes:
This course is offered as a technical art subject to engineering students. It focuses on training the students rigorously in the skills of a structured programming language, particularly in C and application of such language in problem solving.

Text Book T1	"Programming with ANSI C", E. Balaguruswamy, TMH 4th edition, 2004.
Reference Book R1	"Programming with C", Gottfried, Schaum -TMH, 2nd Edition, 2002.
Reference Book R2	"A Book on C", Al Kelly & Ira Pohl, Pearsons, 4th Edition, 2001..
Reference Book R3	"The C Programming Language", Kernighan & Ritchie, 2nd Edition PHI, 2002.

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	(Ch./Sec./ Text Book)
1	Overview of C	History, Sample program, basic structure of C, executing a C program	a. Group Learning and Teaching	T1 Ch.1
2-3	Constants, Variables and Data types	Constants, variables, data types, storage classes, declarations	a. Group Learning and Teaching	T1 Ch.2

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	(Ch./Sec./ Text Book)
4-5	Operators and Expressions	Arithmetic, relational, logical, assignment, increment and decrement bitwise, conditional operators, expressions, operator precedence, type conversions,etc.	a. Group Learning and Teaching	T1 Ch.3
6	Input, output operations	Reading, writing characters, formatted i/o, etc	a. Group Learning and Teaching	T1. Ch.4
7	Decision making & branching	If statement, if - else, nested if, switch statement, etc	a. Group Learning and Teaching	T1 Ch.5
8	Decision making & looping	While loop, do loop, for loop etc	a. Group Learning and Teaching	T1 Ch.6
9-10	Arrays	One-dimensional, two-dimensional, multi-dimensional arrays, initialization, etc	a. Group Learning and Teaching	T1 Ch.7

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	(Ch./Sec./ Text Book)
11-12	Character arrays & strings	Declaring, initializing, reading, writing strings. Arithmetic operations on characters and string operations, etc	a. Group Learning and Teaching	T1 Ch.8
13-15	Low level Programming	Bitwise Operations, Bit fields	a. Group Learning and Teaching	R1 Ch.13
16-17	Understanding Functions	Definition of function, function calls, return values	a. Group Learning and Teaching	T1 Ch.9
18-20	User Defined Functions	Types of functions, passing arguments, nesting, recursion, passing arrays	a. Group Learning and Teaching	T1 Ch.9

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	(Ch./Sec./ Text Book)
21-23	Understanding Structures	Defining structure, accessing structure members, structure initialization, operations on individual members, arrays of structures	a. Group Learning and Teaching	T1 Ch.10
24	Structures & Unions	Unions, Structures Vs Unions	a. Group Learning and Teaching	T1 Ch.10
25	Dynamic Memory Allocation	Introduction, Dynamic Memory Allocation, Malloc, Calloc, Realloc	a. Group Learning and Teaching	T1. Ch.13(13.1-13.6)
26-27	Understanding Pointers	Introduction, accessing address of a variable, declaring pointers, initialization	a. Group Learning and Teaching	T1. Ch.11 (11.1-11.5)
28-29	Programming with Pointers	Accessing a variable through pointer, pointer expressions, pointer	a. Group Learning and Teaching	T1. Ch.11 (11.6-11.9)

Lecture No.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	(Ch./Sec./ Text Book)
		increments and scale factor		
30-31	Pointers & Arrays	Pointers & Arrays, Pointers & Strings, Array of Pointers	a. Group Learning and Teaching	T1. Ch.11 (11.10-11.12)
32-33	Pointers & Functions	Pointers as function arguments, functions returning pointers, pointers & structures	a. Group Learning and Teaching	T1. Ch.11 (11.13-11.16)
34-36	File Management	Opening a files, closing a file, I/O operations, Random Access to File, Command line arguments	a. Group Learning and Teaching	T1. Ch.12
37-42	Data Structures using C	Implementation of linear linked lists, stacks, queues and binary trees	a. Group Learning and Teaching	R2 Ch.10 T1. Ch.13

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	10	17-02-2025	1-20	CB
Test 2	60 Minutes	10	07-04-2025	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	10	**	---	CB
Comprehensive Exam	3 Hours	70	01-05-2025	1- 40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 08/01/2025   **Dr.B RAVI KIRAN**
                                                                            Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
ES203	**Electical Sciences II**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.K NAGAIAH

Learning Objectives:
After successful completion of the course student will be able to   To give an insight to the analysis of single phase and three phase AC circuits and to introduce the theory and operational aspects of electrical machines.

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	(Ch./Sec. /Text Book)
1-2	Basics of AC circuit analysis	Analysis of AC circuits using phasor method	a. Group Learning and Teaching	T1 4.1-4.3
3-4	Concept of complex power and power factor	Complex power and power factor improvement	a. Group Learning and Teaching	T1 4.4
5-6	Concepts of three phase circuit analysis	Three phase circuits; Star and delta configuration	a. Group Learning and Teaching	T1 6.1 - 6.5

Lecture No.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	(Ch./Sec. /Text Book)
7-8	- do-	Analysis of three phase circuits; Three phase power; Two watt meter method of	a. Group Learning and Teaching	T1 6.6 - 6.8
9-10	Magnetic circuits and their analysis	Concept of Magnetic circuit, Analysis of magnetic circuits; Magnetization characteristic	a. Group Learning and Teaching	T1 8.1 - 8.4
11	Concept of magnetic induction and force	Electro magnetic induction and force. Self & mutual inductances	a. Group Learning and Teaching	T1 8.5-8.6
12-13	Energy in magnetic circuits and various Losses	Energy stored in magnetic systems and losses	a. Group Learning and Teaching	T1 8.7 - 8.9
14-15	Transformer basics	Transformer, principles, types: Ideal transformer	c.Technology based Learning	T1 9.1 - 9.3

Lecture No.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	(Ch./Sec. /Text Book)
16-17	Transformer modeling	Transformer circuit model and determination of its parameters using tests	c.Technology based Learning	T1 9.4- 9.5
18-19	Transformer Performance	Per unit system, voltage regulation, efficiency	c.Technology based Learning	T1 9.6 - 9.8
20	Various Types of transformers	Auto Transformers, 3 phase transformers and Special Transformers	c.Technology based Learning	T1 9.9 - 9.11
21- 22	Concepts of rotating machines	Rotating machines and Elementary Synchronous machine	c.Technology based Learning	T1 10.1 - 10.3
23-24	Concept of EMF and MMF	EMF and MMF in AC winding	c.Technology based Learning	T1 10.4 - 10.5
25	Concept of torque in electric machines	Rotating magnetic field and expression for torque	c.Technology based Learning	T1 10.6 - 10.7

Lecture No.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	(Ch./Sec. /Text Book)
26	Operation & constructional features of electric machines	Basic operation and torque production in Synchronous, Induction and DC machines	c.Technology based Learning	T1 10.8
27-28	- Do -	Losses & efficiency in electrical machines; cooling; matching of load characteristics	c.Technology based Learning	T1 10.9 - 10.11
29-30	Constructional features and circuit model of DC machines	DC machines :constructional features emf & torque Circuit model	c.Technology based Learning	T1 11.1 - 11.4
31	Concept of armature reaction and commutation	Armature reaction & commutation; Excitation and magnetization characteristics	c.Technology based Learning	T1 11.5 -11.7
32-33	Performance of DC motors	Characteristics and speed control of DC shunt, series and compound motors	c.Technology based Learning	T1 11.8

Lecture No.	Learning Objective	Topics to be covered	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	(Ch./Sec. /Text Book)
34	- Do-	Starting and Efficiency calculation of DC motors	c.Technology based Learning	T1 11.9 -11.10
35-36	Introduction to Synchronous machines	Synchronous machines, characteristics; Synchronous reactance & voltage regulation	c.Technology based Learning	T112.1 -12.2
37-38	Introduction to Induction machines	Induction machines constructional features, circuit model	c.Technology based Learning	T1 12.3
39-40	Characteristics of induction machines, Modeling and performance of induction machines	Torque slip characteristics of induction machine, Tests for determination of circuit model parameters & starting methods	c.Technology based Learning	T1 12.3

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	18-02-2025	1-10	CB
Test 2	60 Minutes	20	08-04-2025	11-24	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-05-2025	1- 40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Dr.K NAGAIAH**
                                                      Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
MG201	**Principle of Management**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.VARUN PANWAR

Learning Outcomes:
1. To understand the basic concepts of management and demonstrate the roles, skills, function of a manager
2. To Describe and analyses the various management theories in contemporary business environment
3. To develop managerial skills to understand and evaluate the contemporary issues in management

Reference Book R1	Principles Of Business Management, Dr. N. Mishra, Dr.O.P. Gupta, Sahitya Bhawan Publications
Reference Book R2	Principles Of Business Management, Dr. SC Saksena, Sahitya Bhawan Publications
	L. M. Prasad - Principles and Practice of Management, Sultan Chand

Lecture-Wise-Plan:

Lecture Nos	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (chapter/sec ./Page Nos of Text/Ref. Books)
01-03	Fundamentals of Management	Meaning, Nature & Significance; Management Vs Administration; Evolution of Management Thought and different approaches to	Group Learning and Teaching	R1, pg 01-24, Study Materials and PDF

Lecture Nos	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (chapter/sec./Page Nos of Text/Ref. Books)
		management; Levels of Management		
04-07	Key Concepts in Management Practice	Elements of managerial Processes; Styles & Roles of Managers in Organizations; Scientific and Operational Management; Behavioral Science Systems and Contingency approaches.	Group Learning and Teaching	R1, pg 25-30, pg 31-40 Study Materials and PDF
08-09	Planning: Core Concepts and Challenges	Nature & Significance; Process of Planning; Planning and Environmental Uncertainties	Group Learning and Teaching	R1, pg 43-48 Study Materials and PDF
10-12	Planning in Action: Types, Benefits, Drawbacks, and Decision-Makin	Types of Planning; Advantages and Limitations of Planning; Decision Making- Process of Decision Making.	Group Learning and Teaching	R1, pg 48-58, pg 62-66 Study Materials and PDF
13	Internal Assesment			
14-16	Organizing: Authority, Responsibility, and Delegation	Nature & Significance; Authority & Responsibility; Span of Control;	Group Learning and Teaching	R1, pg 103,120 Study Materials and PDF

Lecture Nos	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (chapter/sec./Page Nos of Text/Ref. Books)
		Process of Delegations; Barriers to Delegation		
17-19	Organizing: Structure and Authority Distribution	Centralization & Decentralization; Concept of Line & Staff organization	Group Learnig and Teaching	R1, pg 129,137 Study Materials and PDF
20-22	Organization Structures and Staffing	Organization Structures-Types, Advantages & Disadvantages; Staffing Concept.	Group Learning and Teaching	R1, pg 148-164 Study Materials and PDF
23-25	Directing: Guiding and Supervising Teams	Concept & Importance; Direction & Supervision; Role of Supervisor; Techniques of directing	Group Learning and Teaching	R2, pg 224-232 Study Materials and PDF
26-28	Coordination: Integrating Efforts for Success	Nature and Scope of Coordination; Principles, Techniques and Barriers to Co-ordination	Group Learning and Teaching	R2, pg 267 Study Materials and PDF
29-32	Presentation	Student Based Learning	Peer teaching Project Based Learning	
33-36	Controlling: Ensuring Performance and Achieving Goals	Concept and process; effective control system; Techniques of control.	Group Learning and Teaching	R1, pg 217-240 Study Materials and PDF
37	Internal Assesment			

Lecture Nos	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (chapter/sec ./Page Nos of Text/Ref. Books)
38-40	Revision	Revision		

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	19-02-2025	1-12	CB
Test 2	60 Minutes	20	09-04-2025	14-26	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	14-05-2025	1-40	CB

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Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Mr.VARUN PANWAR**
                                                     Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
MA303	**Operation Research**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.HEMANT KUMAR DEWANGAN

Learning Outcomes:
After successful completion of the course student will be able to:

1. Identify and develop operational research models from the verbal description of the real system.
2. Understand the mathematical tools that are needed to solve optimization problems.
3. Use mathematical software to solve the proposed models.
4. Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.
5. Learn the concepts, models, tools and techniques, to manage operations in manufacturing and service organizations.

Text Book T1	Sharma, S.D., "Operations Research", Kedar Nath Ram Nath & Co. (15th Edition), 2010.
Reference Book R1	Taha, H.A., "Operations Research – An Introduction", Prentice Hall, (7th Edition), 2002.
Reference Book R2	Hillier, F.S., Lieberman, G.J. , Nag, B., Basu, P., "Introduction to Operations Research", McGraw Hill (10th Edition), 2017.
Reference Book R3	Operations Management, FedUni
Reference Book R4	Ravindran, A., Phillips, D. T and Solberg, J. J., "Operations Research: Principles and Practice", John Willey and Sons, 2nd Edition, 2009.
Reference Book R5	Operations Management, Lee J Krajweski and Larry P.Ritzman/ Person Education Delhi 6th edition
Reference Book R6	Operations Management, Russel &Taylor, 4th Edition
Swayam Link	https://onlinecourses.swayam2.ac.in/cec20_ma10/preview

Lecture-Wise-Plan:

Lecture No.	Learning objectives	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Refer to Chapter, See (Book)
1	Linear Programming Problem	Mathematical Formulation of LPP	Peer teaching	T1, Unit-2, ch-3, pg.3-26
2		Graphical Method for Solving LPP	Peer teaching	T1, Unit-2, ch-3, pg.26-53
3		Simplex Method for Solving LPP and Big-M Method	Peer teaching	T1, Unit-2, ch-5, pg.67-95
4		Some Special Cases in LPP	Peer teaching	T1, Unit-2, ch-5, pg.95-125
5		Duality, and Solving LPP using Duality in Simplex Method	Peer teaching	T1, Unit-2, ch-7, pg.158-203
6	Transportation	Mathematical Formulation of LPP	Peer teaching	T1, Unit-2, ch-11, pg.262-267
7		Initial BFS of Transportation Problem	Peer teaching	T1, Unit-2, ch-11, pg.269-278
8		Optimality Test by Stepping Stone Method and, and	Peer teaching	T1, Unit-2, ch-11, pg.278-351
9		MODI Method	Peer teaching	T1, Unit-2, ch-11, pg.278-351
10		Some Special Cases of Transportation Problem	Peer teaching	T1, Unit-2, ch-11, pg.278-351
11	Assignment	Initial BFS of Assignment Problem	Peer teaching	T1, Unit-2, ch-12, pg.352-353

Lecture No.	Learning objectives	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Refer to Chapter, See (Book)
12		Johnson's job of sequencing rules	Peer teaching	T1, Unit-2, ch-12, pg.353-403
13		Solution by Hungarian Method, and Travelling Salesman Problem	Peer teaching	T1, Unit-2, ch-12, pg.353-403
14		Basic Concept and Terminologies	Peer teaching	T1, Unit-4, ch-19, pg.3-5
15		Two-person Zero-sum Game, and Game with Pure and Mixed Strategies	Peer teaching	T1, Unit-4, ch-19, pg.20-61
16	Game Theory	Dominance Principle, Arithmetic Method, and Graphical Method for Solving $(2 \times n)$ Game	Peer teaching	T1, Unit-4, ch-19, pg.20-61
17		Graphical Method for Solving $(m \times 2)$ Game and Solution of Game by Simplex Method	Peer teaching	T1, Unit-4, ch-19, pg.20-61
18	Job Sequencing	Basic Terminologies and Assumptions of Job Sequencing	Peer teaching	T1, Unit-4, ch-24, pg.299-300
19		Processing of n Jobs through 2 and 3 Machines	Peer teaching	T1, Unit-4, ch-24, pg.300-315

Lecture No.	Learning objectives	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Refer to Chapter, See (Book)
20		Processing n Jobs through m Machines, and Processing 2 Jobs through m Machines - Graphical	Peer teaching	T1, Unit-4, ch-24, pg.300-315
21		Economic Order Quantity and EOQ Models without Shortage	Peer teaching	T1, Unit-4, ch-20, pg.62-71
22		EOQ models with Shortage and EPQ Models with/without Shortages	Peer teaching	T1, Unit-4, ch-20, pg.72-100
23	Inventory Theory	Newsboy Problem and Probabilistic Inventory Model with Instantaneous Demand and No Set up Cost	Peer teaching	T1, Unit-4, ch-21, pg.143-172
24		Probabilistic Inventory Model with Uniform Demand and No Set up Cost, and Buffer Stock in Probabilistic Inventory Model	Peer teaching	T1, Unit-4, ch-21, pg.143-172
25		Problems regarding different models	Peer teaching	T1, Unit-4, ch-21, pg.173-175
26	Queuing Theory	Basic Characteristics of Queuing System	Peer teaching	T1, Unit-4, ch-23, pg.215-229

Lecture No.	Learning objectives	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Refer to Chapter, See (Book)
		and Probability Distribution of Arrivals		
27		Probability Distribution of Departures and Model I (M|M|1):(∞|FCFS)	Peer teaching	T1, Unit-4, ch-23, pg.230-231
28		Model I. (General): (M|M|1): (∞|FCFS), and Model II. (M|M|1): (N|FCFS)	Peer teaching	T1, Unit-4, ch-23, pg.232-257
29		Model III - (M|M|s): (∞|FCFS), and Model IV - (M|Ek|1): (∞|FCFS)	Peer teaching	T1, Unit-4, ch-23, pg.258-268
30	Network Analysis	Networking Modeling	Peer teaching	T1, Unit-4, ch-25, pg.316-322
31		Critical Path Method (CPM)	Peer teaching	T1, Unit-4, ch-25, pg.323-349
32		Program Evaluation & Retention Technique (PERT)	Peer teaching	T1, Unit-4, ch-25, pg.349-382
33		Project Crashing	Peer teaching	T1, Unit-4, ch-25, pg.349-382
34		LP and Dual LP Solutions to Network Problem	Peer teaching	T1, Unit-4, ch-25, pg.349-382
35	Dynamic Programming	Basic Concept and Terminology, and Dynamic	Peer teaching	T1, Unit-5, ch-33, pg.72-77

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Lecture No.	Learning objectives	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Refer to Chapter, See (Book)
		Programming Models I and II		
36		DP Model III, Solution of Discrete DP Problem and Solution of LPP by DP	Peer teaching	T1, Unit-5, ch-33, pg.82
37-38	Supply Chain Management	Introduction, Business Drivers in Supply Chain performance	Group Learning and Teaching	R3, ch-16, pg.217-232
39-40	Just-In-Time (JIT) Manufacturing System	Introduction, The Concept of the JIT System	Group Learning and Teaching	R3, ch-18, pg.253-261

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	17-02-2025	1-15	CB
Test 2	60 Minutes	20	07-04-2025	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	05-05-2025	1- 40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Mr.HEMANT KUMAR DEWANGAN**
                                                    Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CS314	**Operating System**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.ASHISH KUMBHARE

Learning Outcome –
1. To understand the basic concepts and functions of operating systems.
2. To understand Processes and Threads
3. To analyze Scheduling algorithms.
4. To understand the concept of Deadlocks.
5. To analyze various memory management schemes.
6. To understand I/O management and File systems.

Text Book T1	Operating Systems Conepts, Silbverschatz, A and Galvin, P.B 7th Edition, Addison, Wesley, 1998
Text Book T2	Operating Systems- A Concept bases approach, Dhamdhere D.M
Reference Book R1	Operating Systems, Stallings W, 4th edition, PHI, 2001.
Reference Book R2	The Design of Unix Operating System, Bach
Reference Book R3	Modern Operating Systems, Tanenbaum, A.S PHI 1996
NPTEL	https://nptel.ac.in/courses/106/105/106105214/

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Page Nos. of Text Book)
1	To understand what is operating system and its functions	Overview	c. Technology based Learning	T1 CH-1
2		Types of OS	c. Technology based Learning	T1 CH-1

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Page Nos. of Text Book)
3		Design Approaches	c. Technology based Learning	T1 CH-1
4		System call, context switching	c. Technology based Learning	T1 CH-2
5		System design implementation	c. Technology based Learning	T1 CH-3
6		Process overview(State, PCB)	c. Technology based Learning	T1 CH-4
7-8	To understand the concept of process and its various states	Process Scheduling	c. Technology based Learning	T1 CH-4
9		Threads	c. Technology based Learning	T1 CH-5
10		Inter Process Communication (IPC)	c. Technology based Learning	T1 CH-5
11	To know what is scheduling and its importance	CPU Scheduling Overview	d. Peer teaching	T1 CH-6
12-13		Scheduling Algorithms	d. Peer teaching	T1 CH-6
14	To understand the problem of Critical Section and its solution	Critical Section Problem	c. Technology based Learning	T1 CH-7
15		Multi Process Solution	c. Technology based Learning	T1 CH-7
16		Semaphores	c. Technology based Learning	T1 CH-7

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Page Nos. of Text Book)
17		Classical Problems of Synchronization	c. Technology based Learning	T1 CH-7
18-20	To know what is deadlock and its handling	Deadlock Handling	c. Technology based Learning	T1 CH-8
21		Memory Management Overview	c. Technology based Learning	T1 CH-9
22-23		Paging	c. Technology based Learning	T1 CH-9
24		Segmentation	c. Technology based Learning	T1 CH-9
25	To understand various memory management schemes and their relative advantages and disadvantages	Segmentation with Paging	c. Technology based Learning	T1 CH-9
26		Virtual Memory	c. Technology based Learning	T1 CH-10
27		Demand Paging	c. Technology based Learning	T1 CH-10
28		Page Replacement	c. Technology based Learning	T1 CH-10
29		Page Replacement Algorithms	c. Technology based Learning	T1 CH-10
30		Thrashing	c. Technology based Learning	T1 CH-10
31	To understand the concept of	File Operations	c. Technology based Learning	T1 CH-11

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Page Nos. of Text Book)
32	files, its types, attributes and operations	Directory Structure	c. Technology based Learning	T1 CH-11
33		File-System Structure	c. Technology based Learning	T1 CH-12
34		Allocation Methods	c. Technology based Learning	T1 CH-12
35-39		I/O Systems	c. Technology based Learning	T1 CH-12
40		Disk Scheduling	d. Peer teaching	T1 CH-13

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	17-02-2025	1-15	CB
Test 2	60 Minutes	20	07-04-2025	16-25	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	01-05-2025	1-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 03/01/2025   **Mr.ASHISH KUMBHARE**
                                                                      Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CS315	**Database Management Systems**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mr.NAVEEN KUMAR VAISHNAV

Scope & Objective of the Course:

After successful completion of the course student will be able to:

1. To understand the core concepts of database systems, including relational databases, data models, and schema design.

2. To learn how to effectively use SQL for querying, updating, and managing databases.

3. To understand the principles of database design, including normalization and ER modelling.

4. To gain knowledge of transaction management, concurrency control, and recovery techniques.

5. To develop the ability to design and implement database systems that meet real-world application needs.

Textbook T1	Database System Concepts, Silberschatz A, Korth HF, and Sudarshan S, TMH,2002
Reference book R1	Database Management Systems, Ramakrishna R.& Gehrke J, 3rd Edition, Mc-GrawHill,2002
Reference Book R2	Database Systems-The Complete book, HectorG Molina, Jeffrey D. Ullmanand Jennifer Widom, Pearson Education, 2002
NPTEL	https://nptel.ac.in/courses/106/105/106105175/
SWAYAM	https://onlinecourses.swayam2.ac.in/cec19_cs05/preview

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching learning Strategies a. Group Learning and Teachig b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (chapter/sec ./Page No.s of Text/Ref. Books)
1-3	Introduction to Database Systems	Course overview, Overview of modern DBMS, Database Architecture	Peer Teaching	T1: 1.1-1.13
4-8	About Database	Data Independence, Data Dictionary, Types of Database Users, Types of Keys, Distributed Database	Group Learning and Teaching	T1: 2.1-2.13
8-11	Data modeling	Data Models, Basic elements of ER model, Attributes, Types of Relationship	Peer Teaching	T1: 7.1-7.10
12-16	Introduction to SQL constructs	SQL, Data types, DDL & DML Commands	Technology based Learning	T1: 3.1-3.9
17-19	Types of Operators and Functions	In, Between, Like, Aggregate Functions	Technology based Learning	T1: 5.1

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching learning Strategies a. Group Learning and Teachig b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (chapter/sec ./Page No.s of Text/Ref. Books)
20-25	Understanding additional SQL structures	Insert, Delete, Update, View Definition and Use, Temporary Tables, Nested Queries	Technology based Learning	T1: 4.1-4.5
26-30	Database design through Functional Dependencies & Normalization	Functional dependencies, Anomalies, Normal Forms: 1NF,2NF, 3NF, BCNF, Multi-valued dependencies:4NF,5NF	Peer Teaching	T1: 8.1-8.9
31-33	Formal Query Languages	Relational algebra operators, Relational algebra queries	Peer Teaching	T1: 61.-6.4
34-35	Integrity constraints	Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers	Technology based Learning	T1: 4.4-4.5
36-38	Understand Database connectivity	Connectivity to the database, designing and implementation	Technology based Learning	T1: 12.1-12.8

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching learning Strategies a. Group Learning and Teachig b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (chapter/sec ./Page No.s of Text/Ref. Books)
39 - 40	Latest Technologies	Introduction to Hadoop, Big-Data, Data warehouse	Technology based Learning	T1: 14.1-14.10

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	19-02-2025	1-16	CB
Test 2	60 Minutes	20	09-04-2025	17-29	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	12-05-2025	1-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

 Date: 07/01/2025   Mr.NAVEEN KUMAR VAISHNAV
                                                          Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CS225	**Web Technology**	3	2	0	4

Instructor-in-charge: Mr.NAVEEN KUMAR VAISHNAV

Scope & Objective of the Course:

After successful completion of the course student will be able to:

1. Understand Web Fundamentals: Learn the architecture of the web, including client-server interactions and HTTP.

2. Proficiency in HTML & CSS: Build structured web pages with HTML and style them using CSS for responsive design.

3. Dynamic Web Pages with JavaScript: Implement interactivity, form validation, and DOM manipulation using JavaScript.

4. Server-side Programming with PHP: Create dynamic websites, connect to databases, and manage sessions using PHP.

5. Build Full Web Applications: Combine front-end and back-end skills to create and deploy complete web applications.

6. Emphasize Web Standards: Focus on accessibility, SEO, web performance, and cross-browser compatibility.

Text Book T1	Deitel, Deitel, Goldberg, "Internet & World Wide Web How to Program", Third Edition, Pearson Education, 2006.
Reference book R1	Achyut Godbole, Atul Kahate "Web Technologies: TCP/IP, Web/Java Programming, and Cloud Computing", Third Edition, McGraw Hill Education.
Reference Book R2	Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill. 4.
NPTEL	https://nptel.ac.in/courses/106/105/106105084/
SWAYAM	https://onlinecourses.swayam2.ac.in/nou20_cs05/preview

Lecture-Wise-Plan:

Lecture	Learning Objective	Topics to be Covered	Teaching learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Chapters)
1-2	Internet Concept:	Fundamental of Web, History of Web, Web development overview, Domain Name System (DNS)	Peer Teaching	T1: 1.5-1.6
3-4	Functionality of Internet	DHCP and SMTP and other servers, Internet service provider (ISP), Concept of IP Address,	Peer Teaching	T1: 1.8, 2.1
5-6	Protocols and Components of internet	Internet Protocol, TCP/IP Architecture, Web Browser and Web Server.	Peer Teaching	T1: 2.1, 2.7
7-10	HTML and DHTML	HTML Tag, Rules of HTML, Text Formatting and Style, List, Image, Hyperlinks	Technology based Learning	T1: 4.1- 4.9
11-15	HTML Tables and Frames	Tables and Layout, Linking Documents, Frame, Forms, Project in HTML	Technology based Learning	T1: 4.10 - 4.11
16-20	DHTML & CSS	Introduction to DHTML, CSS, Class and DIV, External Style Sheet.	Technology based Learning.	T1: 5.1 - 5.8

Lecture	Learning Objective	Topics to be Covered	Teaching learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Chapters)
21-24	Java Script	JavaScript (JS) in Web Page, Advantage of Java Script, JS object model and hierarchy	Technology based Learning.	T1: 6.1 – 6.5
25-28	Java Script Functions	JS Function, Client-side JS Vs. Server-side JS, JS security	Technology based Learning.	T1: 9.1 – 9.11
29-33	PHP	PHP Syntax, Variables, Data Types, Strings, Constants, Operators, Control structure, Functions, Array, PHP Forms, Forms Handling	Technology based Learning.	R1: 8.1- 8.6
34-38	PHP Connectivity	Working with PHP and MySQL, Connecting to Database, Creating, Selecting, Deleting, Updating Records in a table, Inserting Multiple Data	Technology based Learning.	R1: 8.7- 8.9
39-40	Latest Technologies	Introduction to CodeIgniter, Laravel, Word press etc.	Peer Teaching	Refer Internet & Follow Instructor in Charge

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	18-02-2025	1-20	CB
Test 2	60 Minutes	20	08-04-2025	21-40	OB
Quiz/Assignment/Lab	2 Hours	20	**	---	CB
Comprehensive Exam	3 Hours	40	07-05-2025	1- 40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Mr.NAVEEN KUMAR VAISHNAV**
Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
MKE641	**Digital Service and Marketing**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.B RAVI KIRAN

Learning Outcomes:
After the successful completion of the course, the student shall be able to:
1. Understand digital marketing, importance there of, meaning of web site and levels of website, difference between blog, portal and website.
2. Understand the working of SEO (Search engine optimization) on page optimization, off page optimization, and will learn to prepare reports
3. Learn about SMO (Social media optimization) like Face book, twitter, Linkedin, Tumbir, Printerest and other social media services optimization.
4. Understand paid tools like google ad words, display advertising techiques
5. Learn and apply hands on experience on tools useful to SEO for analysis on website traffic, keyword analysis and learn email marketing and ad designing.

Textbook (s) T1	Ahuja Vandana Digital Marketing, Oxford University press (2016) ISBN:9780199455447 Sainy Romi, Nargundkar Rajendra Digital Marketing: cases from India, Notion Press (2018) ISBN 9781644291931, 1644291932
Reference book (s) R1	Stephanie Daimond, Author of Facebook Marketing for Dummies, a Wiley brand
Suggested equivalent online courses:	https://onlinecourses.swayam2.ac.in

Lecture Nos.	Learning objectives	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text Book)
1-10	Learn about the Basics digital marketing	Meaning of Digital Marketing, Differences from Traditional Marketing, Returns of Investments on Digital Marketing vs. Traditional Marketing, E Commerce, tools used for successful marketing, SWOT Analysis of Business for Digital Marketing, Meaning	T1

Lecture Nos.	Learning objectives	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text Book)
		of Blogs, Websites, Portal and their differences, Visibility, Visitor, Engagement, conversion process, Retention, Performance Evaluation.	
11-20	Learn about the SEO	Search Engine Optimization (SEO):On page optimization techniques, off page optimization Techniques, Preparing Reports, Creating search Campaigns, Creating Display Campaigns.	T2
21-30		Social Media Optimization (SMO):Introduction to Social Media Marketing, Advanced Facebook Marketing, Word press Blog Creation, Twitter Marketing, LinkedIn Marketing, Instagram Marketing, social media Analytical Tools.	T1
31-35	Learn about the SMO, SEM and Traffic Analysis	Search engine Marketing:Meaning and Use of Search Engine Marketing, Tools used-Pay Per Click, Google Ad words, Display Advertising Techniques, Report Generation	T1
36-42		Website Traffic Analysis, Affiliate Marketing and Ad Designing:Google Analytics, Online Reputation Management, Email Marketing, Affiliate Marketing, Understanding Ad Words Algorithm, Advertisement Designing	T2

Evaluation Scheme:

Student evaluation is based on the series of Tests and Quizes conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	17-02-2025	1-10	CB
Test 2	60 Minutes	20	07-04-2025	11- 24	OB
Presentations/Lab	Continuous	20	**	**	**
Comprehensive Exam	3 Hours	40	01-05-2025	1- 42	CB

** To be announced   OB=Open Book Exam   CB=Closed Book Exam

Make-up Policy: Make up will be given only under genuine circumstances for Tests only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examination, etc.

Date: 09/01/2025   **Dr.B RAVI KIRAN**
                                                        Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CS223	**Discrete Structures for Computer Science**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.ANIMESH KUMAR SHARAMA

Learning Outcomes:
After successful completion of the course student will be able to
1. Discrete mathematics is the study of discrete sets.
2. Material usually includes Logic, Graph Theory & Boolean Algebra.
3. Mathematical Induction and method of proofs
4. Algebraic Structures and related concepts
5. Language and Grammars

Text Book T1	Discrete Mathematical Structures, Kolman, Busby & Ross : PHI, 5th Edition, 2006.
Reference Book R1	A Textbook of Discrete Mathematics, 9th Edition S.Chand Company Ltd. Dr. Swapan Kumar Sarkar, 9th Edition, 2021
Reference Book R2	Elements of Discrete Maths, C.L. Liu : Tata McGraw Hill, 2nd edition,2001.
Reference Book R3	Discrete Mathematics for Computer Science, Gary Haggard & John Schlipf, Cengage, Thomson 2006.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Ch./Sec. / Page Nos.of Text Book)
1- 4	To understand mathematical structures and operations.	Basic Concept of Mathematical Logic ,Proposition or Statement logical operations or connectives,	Peer teaching	1.2,1.3,1.5,1.6

Lecture Nos.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Ch./Sec. / Page Nos.of Text Book)
		Conditional and Bi-Conditional Statements, Logical Equivalence, Set Theory, Types of Sets, Operations on Sets .		
5- 7	To understand the logical representations.	Quantifiers, Negation of Quantifiers,	Peer teaching	Ch. 2
8-11	To learn about Boolean Algebra.	Boolean Algebra , Absorption Law, De-Morgan's Law, Boolean Function Expressions, CNF, DNF Forms	Peer teaching	6.4, 6.5
12-15	To learn the principles used in the analysis of Algorithms.	Methods of Proof , Mathematical Induction	Peer teaching	3.3, 3.5
16-19	To learn the geometric and algebraic methods of representing objects.	Graphs, Isomorphic Graphs, Subgraphs, Operation on Graphs, Euler Paths & Circuits, Hamiltonian Paths & Circuits	Peer teaching	8.1-8.3
20-22	To learn the theoretical and Computational aspects of discrete	Directed Graphs, Paths in relations & directed graphs, Relations, Equivalence	Peer teaching	Ch. 4

Lecture Nos.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning	Reference (Ch./Sec. / Page Nos.of Text Book)
	structures of relations.	relation & partitions		
23-25	To learn about the construction of trees and its flows.	Trees & their representations labeled trees	Peer teaching	7.1,7.2
26-29	To learn Special Kind of Trees and their properties	Spanning trees, Minimal Spanning Trees, Algorithms for minimal spanning tree in Graph	Peer teaching	7.4, 7.5
30-33	To learn about Algebraic Structure	Definition of group & semi group, General Properties of Groups, Cyclic Groups	Peer teaching	9.2,9.4
34-35	To learn the construction of language compilers.	Introduction, Strings, Languages , Regular Expressions,	Peer teaching	10.1,10.3,10.4
36-37	To understand phrase structure grammars.	Grammar, type-0,type-1,type-2, type-3 grammars	Peer teaching	R1
38-40	To study finite state machines.	Finite State Machine (FSM), Problems based upon language and FSM	Peer teaching	R1

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	19-02-2025	1-19	CB
Test 2	60 Minutes	20	09-04-2025	20-32	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	08-05-2025	1-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 10/01/2025   **Dr.ANIMESH KUMAR SHARMA**
                                                 Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CS324	**Dot Net and C# Programming**	**3**	**2**	**0**	**4**

Instructor-in-charge: Dr.RAMESH KUMAR YADAV

Learning Outcomes:
The Learning objectives of this course are to:
1. Gain a thorough understanding of the philosophy and architecture of Web applications using C# NET
2. Acquire a working knowledge of Web application development using Web Forms and Visual Studio 2019
3. Optimize an C# NET Web application using configratuation, Security, and Caching
4. Access databases using ADO.NET and LINQ
5. More recent C# .NET features
6. Implement rich client applications using C#.NET AJAX
7. Customize Web applications through the use of HTTP handlers and modules

Text Book T1	C# 6.0 and the .NET 4.6 Framework by Andrew Troelsen and Philip Japikse
Text Book T2	Programming Entity Framework by Julia Lerman
Reference Book R1	Pro ASP.Net MVC 5 (Expert's Voice in ASP.Net)by Adam Freeman

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (chapter/sec. /Page Nos of Text/Ref. Books)
1-5	To understand the basics of .NET	Introduction to .NET • NET Executables and the CLR	a. Group Learning and Teaching.	T l Ch-l 1.4,1.5, T2,Ch1.6,1.9

Lecture Nos.	Learning Objective	Topics to be covered	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference (chapter/sec. /Page Nos of Text/Ref. Books)
		• A .NET Testbed for C# Programming • Visual Studio		
6-10	To learn the concepts of web form architecture	Web Forms Architecture Page Class Web Forms Life Cycle Web Forms Event Model	b. Technology based Learning.	T2 Ch-2 2.1,2.4,2.7,2.9
16-20	C# Overview for the Sophisticated Programmer	C# .NET • First C# Console Application • Namespaces • Data Types • Conversions • Control Structures • Subroutines and Functions • Parameter Passing • Strings • Arrays •	a. Group Learning and Teaching	T1 Ch-3 3.1,3.7 T2 Ch3 5.6,3.8
21-23	Object-Oriented Programming in C#	C# .NET • Classes • Access Control • Methods and Properties • Static Data and Methods • Inheritance	Technology based Learning.	T1 Ch-4 4.7, 4.4 T2 Ch4 4.8,4.10

Lecture Nos.	Learning Objective	Topics to be covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (chapter/sec. /Page Nos of Text/Ref. Books)
		• Overriding Methods • Abstract Classes		
24-25	C# and the .NET Framework	• Components • Interfaces • System.Object • .NET and COM •	a. Group Learning and Teaching	T1 Ch-5 5.5,5.9
26-30	Introduction to Windows Forms	• Creating Windows Applications • Using Visual Studio • Buttons, Labels and Textboxes • Handling Events • Listbox Controls	a. Group Learning and Teaching	T2 Ch-5 5.3,5.7
31-40	Using Visual Studio	Overview of Visual Studio MVC Debugging	a. Group Learning and Teaching. b. Technology based Learning.	T1 Ch-5,Ch6 5.7, 6.4,7.2 T2 Ch6 6.9,7.4,7.9

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	18-02-2025	1-20	CB
Test 2	60 Minutes	20	08-04-2025	21-35	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	07-05-2025	1- 40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

  Date: 10/01/2025   **Dr.RAMESH KUMAR YADAV**
                                                 Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CS325	**Software Engineering**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.RAMESH KUMAR YADAV

Learning Objectives:
1. Students will learn to apply fundamental software engineering concepts, design, analysis and testing methodologies while incorporating the software engineering quality metrics to produce high quality correct software in a scheduled amount of time
2. Students will learn object oriented methodologies for proving programs are correct and methods of testing programs to demonstrate correctness
3. Students will learn to use the unified Modelling Language UML programming to achieve

Text Book T1	Software Engineering: A Practitioner's approach, Pressman R.S, MGHISE, 6th Edition, 2005.
Reference Book R1	Object Oriented Technology , Tsang, THM, 2006.
Reference Book R2	Larmen C, Aplying UML and Patterns: An Introduction to Object Oriented analysis and Design and the Unified process, Pearson Education 2nd Edition, 2004.
Reference Book R3	Pankaj Jalote, An Integrated approach to Software Engineering, Narosa Publishing House, 3rd Edition, 2004.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Page Nos.of Text Book)
1-2	Key concepts, software characteristics	Introduction	a. Group Learning and Teaching.	Chapter 1 (T1)

Lecture Nos.	Learning Objective	Topics to be Covered	**Teaching Learning Strategies:** a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Page Nos.of Text Book)
3-4	Generic framework activities, agility	Generic View of Process	b. Technology based Learning.	Chapter 2 (T1)
5-7	Perspective models, RAD, spiral model	Process models	a. Group Learning and Teaching	Chapter 3 (T1)
8-9	Philosophy & a set of guidelines	An agile view of process		Chapter 4 (T1)
10-12	Practice encompasses the technical activities	Software Engineering Practice	a. Group Learning and Teaching	Chapter 5 (T1)
13-15	It provides with a solid approach for addressing requirements challenges	Requirements Engineering	a. Group Learning and Teaching	Chapter 7 (T1)
16-18	Diagrammatic forms, provides view of one or more model elements	Analysis Modeling	b. Technology based Learning.	Chapter 8 (T1 & R1)

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Page Nos.of Text Book)
19-21	Design is the place where software quality is established	Design Engineering	a. Group Learning and Teaching	Chapter 9 (T1 & R1)
22-25	The preliminary blue print from which software is constructed	Architectural Engineering	b. Technology based Learning. a. Group Learning and Teaching	Chapter 10 (T1 & R1)
26-28	Design guide lines for avoiding errorsas procedural design evolves	Component level Design	b. Technology based Learning. a. Group Learning and Teaching	Chapter 11 (T1 & R1)
29-31	User scenarios will be created andscreen layouts will be developed	User Interface Design	a. Group Learning and Teaching	Chapter 12 (T1 & R1)
32-34	Different strategies fortesting software.	Testing Strategies	a. Group Learning and Teaching.	Chapter 13 (T1&R1)
35-37	Software Maintenance	Characteristics of Software management, types of maintenance, Software reverse Engineering	b. Technology based Learning.	Chapter 13 (T1)

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Page Nos.of Text Book)
38-40	Estimation	Estimation of Maintenance Cost. Emerging trends and various tools.	a. Group Learning and Teaching	Chapter 13 (T1&R1)

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	18-05-2025	1-20	CB
Test 2	60 Minutes	20	08-04-2025	21-35	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	25-40	CB
Comprehensive Exam	3 Hours	40	09-05-2025	1-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Dr.RAMESH KUMAR YADAV**
                                            Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CS327	**Theory of Computation**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.PALAK KESHWANI

Learning Outcomes:

The Learning objectives of this course are to:

1. Introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars the notions of algorithm, decidability, complexity, and computability.
2. Enhance/ Develop students ability to understand and conduct mathematical proofs for computation and algorithms

Text Book T1	Introduction to Automata Theory Languages, and Computation, by J.E.Hopcroft, R.Motwani & J.D.Ullman (3rd Edition) – Pearson Education
Text Book T2	Theory of Computer Science (Automata Language & Computations), by K.L.Mishra& N. Chandrashekhar, PHI
Reference Book R1	Sipser, M. (2006). *Introduction to the Theory of Computation* (2nd ed.). Boston, MA: Thompson Course Technology.

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (chapter/sec. /Page Nos of Text/Ref. Books)
1-5	To understand the basics of Automata	Introduction to automata theory, Examples of automata machine, Finite automata as a language acceptor and	a. Group Learning and Teaching	T l Ch-3

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference (chapter/sec./Page Nos of Text/Ref. Books)
		translator. Deterministic finite automata. Non deterministic finite automata,		
6-10	Conversion	Conversion of NFA to DFA Minimizing number of states of a DFA, Mealy Machine, Moore machine	a. Group Learning and Teaching	T2 Ch-3
11-15	Regular-Expression	Regular Expressions, Properties of Regular Expression. Finite automata andRegular expressions. Regular Expression to DFA conversion & vice versa.	a. Group Learning and Teaching	T1 Ch-3 T2 Ch3
16-20	Pumping Lemma for Regular grammars	Pumping lemma for regularsets.Application of pumping lemma, Regular sets and Regular grammar	a. Group Learning and Teaching	T1 Ch-5
21-25	Types of grammar	Definition and types of grammar. Chomsky hierarchy of grammar. Relation between types of grammars	a. Group Learning and Teaching	T1, Ch-4
26-28	Context free grammar	Context free grammar. Left most linear &right mostderivation trees. Ambiguity in grammar.	a. Group Learning and Teaching	T1 Ch-4 T2 Ch-4
29-30	Simplification of grammar	Simplification of context free grammar. Chomsky normal from.	a. Group Learning and Teaching	T1,Ch-6

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching learning strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (chapter/sec./Page Nos of Text/Ref. Books)
31-34	Context Free Grammar	Pumping lemma fromcontext freelanguage.Decision algorithm for context tree language.	a. Group Learning and Teaching	T1 Ch-7
35-40	Pushdown automata	Pushdown automata, Deterministic pushdownautomata and non deterministic push down automata. Acceptance of push down automata. Push downautomata and context free language	a. Group Learning and Teaching	T1, Ch-7

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	17-02-2025	1-15	CB
Test 2	60 Minutes	20	07-04-2025	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	05-05-2025	01-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 10/01/2025

Dr.PALAK KESHWANI
Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CS328	**Machine Learning**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.PINKEY CHOUHAN

Learning Outcomes:

1. Introduce the basic principles of ML towards problem solving, inference, perception, knowledge representation and learning.

2. Investigate applications of ML techniques in machine learning models

3. Experiment with a machine learning model for simulation and analysis.

4. The course will cover the major approaches to learning namely, supervised, unsupervised, and reinforcement learning. The course emphasizes various techniques, which have become feasible with increased computational power and our ability to regression, decision trees, support vector machines, artificial neural networks, Bayesian techniques, Hidden Markov models, genetic algorithms etc. Some advanced topics like active and deep learning

Text Book T1	Tom M. Mitchell, Machine Learning, The McGraw-Hill Companies, Inc. International Edition 1997.
Reference Book R1	Christopher M.Bhisop Pattern Recognition and Machine Learning Springer, 2006
Reference Book R2	D.Michie, D.J Spiegelhalter, C.C.Tylor (eds), Machine learning, Nerual and Statistical Classification, Ellis Horwood Publishers, Online Link http://ww.amsta.leeds.ac.uk/~tibs/Elemstatlearn /Printings/ESLII/-print10.pd
Reference Book R3	Hal Daume III, A Course in Kevin Murphy, Machine Learning;A Probabilistic Perspective, MIT Press, 2012 Online Link https;//mitpress.mit.edu/books/machine learning-0

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference (Ch./Sec./ Pa ge Nos.of Text Book)
1-5	Overview of ML	Introduction to Machine Learning, Probability theory, Decision theory	Group Learning and Teaching	TB[Ch-1, R1[Ch2], TB[Apndx-C]
6-9	Basic concept of regression	Liner Models for regression: Linear basis function models, Bayesian linear regression	a. Group Learning and Teaching	R1[Ch-3]
10-14	Overview & Techniques of liner models	Liner Models for classification: Discriminant Functions, Probabilistic Generative Classifiers,	Technology-Based Learning	R1[Ch-4]
15-9	Overview & Techniques of Bayesian Learning	Bayesian Learning Techniques: Bayes optimal classifier, , Naive Bayes Classifier	Peer Teaching	TB[Ch-6]

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference (Ch./Sec./ Pa ge Nos.of Text Book)
20-26	Overview& Non-linear Models Techniques:	Non-linear Models: Model Selection & Decision Trees, Ensemble Classifiers, Neural Networks, Multilayer Perceptron, Network training, Error back-propagation, Instance-based Learning, K-NN, Casebased Reasoning	c. Technology based Learning	TB[Ch-3], TB[Ch-4], R1[Ch-5], TB[Ch-8]
27-30	Overview and SVM Techniques:	Margin/Kernel Based Approaches: Support Vector Machines	a. Group Learning and Teaching	Class Notes, R1[Ch-7]
31-34	How to do Graphical Models Representation	Graphical Models: Bayesian Belief Networks, Hidden Markov Models	a. Group Learning and Teaching	TB[Ch-6], class notes
35-38	Unsupervised Learning concept	Unsupervised Learning: Mixture Models, K-means Clustering,	a. Group Learning and Teaching	TB[Ch-6], R1[Ch-9]

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Pa ge Nos.of Text Book)
39-40	Reinforcement Learning: Concept	Reinforcement Learning: Q Learning, Non-deterministic rewards & actions, Temporal difference learning, Generalizatio	a. Group Learning and Teaching	TB[Ch-13]

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	19-02-2025	1-12	CB
Test 2	60 Minutes	20	09-04-2025	13-26	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	12-05-2025	1-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 08/01/2025   Dr.PINKEY CHOUHAN
                                                            Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
EC324	RF and Microwave Engineering	3	0	0	3

Instructor-in-charge: Mr.ROHIT KUMAR

Learning Outcomes:
After successful completion of the course student will be able to:
1. Understand and remember basic concepts and applications of microwave systems.
2. Analyze and solve problems related to microwave transmission lines.
3. Design, analyze and solve problems related to microwave waveguide
4. Analyze, test and use, maintain various microwave components.
5. Design simple microwave strip lines, couplers, Microwave filters.

Text Book T1	MicrowaveEngineering,DavidPozar,JohnWiley&Sons,Edition,1999.
Text Book T2	MicrowaveDevicesandCircuits,SumuelY.Liao,PHI,3rd.Ed,2003.
Reference Book R1	FoundationforMicrowaveEngineering,R.E.Collins,Wiley-IEEEPress,2ndEd.2001.
Reference Book R2	ElectromagneticwavesandRadiatingSystems,JordanandBalmain,TMH,4th.Ed,1999
Reference Book R3	ElectronicCommunicationSystems,Kennedy,3rdEdition,McGrawhill,1995.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (Ch./Sec./Page Nos. ofText Book)
1	Introduction to Microwave engineering.	Frequency bands; Microwave and RF Engg, Problems & limitations at high frequencies, advantages	Group Learning and Teaching	T1:1.1 T2:1.1
2-5	Study of different phenomenon affecting microwave propagation.	Propagation of wave in free space, atmospheric effect, ground effects, plasma effects.	Group Learning and Teaching	R3:Ch.16,17
6-8	To study guided waves on surfaces	Modes of surface waves, strip lines and micro strip lines	Peer teaching	T1:3.6-3.8T2:11
9-11	To understand the concepts of impedance and the representation of incident	Concepts of impedance, equivalent voltages currents, impedance & admittance matrix, S-matrix, ABCD parameters.	Peer teaching	T1:4.1-4.4 R1:4.1-4.2 R1:4.5-4.10
12-13	To reflected and transmitted waves for microwave passive network analysis.	Signal flow graphs and circuit analysis	Peer teaching	T1:4.5R1:4.10

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (Ch./Sec. /Page Nos. ofText Book)
14-16	To study various microwave resonators	Resonantcircuits,Transmission line resonators,cavity resonators,dielectri cresonators,excitat ion of resonators	Peer teaching	T1:6.1-6.5,6.7 T2:4.3R1:7.1-7.2,R1:7.4,7.6
17-21	Tostudymicrowave components	Dividers,circulators, isolators, Directional couplers and other hybrid components.	Peer teaching	T1:7.1-7.9T2: 4.4-4.6R1:6.4-6.6,6.10
22-24	Overview of design and principle of semiconductor devices used as microwave ssourcesand circuit elements	Microwave HBTs,FETS,MESFETS	Peer teaching	T2:5.2-5.3; T2:6.1-6.4;
25-26	To study microwave diodes	Transferred electron devices,GUNNeffect, GUNNdiodes	Technology based Learning	T2:7.1-7.5
27-28	To study avalanche diodes	Avalanche Transit time devices,IMPATT, TRAPATT,BARITT	Technology based Learning	T2:8.1-8.4

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (Ch./Sec. /Page Nos. ofText Book)
29-32	To design high power sources of microwave like Klystron Magnetron & amplifiers using TWTs	Klystrons, Multicavity Klystrons, ReflexKlystronsTWTs	Technology based Learning	T2:9.2-9.5
33-34	Overview of design and principle of high power sources of microwave	Magnetrons	Peer teaching	T2:10.1
35-36	An introduction to design of Microwave antennas	Antennas special problems and design at microwave frequencies	Peer teaching	Classnotes
37-38	To study the RF and Microwave Comm. Systems.	Microwave and RF systems ,transmitters and receivers.	Peer teaching	R2:T1:121
39-40	To study EMI & EMC	An introduction to Electromagnetic Interference and Compatibility	Peer teaching	ClassNotes
41-42	Other microwave applications such as Radar, Radiometry, microwave Ovens etc.	Radar equations and various types of radars such as pulse, Doppler, RCS, etc. Microwave ovens and Radiometry.	Technology based Learning	R2:T1:12.3-12.4,T1:12.6

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	17-02-2025	1-15	CB
Test 2	60 Minutes	20	07-04-2025	16-34	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	05-05-2025	1- 42	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Mr.ROHIT KUMAR**
                                                                                                            Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
EC325	**Analog Electronics**	**3**	**0**	**0**	**4**

Instructor-in-charge: Mr.ROHIT KUMAR

Learning outcomes:
After successful completion of the course student will be able to
1. To design the circuits using operational amplifiers for various applications.
2. To analyze and design amplifiers, active filters using Op-amp.
3. To develop skills required for designing and testing integrated circuits
4. To apply the gain-bandwidth concept and frequency response of the three basic amplifiers.
5. To design the combinational logic circuits for different applications.

Text Books T1	L.K. Maheshwari and M.M.S. Anand, Analog Electronics, 1st Ed., PHI, 2005.
Reference Book R1	Sedra and Smith, Microelectronics Circuits, Oxford Univ. Press, New York, 2014.
Reference Book R2	I.S.Franco, Design with Operational Amplifiers and Analog Integrated Circuits, 3rdedition, TMH, New Delhi, 2003.
Reference Book R3	RamakanthA.Gayakwad, Op-Amps and Linear Integrated Circuits, 4th Ed, Pearson Education 2006.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning strategies: a. **Group Learning and Teaching** b. **Game based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning**	Reference (Ch/Sec. /Page Nos. of Text/Ref. Books)
1-2	Review of fundamental Concepts	Circuit Theorems & Analysis	c. Technology based Learning	T1: 1.1, 1.2 T1: 1.3

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning strategies: a. Group Learning and Teaching b. Game based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (Ch/Sec. /Page Nos. of Text/Ref. Books)
		Basic Electronic devices		
3-7	Focuses on the basics of Ideal and Practical Operational Amplifier	An Ideal Op-amp Basic Configurations of Op-amps Practical Op-amp Frequency Compensation	d. Peer teaching	T1: 2.1-2.3 T1: 2.4 T1: 2.5.1 T1: 2.5.2
8-11	Application of Opamp in Analog Electronic Systems.	Instrumentation Amplifier, Programmable Gain Amplifier Negative Feedback Amplifiers Inductance Simulation	d. Peer teaching	T1: 3.2 T1: 3.4 T1: 3.5 T1: 3.6
12-16	Practical realization of Active Filters	Basic Theory of Filters Realization of Active Filters	d. Peer teaching	R1: 7.1-7.10
17-24	Application of Opamp in realization of Non-linear functions	Logarithmic Amplifier Analog Multipliers Applications Precision Circuits Comparators Schmitt Triggers Analog Switch	d. Peer teaching	T1: 5.2 T1: 5.3.1-5.3.6 T1: 5.4 T1: 5.5 T1: 5.6.1-5.6.2 T1: 5.6.4 T1: 5.7.1-5.7.3 T1: 5.8

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning strategies: a. **Group Learning and Teaching** b. **Game based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning**	Reference (Ch/Sec. /Page Nos. of Text/Ref. Books)
		Sample-and-Hold Circuits, Analog Multiplexers		T1: 5.9.1-5.9.2
25-30	Generation of Various types of signals using Op-amps	Sinusoidal Oscillators Non-sinusoidal Oscillators Function Generator Phase Locked Loop	d. Peer teaching	T1: 6.2 T1: 6.3 T1. 6.5 T1. 6.6
31-34	Use of Op-amps in Voltage Regulation	Voltage Regulator Circuits Switched capacitor voltage converters Switching Regulators	d. Peer teaching	T1: 7.1-7.3 T1: 7.4.5 T1: 7.4.6(part)
35-36	IC Power Amplifiers	Fixed gain, Bridge Amplifiers	d. Peer teaching	R1: 14.8
37	Tuned Amplifiers	Basic Principle, Tuned circuits	d. Peer teaching	R1: 12.11
38-40	Data Converters	DAC & ADC circuits	c.Technology based Learning	R1: 9.7-9.9

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning strategies: a. Group Learning and Teaching b. Game based Learning c. Technology based Learning d. Peer teaching e. Project based Learning	Reference (Ch/Sec. /Page Nos. of Text/Ref. Books)
41-42	IC sensors and Analog Systems	Evolution of sensors, classification of sensors, Introduction to MEMS Typical IC Sensors	c.Technology based Learning	T1: 11.1-11.6

List of Experiment:

S.No.	Name of the Experiment
1	Voltage regulator using operational amplifier .
2	Function generator using operational amplifier (sine, triangular & square wave)
3	Study of basic properties of Operational Amplifier: Inverting and Non-Inverting Amplifiers
4	Study of Differentiator and Integrator using Operational Amplifier
5	Log and antilog Operational amplifiers
6	Inverting and Non Inverting Voltage comparator using IC 741
7	Wien bridge oscillator using operational amplifier
8	Astable and Monostablemultivibrator using IC 555
9	Voltage to current converters using IC 741

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	18-02-2025	1-15	CB
Test 2	60 Minutes	20	08-04-2025	16-34	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	07-05-2025	1- 42	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 09/01/2025   **Mr.ROHIT KUMAR**
                                                                          Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
EC323	Microelectronic Circuits	3	0	1	4

Instructor-in-charge: Mrs.BHAVNA CHAUDHARY

Learning Objectives:
The objective of the course is to

1. Develop the student with the principles, operation and applications of the analog building blocks like diodes, BJT, FET for performing various functions.
    2. Learn the qualitative analysis using models, equations to illustrate the concepts and to gain the knowledge of existing analog circuits.
    3. Understand the working and analysis of amplifiers, feedback amplifiers and oscillators

Text Book T1	Microelectronic Circuits A.S.Sedra & K.Smith, Microelectronic Circuits, 5th edition, Oxford higher education, 2009.
Reference Book R1	Microelectronic Circuits Robert L.Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 10th edition, Pearson, New Jersy, Coloumbus, ohio, 2011
Reference Book R2	Microelectronic Circuits Jacob Millman, CCHalkias, SatyabrataJit, Electronic Devices and Circuits, 3rd edition, TMH, New Delhi, 2011.
Reference Book R3	Microelectronic Circuits S. Shalivananan, N.Suresh Kumar, A.VallavaRaj, Electronic Devices & Circuits, Tata McGraw Hill, New Delhi,2003

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies
			   a. Group Learning and Teaching
			   b. Game Based Learning
			   c. Technology based Learning
			   d. Peer teaching
			   e. e. Project based Learning.
				Reference

1	Characteristics and type of amplifiers.	Amplifiers, Circuit Models, Frequency	Group Learning and Teaching	T 1 Ch-l

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
		response of amplifiers		1.4,1.5,1.6
2	BJT Structure, I-V Characteristics	Device structure & Physical operation of BJT, I-V Characteristics	Group Learning and Teaching	T1 Ch-5 5.1
3	Working of BJT as a switch and amplifier	BJT as an Amplifier & switch	Group Learning and Teaching	T1 Ch-5 5.2,5.3
4	Analysis of BJT circuits under DC conditions	BJT circuits at DC	Group Learning and Teaching	T1 Ch-5 5.4
5	Analysis of BJT circuits under DC conditions	BJT circuits at DC	Technology based Learning	T1 Ch-5 5.4
6	Biasing and types of Biasing	Biasing in BJT amplifier circuits	Group Learning and Teaching	T1 Ch-5 5.5
7	Small signal models of BJT	Small signal operation & Models	Group Learning and Teaching	T1 Ch-5 5.6
8	BJT as a single stage amplifier	Single stage BJT Amplifiers	Group Learning and Teaching	T1 Ch-5 5.7
9	High frequency models.	BJT Internal capacitances &High frequency model	Group Learning and Teaching	T1 Ch-5 5.8

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
10	MOSFET Introduction	Device structure & Physical operation of MOSFET	Group Learning and Teaching	T1 Ch-4 4.1
11	I-V Characteristics of MOSFET.	MOSFET I-V Characteristics	Group Learning and Teaching	T1 Ch-4 4.2
12	Working of MOSFET as amplifier	MOSFET as an amplifier	Group Learning and Teaching	T1 Ch-4 4.3
13	Working of MOSFET as switch	MOSFET as a switch	Group Learning and Teaching	T1 Ch-4 4.4
14	MOSFET as a switch circuits at DC.	MOSFETS Circuits at DC	Group Learning and Teaching	T1 Ch-4 4.5
15	Biasing of MOSFET.	Biasing in MOS amplifier circuits	Group Learning and Teaching	T1 Ch-4 4.6
16	MOSFET as small signal models	Small signal operation & Models	Group Learning and Teaching	T1 Ch-4 4.7
17	MOSFET as a single stage amplifier	Single stage MOS Amplifiers, MOSFET Internal capacitances	Group Learning and Teaching	T1 Ch-4 4.7
18	high frequency models.	High frequency models	Group Learning and Teaching	T1 Ch-4 4.8

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
19	To Understand the concept of Differential Amplifiers	The MOS Differential pair	Group Learning and Teaching	TI Ch-7 7.1
20	Operation of MOS Differential amplifier.	The MOS Differential pair.	Technology based Learning	TI Ch-7 7.1
21	Operation of MOS Differential amplifier.	The MOS Differential pair	Group Learning and Teaching	TI Ch-7 7.1
22	Operation of MOS Differential amplifier.	The MOS Differential pair	Group Learning and Teaching	TI Ch-7 7.1
23	Practical characteristics of MOS Differential pair.	Small signal operation of MOS Differential pair	Group Learning and Teaching	T1 Ch-7 7.2
24	Practical characteristics of MOS Differential pair.	Small signal operation of MOS Differential pair	Technology based Learning	T1 Ch-7 7.3
25	Practical characteristics of MOS Differential pair.	Non-ideal characteristics of MOS Differential pair.	Group Learning and Teaching	T1 Ch-7 7.4
26	Practical characteristic	Non-ideal characteristics of	Technology based Learning	T1 Ch-7

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
	s of MOS Differential pair.	MOS Differential pair.		7.4
27	Effect of active load on MOS differential amplifier.	MOS Differential amplifier with active load.	Group Learning and Teaching	T1 Ch-7 7.5
28	Effect of active load on MOS differential amplifier.	MOS Differential amplifier with active load.	Technology based Learning	T1 Ch-7 7.5
29	To Understand the concept of Feedback concept	General Feedback structure, Properties of Negative feedback, Four basic feedback topologies	Group Learning and Teaching	T1 Ch-8 8.1,8.2,8. 3
30	To Understand the concept of Feedback concept	General Feedback structure, Properties of Negative feedback, Four basic feedback topologies	Technology based Learning	T1 Ch-8 8.1,8.2,8. 3
31	Analysis of Series-Shunt & Series-Series feedback amplifier	Series-Shunt and Series-Series feedback amplifier	Group Learning and Teaching	T1 Ch-8 8.4

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
32	Analysis of Series-Shunt & Series-Series feedback amplifier	Series-Shunt feedback amplifier	Technology based Learning	T1 Ch-8 8.5
33	Analysis of Shunt-Shunt & Shunt-Series feedback amplifier.	Shunt-Shunt feedback amplifier.	Group Learning and Teaching	T1 Ch-8 8.6
34	Analysis of Shunt-Shunt & Shunt-Series feedback amplifier.	Shunt-Shunt feedback amplifier.	Group Learning and Teaching	T1 Ch-8 8.6
35	To Understand the concept of power amplifiers and output stages	Classification of output stages, Class A and Class B output stage.	Group Learning and Teaching	TI Ch-14 14.1, 14.2, 14.3
36	To Understand the concept of power amplifiers and output stages	Classification of output stages, Class A and Class B output stage.	Technology based Learning	TI Ch-14 14.1, 14.2
37	To Understand the concept of	Classification of output stages, Class A and	Group Learning and Teaching	TI Ch-14

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
	power amplifiers and output stages	Class B output stage.		14.2, 14.3
38	Overview of class AB Output stage	Class AB output stage and its biasing.	Group Learning and Teaching	TI Ch-14 14.5
39	Overview of class AB Output stage	Class AB output stage and its biasing.	Group Learning and Teaching	TI Ch-14 14.4
40	To learn the concepts power transistors	Power BJT's and MOS power transistors.	Technology based Learning	TI Ch-14 14.6,14.9

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	18-2-2025	1-15	CB
Test 2	60 Minutes	20	08-04-2025	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	31-40	CB
Comprehensive Exam	3 Hours	40	09-05-2025	1-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Mrs.BHAVANA CHOUDHARY**
                                                             Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
EC322	Antennas and Wave Propagation	3	0	0	3

Instructor-in-charge: Mrs.BHAVANA CHOUDHARY

Learning Outcomes:
The objective of the course is to :   1. Introduce the fundamental principles of antenna theory   2. Apply them to the analysis, Design and measurements of antennae   3. Use in Wireless, RADAR, Mobile Communication and others

Text book T1	Antennas and Wave Propagation Antenna and Wave Propagation ,R L Yadava ,PHI Learning1st Edition
Reference Book R1	Antennas and Wave Propagation Antennas and Wave Propagation , John D Kraus ,R J Marhefka, A S Khan, TMH ,4th Edition
Reference Book R2	Antennas and Wave Propagation Antennas and Wave Propagation A P Harish, M Sachidananda, Oxford University Press, 1st Edition,
Reference Book R3	Antennas and Wave Propagation Antennas and Wave Propagation G S N Raju,Pearson,1st Edition

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
1	Fundamental concepts of Radiation	Concept of radiation, Radiation pattern,	Group Learning and Teaching	T(1),R$_1$(2)

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
		Radiation resistance		
2	Antenna basics	Directivity, Gain, Intensity, Beam area, Beam Efficiency, HPBW,FNBW	Group Learning and Teaching	$R_1(2)$,T(3)
3	Antenna basics	Directivity, Gain, Intensity, Beam area, Beam Efficiency, HPBW,FNBW	Group Learning and Teaching	$R_1(2)$,T(3)
4	Antenna aperture	Effective aperture, aperture efficiency	Group Learning and Teaching	T(3),$R_1(2)$,$R_2(2)$
5	Antenna aperture	Effective aperture, aperture efficiency	Group Learning and Teaching	T(3),$R_1(2)$,$R_2(2)$
6	Linear Wire antennas	Hertzian dipole, Half-wave dipole Folded dipole, Monopole	Group Learning and Teaching	T(5),$R_1(3,4)$

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
7	Linear Wire antennas	Hertzian dipole, Half-wave dipole Folded dipole, Monopole	Group Learning and Teaching	T(5),R$_1$(3,4)
8	Antenna arrays	Point sources, different configurations of arrays, Binomial array	Group Learning and Teaching	T(4),R$_1$(5)
9	Antenna arrays	Point sources, different configurations of arrays, Binomial array	Group Learning and Teaching	T(4),R$_1$(5)
10	Antenna arrays	Point sources, different configurations of arrays, Binomial array	Group Learning and Teaching	T(4),R$_1$(5)
11	VHF,UHF antennas	V- antenna , Rhombic, Yagi-Uda, Log-Periodic, Loop, Helical antenna	Group Learning and Teaching	T(5,6,9,10,12) R$_1$(7,8),R$_2$(6)

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
12	VHF,UHF antennas	V- antenna , Rhombic, Yagi-Uda, Log-Periodic, Loop, Helical antenna	Group Learning and Teaching	T(5,6,9,10,12) R_1(7,8),R_2(6)
13	Microwave antennas	Parabolic reflector, feed systems, field distributions, Horn, Slot, Lens& Micro strip antenna	Group Learning and Teaching	T(7,8,11,13) R_1(9,14)
14	Microwave antennas	Parabolic reflector, feed systems, field distributions, Horn, Slot, Lens& Micro strip antenna	Group Learning and Teaching	T(7,8,11,13) R_1(9,14)
15	Microwave antennas	Parabolic reflector, feed systems, field distributions, Horn, Slot, Lens& Micro strip antenna	Group Learning and Teaching	T(7,8,11,13) R_1(9,14)
16	Microwave antennas	Parabolic reflector, feed systems, field distributions, Horn, Slot, Lens& Micro strip antenna	Group Learning and Teaching	T(7,8,11,13) R_1(9,14)

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
17	Measurement of antenna Parameters	Measurement of radiation pattern, Gain, Impedance, Current, Reflectivity	Group Learning and Teaching	T(17),R_1(21)
18	Measurement of antenna Parameters	Measurement of radiation pattern, Gain, Impedance, Current, Reflectivity	Group Learning and Teaching	T(17),R_1(21)
19	Measurement of antenna Parameters	Measurement of radiation pattern, Gain, Impedance, Current, Reflectivity	Group Learning and Teaching	T(17),R_1(21)
20	Antennas for special applications	Ground plane antenna ,Sleeve, turnstile, Omni directional antenna, submerged antennas	Group Learning and Teaching	R_1(15)
21	Antennas for special applications	Ground plane antenna ,Sleeve, turnstile, Omni directional antenna, submerged antennas	Group Learning and Teaching	R_1(15)

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
22	Antennas for special applications	Ground plane antenna ,Sleeve, turnstile, Omni directional antenna, submerged antennas	Group Learning and Teaching	$R_1(15)$
23	Basics of Wave propagation	general classification, different modes of wave propagation, Ray and Mode concept	Group Learning and Teaching	$T(14),R_1(22)$
24	Basics of Wave propagation	general classification, different modes of wave propagation, Ray and Mode concept	Group Learning and Teaching	$T(14),R_1(22)$
25	Basics of Wave propagation	general classification, different modes of wave propagation, Ray and Mode concept	Group Learning and Teaching	$T(14),R_1(22)$
26	Reflections and refractions in wave propagation	Multi hop Propagation	Group Learning and Teaching	$T(14),R_1(25)$

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
27	Reflections and refractions in wave propagation	Multi hop Propagation	Group Learning and Teaching	T(14),R$_1$(25)
28	Ground wave propagation	Plane earth reflection ,Surface wave tilt, impact of Imperfect Earth, Earth's behavior at different frequencies	Group Learning and Teaching	T(14),R$_1$(23)
29	Ground wave propagation	Plane earth reflection ,Surface wave tilt, impact of Imperfect Earth, Earth's behavior at different frequencies	Group Learning and Teaching	T(14),R$_1$(23)
30	Space Wave propagation	Curvature of Earth, Shadowing effect, Super refraction, Scattering phenomena, Tropospheric propagation, M-curves, LOS distance	Group Learning and Teaching	T(15),R$_1$(24)

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
31	Space Wave propagation	Curvature of Earth, Shadowing effect, Super refraction, Scattering phenomena, Tropospheric propagation, M-curves, LOS distance	Group Learning and Teaching	T(15),R_1(24)
32	Losses in space wave propagation	Fading, Path loss calculation	Group Learning and Teaching	R_1(24),T(16)
33	Losses in space wave propagation	Fading, Path loss calculation	Group Learning and Teaching	R_1(24),T(16)
34	Sky wave propagation	Structural details of Ionosphere , Absence and presence of Earth's magnetic field, GMF	Group Learning and Teaching	T(16),R_1(25)
35	Sky wave propagation	Structural details of Ionosphere , Absence and presence of Earth's magnetic field, GMF	Group Learning and Teaching	T(16),R_1(25)

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. e. Project based Learning.	Reference
36	Measures of Ionosphere Propagation	Refractive index, Critical frequency, angle of incidence, MUF, OF	Group Learning and Teaching	$T(16),R_1(25)$
37	Measures of Ionosphere Propagation	Refractive index, Critical frequency, angle of incidence, MUF, OF	Group Learning and Teaching	$T(16),R_1(25)$
38	Calculations in Ionosphere	LUF, Virtual Height, Skip Distance	Group Learning and Teaching	$R_1(25),T(16)$
39	Calculations in Ionosphere	LUF, Virtual Height, Skip Distance	Group Learning and Teaching	$R_1(25),T(16)$
40	Abnormalities in Ionosphere	Attenuation factor, SID, Ionospheric Storms, Sun spot cycle	Group Learning and Teaching	$R_3(9)$

Evaluation Scheme:

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	10		1-20	CB
Test 2	60 Minutes	10		21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	10	**	---	CB
Comprehensive Exam	3 Hours	70		1- 40	CB

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General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Mrs.BHAVNA CHOUDHARY**
                                                                              Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
EC321	**Digital Communication**	**3**	**0**	**0**	**4**

Instructor-in-charge: Dr.K NAGAIAH

Learning Outcomes:

After Successful completion of the course student will be able to

1. Analyze digital and analogy signals with respect to various parameters like bandwidth, noise etc

2. Demonstrate generation and reconstruction of different pulse Code Modulation Schemes like PCM DOCM etc

3. Acquire the knowledge of different pass band digital modulation techniques like ASK, PSK etc

4. Calculate different parameters like power spectrum density, probability of erro etc of base abdn signal for optimum transmission

5. Analyze the concepts of information theory, Huffman coding etc to increase average information per bit

6. Generate and retrieve data using block codes and analyze their error detection and correction capabilities

Text Book T1	Digital communications- Simon Haykin, John Wiley, 2005
Text Book T2	Digital and anolog communiation systems- Sam Shanmugam, John Wiley,2005
Reference Book R1	Principles Of Communication Systems-Herberet Taub, Donald L Schiling, Goutham saha,3rf edition, Mc Graw Hill 2008
Reference Book R2	Digital Communications 3rd Ed - I. A.Glover, P. M. Grant, 2nd Edition, Pearson Edu,, 2008
Reference Book R3	Communication Systems ---- B.P.Lathi, BS Publications, 2006
Reference Book R4	Digital Communication – Theory, Techniques, and Applications – R.N.Mutagi, 2nd Edition, 2013

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Text Book)
1	Elements of digital communication systems	Analyze the elements of digital communication system, the importance and Applications of Digital Communication	a. Group Learning and Teaching	T1- Back ground and preview page 1-24
2	Concepts of digital communication systems	Differentiate analog and digital systems, the advantages of digital communication systems over analog systems. The importance and the need of sampling theorem in digital communication systems.	a. Group Learning and Teaching	Back ground and preview page 1-24
3	Concepts of digital communication systems	Conversion of analog signal to digital signal and the issues occur in digital transmission techniques like Bandwidth- S/N trade off.	a. Group Learning and Teaching	Back ground and preview page 1-24

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Text Book)
4-5	Concepts of digital communication systems	Compute the power and bandwidth requirements of modern communication systems. Analyse the importance of Hartley Shannon law in calculating the BER and the channel capacity.	a. Group Learning and Teaching	Back ground and preview page 1-24
6-8	Pulse Code Modulation	Explain the generation and reconstruction of PCM. To Analyze the effect of Quantization noise in Digital Communication. Analyse the different digital communication schemes like Differential PCM systems (DPCM), Delta modulation, and adaptive delta modulation.	c.Technology based Learning	T1 chapter-3

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference (Ch./Sec./ Text Book)
9-10	Pulse Code Modulation	Compare the digital communication schemes like Differential PCM systems (DPCM), Delta modulation, and adaptive delta modulation. Illustrate the effect of Noise in PCM and DM systems	c.Technology based Learning	T1 chapter-3
11-14	Digital Modulation Techniques	Describe and differentiate the different shift keying formats used in digital communication. Compute the power and bandwidth requirements of modern communication systems modulation formats like those employing ASK, PSK, FSK, and QAM. Explain the different modulators like	c.Technology based Learning	T1 chapter-6

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer teaching** e. **Project based Learning.**	Reference (Ch./Sec./ Text Book)
		ASK Modulator, Coherent ASK detector, non-Coherent ASK detector, Band width frequency spectrum of FSK, Non-Coherent FSK detector, Coherent FSK detector Analyze the need and use of PLL in FSK Detection		
15-16	Digital Modulation Techniques	Differentiate the different keying schemes -BPSK, Coherent PSK detection, QPSK & Differential PSK	c.Technology based Learning	T1 chapter-6
17	Base Band Transmission and Optimal reception of Digital Signal	Identify the need of pulse shaping for optimum transmission and get the knowledge of Base band signal receiver model.	a. Group Learning and Teaching	T1 chapter-4
18	Base Band Transmission and Optimal reception of Digital Signal	Analyze different pulses and their power spectrum densities	a. Group Learning and Teaching	T1 chapter-4

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Text Book)
19-20	Base Band Transmission and Optimal reception of Digital Signal	Calculation of Probability of error, optimum receiver, Optimum of coherent reception and understand the Signal space representation and calculate the probability of error.	a. Group Learning and Teaching	T1 chapter-4
21-22	Base Band Transmission and Optimal reception of Digital Signal	Explain the Eye diagram and its importance in calculating error. Describe cross talk and its effect in the degradation of signal quality in digital communication.	a. Group Learning and Teaching	T1 chapter-4
23-25	Source coding methods	Compute problems on Source coding methods like - Huffman code, variable length codes used in digital communication. Explain Source coding and	c.Technology based Learning	T1 chapter-9

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Text Book)
		drawbacks of Lossy source Coding and how to increase the average information per bit.		
26-28	Linear Block Codes	Illustrate the different types of codes used in digital communication and the Matrix description of linear block codes. Analyze and find errors, solve the numerical in Error detection and error correction of linear block codes Explain cyclic codes, the difference between linear block codes and cyclic codes.	c.Technology based Learning	T1 chapter-10
29-32	Linear Block Codes	Compute problems based on the representation of cyclic codes and	c.Technology based Learning	T1 chapter-10

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Text Book)
		encoding and decoding of cyclic codes. Solve problems to find the location of error in the codes i.e., syndrome calculation.		
33	Convolution Codes	Identify the difference between the different codes digital communication	c.Technology based Learning	T1 chapter-10
34-35	Convolution Codes	Describe Encoding & decoding of Convolutional Codes Solve problems on error detection & correction using state Tree and trellis diagrams.	c.Technology based Learning	T1 chapter-10
36-37	Convolution Codes	Solve problems based on Viterbi algorithm.	c.Technology based Learning	T1 chapter-10

Lecture No.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer teaching e. Project based Learning.	Reference (Ch./Sec./ Text Book)
38-40	Convolution Codes	Compute numerical on error calculations and compare the error rates in coded and uncoded transmission	c.Technology based Learning	T1 chapter-10

List of Experiments:

Digital Communication Laboratory: (List of Experiments)

1	Analog Signal Sampling And Reconstruction
2	Pulse code Modulation and Demodulation
3	Study of A/D and D/A converter , PRBS Generator
4	Delta Modulation and Demodulation
5	Adaptive Delta Modulation and CVSD
6	Carrier Modulations & Demodulations (ASK,FSK,PSK)
7	Binary Phase Keying(BPSK) Modulation and Demodulation
8	Differential phase Shift Keying(DPSK) Modulation and Demodulation
9	Quadrature Phase Shift Keying(QPSK) Modulation and Demodulation
10	Differential Quadrature Phase Shift Keying (DQPSK) Modulation and Demodulation
11	Time Division Multiplexer circuit Design
12	Convolution encoder and Viterbi decoder
13	Study of BPSK and other bandpass signal using MATLAB Code
14	MATLAB Assignment

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Test 1	60 Minutes	10	19-02-2025	1-20	CB
Test 2	60 Minutes	10	09-04-2025	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	10	**	---	CB
Comprehensive Exam	3 Hours	70	14-05-2025	1- 40	CB

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Date: 07/01/2025   **Dr.K NAGAIAH**
                                                             Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CE323	**Water Supply and Waste Water Management**	3	0	0	3

Instructor-in-charge: Mr.DILIP MISHRA

Scope and Objectives of the course:
1. Comprehensive understanding of water supply and waste water engineering principles
2. Study of water treatment processes and technologies
3. Analysis of design, Operation and Maintenance of water and waste water infrastructure
4. Equip students with fundamental Knowledge of water supply systems and waste water

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology based Learning** d. **Peer Teaching** e. **Project Based Learning.**	Reference/ Text Book
1	Introduction of water resources	Estimation of surface water resources, Estimation of subsurface water resources	a. Group Learning Teaching	T1
2-3	Water Quality	Predicting demand for water, Impurities of water and their significance	a. Group Learning Teaching	T1

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
4-5	Different Analysis of Water	Physical analysis of water, Chemical analysis of water, Bacteriological analysis of water	a. Group Learning Teaching	T1
6	Minimum Standards for water quality	Waterborne diseases, Standards for potable water	a. Group Learning Teaching	T1
7-8	Schemes for intake of water	Intake of water: Pumping schemes, Intake of water: Gravity schemes	a. Group Learning Teaching	T1
9-10	Operations & Processes of water treatment	Unit operations in water treatment, Processes in water treatment	a. Group Learning Teaching	T2
11	Principles and functions	Principles of water treatment plant units, Functions of water treatment plant units	a. Group Learning Teaching	T2
12-13	Design of treatment plants	Design of water treatment plant units,	a. Group Learning Teaching	T2

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
14-16	Use of Aerators	Aerators in water treatment, Flash mixers in water treatment,	a. Group Learning Teaching	T2
17-18	Coagulation in plant	Coagulation in water treatment, Flocculation in water treatment,	a. Group Learning Teaching	T1
19		Clariflocculator in water treatment	a. Group Learning Teaching	T1
20-21	Plate settlers	Plate settlers in water treatment, Tube settlers in water treatment	a. Group Learning Teaching	T1
22-23	Sand filters	Pulsator clarifier in water treatment, Sand filters in water treatment,	a. Group Learning Teaching	T1
24	Desalination of Water	Disinfection of water, Softening of water, Removal of iron and manganese	a. Group Learning Teaching	T1

Lecture Nos.	Learning Objective	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
25		Defluoridation of water, Desalination process, Residue management in water treatment,	a. Group Learning Teaching	T2
26-28	Construction aspect of water treatment devices	Construction aspects of water treatment, Operation aspects of water treatment,	a. Group Learning Teaching	T2
29-32	Maintenance and storage Aspects	Maintenance aspects of water treatment	a. Group Learning Teaching	T2
33-35		Storage reservoirs: types and capacity, Balancing reservoirs: location and capacity,	a. Group Learning Teaching	T1
36-38	Distribution Systems	Distribution system layout, Hydraulics of pipelines,	a. Group Learning Teaching	T1
39-40		Pipe fittings in distribution systems, Valves in distribution systems	a. Group Learning Teaching	T1

Evaluation Scheme:

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Test 1	60 Minutes	20	19-02-2025	1-10	CB
Test 2	60 Minutes	20	09-04-2025	11-20	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	14-05-2025	1- 40	CB

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Date: 08/01/2025   **Mr.DILIP MISHRA**
                                                              Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CE325	**Finite Element Analysis**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mr.DILIP MISHRA

Scope and Objective of the Course:

1. To impart foundational knowledge of classical structural analysis methods including force and displacement approaches, enabling students to analyze determinate and indeterminate structures like beams and frames effectively.

2. To develop proficiency in matrix-based flexibility and stiffness methods, which form the basis for computer-aided structural analysis and are essential for solving large-scale structural problems.

3. To introduce the fundamental concepts of Finite Element Analysis (FEA) and its application in solving engineering field problems through mathematical modeling, variational principles, and numerical techniques.

Text Book T1	Wang, C. K. (1983). Intermediate Structural Analysis, McGraw-Hill.
Text Book T2	Reddy, C. S. (2019). Basic Structural Analysis, McGraw Hill Education.
Reference Book R1	Punmia, B. C., Jain, A. K., & Jain, A. K. (2017). Theory of Structures, Laxmi Publications.
Reference Book R2	Reddy, J. N. (2006). An Introduction to the Finite Element Method, McGraw-Hill.
Reference Book R3	Krishnamoorthy, C. S. (1994). Finite Element Analysis: Theory and Programming, Tata McGraw Hill.

Lecture-Wise-Plan:

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
1	Introduction to structural analysis	a. Group Learning Teaching	Wang, C. K. (1983)
2	Review of force method	a. Group Learning Teaching	Wang, C. K. (1983)
3	Review of displacement method	a. Group Learning Teaching	Wang, C. K. (1983)
4	Concept of static indeterminacy	a. Group Learning Teaching	Reddy, C. S. (2019)
5	Degree of Static Indeterminacy (DSI) for beams, frames, and trusses	a. Group Learning Teaching	Reddy, C. S. (2019)
6	Concept of kinematic indeterminacy	a. Group Learning Teaching	Reddy, C. S. (2019)
7	Degree of Kinematic Indeterminacy (DKI) for beams and frames	a. Group Learning Teaching	Reddy, C. S. (2019)
8	Comparative analysis: Force vs Displacement Methods	a. Group Learning Teaching	Reddy, C. S. (2019)
9	Introduction to Flexibility Method	a. Group Learning Teaching	Wang, C. K. (1983)
10	Flexibility coefficients	a. Group Learning Teaching	Wang, C. K. (1983)
11	Flexibility matrix formulation	a. Group Learning Teaching	Punmia, B. C. (2017)
12	Properties of flexibility matrix	a. Group Learning Teaching	Punmia, B. C. (2017)

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
13	Application: Continuous beam with 1 redundant	a. Group Learning Teaching	Wang, C. K. (1983)
14	Application: Continuous beam with 2 redundants	a. Group Learning Teaching	Wang, C. K. (1983)
15	Solving by superposition and compatibility	a. Group Learning Teaching	Wang, C. K. (1983)
16	Numerical examples: Flexibility method	a. Group Learning Teaching	Punmia, B. C. (2017)
17	Introduction to stiffness method	a. Group Learning Teaching	Wang, C. K. (1983)
18	Stiffness coefficient	a. Group Learning Teaching	Wang, C. K. (1983)
19	Development of stiffness matrix for beams	a. Group Learning Teaching	Reddy, C. S. (2019)
20	Global vs local stiffness matrix	a. Group Learning Teaching	Reddy, C. S. (2019)
21	Relationship between flexibility and stiffness matrices	a. Group Learning Teaching	Reddy, C. S. (2019)
22	Boundary conditions in stiffness method	a. Group Learning Teaching	Wang, C. K. (1983)
23	Application: Continuous beam using stiffness method	a. Group Learning Teaching	Wang, C. K. (1983)

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
24	Numerical examples: Stiffness method	a. Group Learning Teaching	Punmia, B. C. (2017)
25	Analysis of rigid jointed frames using flexibility method	a. Group Learning Teaching	Wang, C. K. (1983)
26	Analysis of pin-jointed frames using flexibility method	a. Group Learning Teaching	Reddy, C. S. (2019)
27	Analysis of rigid jointed frames using stiffness method	a. Group Learning Teaching	Wang, C. K. (1983)
28	Analysis of pin-jointed frames using stiffness method	a. Group Learning Teaching	Wang, C. K. (1983)
29	Comparison: Flexibility vs Stiffness method for frames	a. Group Learning Teaching	Reddy, C. S. (2019)
30	Numerical examples: Frames (combined)	a. Group Learning Teaching	Punmia, B. C. (2017)
31	Historical background of Finite Element Analysis (FEA)	a. Group Learning Teaching	Reddy, J. N. (2006)
32	Mathematical modeling of field problems	a. Group Learning Teaching	Reddy, J. N. (2006)
33	Governing equations and types of models	a. Group Learning Teaching	Reddy, J. N. (2006)
34	Boundary, Initial, and Eigenvalue problems	a. Group Learning Teaching	Krishnamoorthy, C. S. (1994)

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
35	Weighted residual methods	a. Group Learning Teaching	Reddy, J. N. (2006)
36	Variational formulation and applications	a. Group Learning Teaching	Reddy, J. N. (2006)
37	Ritz technique – Introduction and Example	a. Group Learning Teaching	Reddy, J. N. (2006)
38	Basic concepts of finite elements	a. Group Learning Teaching	Krishnamoorthy, C. S. (1994)
39	One-dimensional element formulation (bar/spring)	a. Group Learning Teaching	Reddy, J. N. (2006)
40	Summary and comparison of structural methods	a. Group Learning Teaching	Wang, C. K. (1983)

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	18-08-2025	1-15	CB
Test 2	60 Minutes	20	08-04-2025	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	07-05-2025	1-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, et

Date: 07/01/2025   **Mr.DILIP MISHRA**
                                                            Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CE324	**Highway and Transportation Engineering**	3	2	0	4

Instructor-in-charge: Mr.DILIP MISHRA

Scope & Objective of the Course:
1. To understand the principles of highway planning and alignment.
2. To learn about engineering surveys, traffic engineering, and geometric design.
3. To acquire knowledge on pavement design and construction techniques.
4. To understand airport planning, layout and geometric standards.

Text Book (T1)	Highway Engineering – S.K. Khanna & C.E.G. Justo, 10th edition, 2014 – Nem Chand & Bros., Roorkee.
Text Book (T2)	Transportation Engineering – L.R. Kadiyali, 9th edition, 2013 – Khanna Publishers, New Delhi.
Reference Book (R1)	Principles of Transportation Engineering – Partha Chakroborty & Animesh Das, 2nd edition, 2005 – Prentice Hall of India, New Delhi.

Lecture-Wise-Plan:

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. **Group Learning and Teaching** b. **Game Based Learning** c. **Technology Based Learning** d. **Peer Teaching** e. **Project Based Learning.**	Reference/ Text Book
1	Introduction to highway planning and development in India	a. Group Learning Teaching	T1: S.K Khanna &C.E.G Justo, PP 1-5
2	History and necessity of highway development	a. Group Learning Teaching	T1: PP 9-12
3	Principles of highway alignment and requirements	a. Group Learning Teaching	T1: PP 9-12

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
4	Engineering surveys for highway location	a. Group Learning Teaching	T1: PP 13–15
5	Map preparation and highway drawings	a. Group Learning Teaching	T1: PP 15–17
6	Vehicle characteristics in transportation	a. Group Learning Teaching	T1: PP 18–20
7	Driver and road user characteristics	a. Group Learning Teaching	T1: PP 21–23
8	Traffic terminals and their role	a. Group Learning Teaching	T1: PP 24–26
9	Traffic control: Signals and Signs	a. Group Learning Teaching	T1: PP 27–30
10	Cross-section elements of highways	a. Group Learning Teaching	T1: PP 31–34
11	Horizontal alignment and curves	a. Group Learning Teaching	T1: PP 35–38
12	Vertical alignment and summit curves	a. Group Learning Teaching	T1: PP 39–42
13	Valley curves and transition curves	a. Group Learning Teaching	T1: PP 43–45
14	Surface drainage system for highways	a. Group Learning Teaching	T1: PP 46–49
15	Subsoil drainage techniques	a. Group Learning Teaching	T1: PP 50–52

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
16	Geometric features of hill roads	a. Group Learning Teaching	T1: PP 53–56
17	Curve layout in hilly terrain	a. Group Learning Teaching	T1: PP 57–59
18	Introduction to traffic flow theory	a. Group Learning Teaching	T2: L.R. Kadiyali, PP 1–4
19	Speed-density-flow relationships	a. Group Learning Teaching	T2: PP 5–8
20	Flow-density relationships	a. Group Learning Teaching	T2: PP 9–11
21	Traffic data collection techniques	a. Group Learning Teaching	T2: PP 12–15
22	Delay studies and measurement	a. Group Learning Teaching	T2: PP 16–18
23	Design and types of parking facilities	a. Group Learning Teaching	T2: PP 19–22
24	Road signs and traffic control devices	a. Group Learning Teaching	T2: PP 23–26
25	Rotary intersections and their design	a. Group Learning Teaching	T2: PP 27–29
26	Highway lighting systems	a. Group Learning Teaching	T2: PP 30–33

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
27	Introduction to highway materials	a. Group Learning Teaching	T1: PP 60–63
28	Properties of subgrade and pavement materials	a. Group Learning Teaching	T1: PP 64–67
29	Soil testing methods	a. Group Learning Teaching	T1: PP 68–71
30	Aggregate and bitumen testing	a. Group Learning Teaching	T1: PP 72–75
31	Flexible pavement types and design	a. Group Learning Teaching	T1: PP 76–79
32	Rigid pavements: stresses and types	a. Group Learning Teaching	T1: PP 80–83
33	IRC guidelines for pavement design	a. Group Learning Teaching	T1: PP 84–87
34	Water Bound Macadam construction	a. Group Learning Teaching	T1: PP 88–90
35	Bituminous pavement construction	a. Group Learning Teaching	T1: PP 91–93
36	Cement concrete pavements and joints	a. Group Learning Teaching	T1: PP 94–97
37	Modern pavement materials	a. Group Learning Teaching	T1: PP 98–100

Lecture Nos.	Topics to be Covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference/ Text Book
38	Airport planning: terms and scope	a. Group Learning Teaching	R1: Partha Chakroborty & A. Das, PP 1–4
39	Site selection, zoning, and surveys	a. Group Learning Teaching	R1: PP 5–7
40	Runway orientation and taxiway design	a. Group Learning Teaching	R1: PP 8–10

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	10	18-02-2025	1-15	CB
Test 2	60 Minutes	10	09-04-2025	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	10	**	**	CB
Comprehensive Exam	3 Hours	70	07-05-2025	1- 40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 08/01/2025   **Mr.DILIP MISHRA**
                                        Instructor-in-charge

The ICFAI University, Raipur
Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CE322	**Design of Steel Structure II**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.DILIP MISHRA

Learning Outcomes:
After successful completion of the course student will be able to   1. To educate the student about the behavior of plate girders.   2. To understand the behavior of members subjected to combined forces.   3. To understand the behavior of column bases and gantry girders.   4. To understand the behavior of eccentric and moment connections.

Text Book(s) T1	Design of steel structure – N. Subramanian
Text Book T2	Limit state of Design of steel structure – S.K. Duggal
Reference Book (s) R1	Design of steel structure – K. S. Sai Ram
Reference Books R2	Limit state of Design of steel structure – V. L. Shah

Lecture-wise-plan:

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference (Ch./Sec. /Pg No)
1	Plate girders with solid webs	Components of a plate girder, typical section.	a. Group Learning and Teaching	T1
2-3	Plate girders with solid webs	Proportioning of the section, design bending strength.	a. Group Learning and Teaching	T1

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference (Ch./Sec. /Pg No)
4-5	Plate girders with solid webs	Design shear strength, stiffened web panels	a. Group Learning and Teaching	T1
6	Plate girders with solid webs	Minimum wed thickness, bearing stiffeners, load carrying stiffeners	a. Group Learning and Teaching	T1
7-8	Plate girders with solid webs	numerical	a. Group Learning and Teaching	T1
9-10	Members subjected to combined forces	Combined shear & bending	a. Group Learning and Teaching	T2
11	Members subjected to combined forces	Combined axial forces & bending moment	a. Group Learning and Teaching	T2
12-13	Members subjected to combined forces	Section strength, overall member combinations.	a. Group Learning and Teaching	T2
14-16	Members subjected to combined forces	Design of members subjected to combined forces	a. Group Learning and Teaching	T2
17-18	Column bases and gantry girders	Types of column bases	a. Group Learning and Teaching	T1
19	Column bases and gantry girders	Slab bases, gusset base	a. Group Learning and Teaching	T1

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference (Ch./Sec. /Pg No)
20-21	Column bases and gantry girders	Moment resisting base plates.	a. Group Learning and Teaching	T1
22-23	Column bases and gantry girders	Loads and load combinations	a. Group Learning and Teaching	T1
24	Column bases and gantry girders	Typical sections, design of gantry girders	a. Group Learning and Teaching	T1
25-26	Eccentric and moment connections	Analysis of bolt / weld groups.	a. Group Learning and Teaching	T1
27-28	Eccentric and moment connections	Connection configuration , beams to column connections	a. Group Learning and Teaching	T1
30-32	Eccentric and moment connections	Beam to beam connections, web splice and its connections.	a. Group Learning and Teaching	T1
33-34	Roof trusses	Types of roof trusses	a. Group Learning and Teaching	T1
35-38	Roof trusses	Dead , imposed and wind load, load combination	a. Group Learning and Teaching	T1
39-40	Roof trusses	Design of purlins, analysis & design of roof trusses	a. Group Learning and Teaching	T1

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	19-02-2025	1-10	CB
Test 2	60 Minutes	20	09-04-2025	11-24	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	12-05-2025	25-40	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 07/01/2025   **Mr.DILIP MISHRA**
                                                           Instructor-in-charge

The ICFAI University, Raipur

Faculty of Science and Technology
Second Semester, 2024-2025
Course Handouts

Course Code	Course Title	L	P	T	U
CE321	**Hydraulics and Hydraulic Machines**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mr.DILIP MISHRA

Scope and Objective Learning:

1. The problems encountered by man in the field of water supply, irrigation, navigation and water- power, resulted in the development of the fluid mechanics.

2. Will show how the principles can be applied to the solution of practical engineering problems such as water supply systems, waste water treatment facilities, dam spillways, flow-meters, hydraulic shock absorbers etc.

3. Different kinds of flow of fluid under different conditions have also been included so that the students learn to apply in practical life.

Text Book T1	Modi, P.N. and Seth, S.M., Hydraulics and Fluid Mechanics, Standard Book House, 15th ed., 2005.
Text Book T2	Patra, K.C., Hydrology and water Resources Engineering, Narosa Publishing House, 2001.
Text Book T3	Moondra, H.S., Gupta, R., Lab. Manual for Civil Engineering, CBS Publishers & Dist, 2nd ed., 2000.
Reference Book R1	Fox, R.W. and McDonald, A.T., Introduction to Fluid Mechanics, John Wiley and Sons Inc., Singapore, Fifth Edition, 2001
Reference Book R1	Arora, K.R., Fluid Mechanics, Hydraulics and Hydraulic Machines, Standard Publishers, Delhi, 1985.
Reference Book R2	Simon, A.L., Hydraulics, Willey, John & Sons, New York, 1986.
Reference Book R3	Shames, I.H., Mechanics of Fluids, McGraw-Hill Company, Second Edition, 1982
Reference Book R4	Douglas J. F., Gasiorek J. M. and Swaffield J. A., Fluid Mechanics, Pearson Education, Third Indian reprint, 2004.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference (Ch./Sec. /Pg No)
1-2	Introduction to the Hydraulics and fluid mechanics. To establish a base and a perspective for the study of subject	Introduction, Fundamental definitions and concepts	a. Group Learning and Teaching	T1
3-7	To study the behavior of real fluid flow in pipes and channels	Boundary layer theory	a. Group Learning and Teaching	T1
8-11	Analysis of uniform fluid flow in open channel	Flow in open channels	a. Group Learning and Teaching	T1
12-14	Analysis of Non uniform fluid flow in open channel	Non-uniform flow in channels	a. Group Learning and Teaching	T1
15-17	Design of Hydraulic Structures such as Parshall Flume, Gates, Culverts etc.	Hydraulic Structures	a. Group Learning and Teaching	T1

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference (Ch./Sec. /Pg No)
18-21	Analysis of Fluid flow around submerged objects	Lift & Drag	a. Group Learning and Teaching	T2
22-24	Use of turbines, different kind of turbines, their functionality and uses	Fluid machines, Francis Turbine, Kaplan turbine etc.	a. Group Learning and Teaching	T2
25-27	Use of pumps, different kind of pumps, their functionality and uses	Centrifugal Pump, Reciprocating Pump	a. Group Learning and Teaching	T2
28-30	Introduction to hydrology and hydrological cycle and presentation of basic concepts of hydrology and development of a flavor for application of hydrology to the solution of a range of problems	Elements of Hydrology	a. Group Learning and Teaching	T2
31-34	To present hydrologic inputs such as	Precipitation	a. Group Learning and Teaching	T1

Lecture Nos.	Learning Objective	Topics to be covered	Teaching Learning Strategies: a. Group Learning and Teaching b. Game Based Learning c. Technology Based Learning d. Peer Teaching e. Project Based Learning.	Reference (Ch./Sec. /Pg No)
	Precipitation measurement and method of analyzing the measured precipitation, Network design and presentation of precipitation data			
35-38	To present stream flow measurement and hydrograph analysis techniques of stream flow measurement and sources of stream flow hydrologic inputs	Stream flow	a. Group Learning and Teaching	T1
39-42	To deal with the precipitation-runoff relation. Given the amount of surface runoff, the surface runoff hydro would be estimated by unit hydrograph method	Hydrograph	a. Group Learning and Teaching	T1

Evaluation Scheme:

Student evaluation is based on the series of Tests and Lab Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	20	19-02-2025	1-15	CB
Test 2	60 Minutes	20	09-04-2025	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	**	CB
Comprehensive Exam	3 Hours	40	14-05-2025	1-42	CB

** To be announced in the class   CB= Close Book Exam   OB= Open Book

Make-up Policy: Make –up will be given only under genuine circumstances for Tests Only. However prior and proper intimation to the concerned instructor is must.

General: It shall be the responsibility of individual students to attend all sessions, to take prescribed Assessment Tests, Tests and Comprehensive Examinations, etc

Date: 02/01/2025   **Mr.DILIP MISHRA**
                                                                              Instructor-in-charge