The ICFAI University, Raipur

Faculty of Science and Technology

First Semester, 2024–2025
Course Handouts

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The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
MA111	**Mathematics I**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.SHANTI SWARUP DUBEY

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

1. Rank of matrices, test for consistency.
2. Basic concept of eigen values and eigen vectors
3. Expansion of series. Maclaurins and Taylors series.
4. Homogeneous function and Euler's theorem.

Text Book T1	Engineering Mathematics, Dr Hari Arora, S K Kataria & Sons
Reference Book R1	Engineering Mathematics A Tutorial Approach Ravish R Singh, Mukul Bhatt Tata McGraw Hill Education Private Limited, NEW DELHI
Reference Book R2	Higher Engineering Mathematics, Jain & Iyanger, Narosa Pub.
NPTEL Course Link	Engineering Mathematics - I, IIT Kharagpur https://nptel.ac.in/courses/111105121

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
1-4	Definition of Matrix	Types of Matrix, Systems of linear equations, Row reduction and echelon forms, Linear independence, The rank of a matrix and applications.	T l Ch-12 441-560
5-7	Introduction to linear transformations,	Introduction to linear transformations, The matrix of a linear transformation, Matrix operations, Determinants.	T l Ch-12 441-560

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
8-9	Inverse of a matrix	The inverse of a matrix, Characterizations of invertible matrices	T l Ch-12 441-560
10-12	Eigen values and Eigen vectors	Eigen vectors and Eigen values of a linear transformation, Characteristic polynomial and Cayley–Hamilton theorem, Minimal polynomial.	T l Ch-12 441-560
13-14	Orthogonal transformation	Reduction of a matrix to diagonal form. Orthogonal transformation of symmetric matrix to diagonal form	T l Ch-12 441-560
15-16	Sequence and series	Definition of Sequence and series	T1 Ch-8 237-276
17-18	Condition of convergence	Convergence and divergence of infinite series.	T1 Ch-8 237-276
19-20	Test for convergence	Comparison test, D'Alembert ratio test, Cauchy's root test	T1 Ch- 237-276
21-25	Differential Calculus	Successive differentiations, Leibnitz's theorem, Maclaurin's and Taylor's theorem.	T l Ch-6 155-201
26-31	Indeterminate forms	Indeterminate forms, Cauchy's rules for Indeterminate form, L' Hospital rules	T l Ch-7 202-236

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
32-40	Multivariable Calculus	Partial differentiation, Homogeneous function, Euler's Theorem, Total derivative of composite function. Minima and Maxima, Jacobians.	T l Ch-11 351-440

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	50 Minutes	20	07-10-2024	1-10	CB
Test 2	50 Minutes	20	18-11-2024	11-20	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-12-2024	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: 05/08/2024

Dr.SHANTI SWARUP DUBEY
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
PH112	**Mechanics & Waves Motion**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.ANIL KUMAR VERMA

Learning Outcomes:
Physics I form the first half of a two-semester comprehensive course on core level physics to be taught to all engineering students. The course aims at:-

1. Developing an understanding of the basic principles of physics of Mechanics & Waves motion.
2. Developing the application of concepts to problems of practical interest in Mechanics & Waves motion
3. Improving the concepts and improving the Physics problem solving skills of students.

Text Book T1	Mechanics and wave motion by JC Upadhyaya, Himalaya Publishing House
Text Book T2	Oscillation and Waves by Satya Praksh, Pragati Prakshan Meerut
Text Book T3	Waves and Oscillation by JC Upadhyaya, Himalaya Publishing House
Reference Book R1	Mechanics by Prof. DS Mathur, S.Chand Publication
Reference Book R2	Handbook of Physics by Walter Beneson et al. Springer Publication
Reference Book R3	D. Haliday, R. Resnick, J. Walker, Fundamentals of Physics, Sixth Edition, John Wiley & Sons, 2001

Lecture-Wise-Plan:

Lecture Nos.	Learning objectives	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
1-5	Origin of the Mechanics of particle.	Newton law of motion, Principle of conservation of linear momentum, angular momentum and energy.	T1 (1.4, 2.6, 3.7,3.8,3.9,310,3.11, 3.12) R1 (2.5, 2.6, 2.7, 5, 6)

Lecture Nos.	Learning objectives	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
6-11	Behaviours of the Dynamics of Rigid Bodies	Moment of inertia and its physical significance, Equation of motion, concept of radius of gyration, Theorem of parallel and perpendicular axes, Fly Wheels.	T1 (5.1, 5.2,5.3,5.4, 5.8, 5.11) R1 (11.1, 11.4, 11.5, 11.12, 11.13, 11.14)
12-17	Concept of the Properties of the matters	Elasticity and elastic constant, Stress and Strain, Hooks law, Types of elastic constant and relation among them.	T1(6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7) R1 (13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.11, 13.12, 13.13, 13.14, 13.15)
18-25	To understand the fundamentals characteristics of the motion	Oscillatory Motion and its types, Simple harmonic oscillator and solution of the differential equation – Physical characteristics of SHM. Examples of SHM, Simple and compound pendulum, measurement of the acceleration due to gravity 'g' using a simple pendulum.	T1 (8.1, 8.2, 8.3, 8.4, 8.5) R1 (7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7)
26-36	Basic ideas about free, damped and forced harmonic motion	Free, forced and Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with un-damped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, velocity resonance, Coupled oscillators.	T1 (10.1, 10.2, 10.3, 10.4, 10.5, 11.1, 11.2, 11.3, 11.4, 101.5) R1 (8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9)
37-42	To understand the characteristics of different kinds of waves.	Types of waves: Mechanical and non-mechanical waves (Transverse and longitudinal waves), Differential wave and its solution, Energy in waves, Phase and group velocity and relation between them, Superposition of two waves	T1 (12.1, 12.2, 12.3, 12.5, 12.7, 12.12, , 12.8, 12.18, 12.19 R1 (10.1, 10.2, 10.8, 10.9, 10.10, 10.13, 10.36, 10.37)

Experiment Physics I (LAB)

Sr. No.	Name of the Experiments
1	To study and observe the Sinusoidal wave using CRO with Function generator.
2	To study and observe the Triangular wave using CRO with Function generator.
3	To study and observe the Square wave using CRO with Function generator.
4	To study of Small Oscillation using a Simple/ Bar Pendulum.
5	To study and calculate the moment of inertia using Fly Wheel.
6	To study and Getting Familiar with ExpEYES17/ SEE lab 3.0
7	To study and measure ac voltage (Sinusoidal, Triangular, Square) signal using SEE lab 3.0
8	To study the behavior of light dependent resistor (LDR) using SEE lab 3.0
9	To study and measure the velocity of sound waves using SEE lab 3.0
10	To Study the beats produced by two Piezo buzzers are excited by two nearby frequencies using SEE lab 3.0

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	50 Minutes	20	07-10-2024	01-11	CB
Test 2	50 Minutes	20	18-11-2024	12-25	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	11-12-2024	1- 42	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: 07/08/2024

Dr.ANIL KUMAR VERMA
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CH113	**Chemistry**	**3**	**2**	**0**	**3**

Instructor-in-charge: Dr.PIYUSH KUMAR THAKUR

Learning Outcomes:
This first level course is offered in the first semester for the students of all branches of engineering.

1. Mechanistic pathways of organic reactions. Gives an idea about reactions and reagents.
2. Students will be able to understand and explain the principles of stereochemistry, including chirality, enantiomers, diastereomers, and optical activity, as well as the impact of stereochemistry on molecular properties.
3. Students will be able to explain the principles of electrochemical cells, electrode potentials, and redox reactions, and apply these concepts to various electrochemical systems.
4. Students will demonstrate the ability to use thermodynamic principles in practical applications, such as engines, refrigeration systems, and chemical reactions
5. Students will be able to explain the structure, bonding, and properties of coordination compounds, including crystal field theory, ligand field theory, and the roles of metal-ligand interactions.

Text Book T1	The Elements of Physical Chemistry, Peter Atkins and Julio de Paula, Fourth edition, Oxford University Press, 2005.
Text Book T2	Concise Inorganic Chemistry, J.D.Lee, Black Well Science, OUP, 5th Edition, 1996
Text Book T3	Unified Chemistry, M.M.N. Tandon, Shiva Lal Agrawala & Compony, 2002.
Reference Book R1	Physical Chemistry, Ira N. Levine, Fifth Edition, Tata McGraw-Hill , 2002.
Reference Book R2	Ernest L Eliel, Stereochemistry of Carbon Compounds, Tata McGraw-Hill Edition, 2002.
Reference Book R3	Huheey, Keiter & Keiter, Inorganic Chemistry, Pearson Education, 2003.

Lecture-Wise-Plan:

Lecture No	Learning Objectives	Topics to be Covered	Reference (Ch./Sec./Page Nos.of Text Book)
1-3	Organic reaction mechanisms To understand the mechanistic pathways of organic reactions. Gives an idea about reactions and reagents.	Inductive, electromeric, resonance and mesomeric effects, hyper conjugation and their applications	T3:507 – 530
4-5		Electrophiles and Nucleophiles; Nucleophilicity and basicity	T3:539 – 541
6-7		Types, shape and relative stability of carbocations, carbanions, free radicals and carbenes.	T3:545-553
8-9		Introduction to types of organic reactions and their mechanism: Addition, Elimination and Substitution reactions.	T3:541-545
10-12	Stereo chemistry To understand the perspective and spatial Orientations of atoms in an organic molecule.	Fischer Projection, Newmann and Sawhorse Projection formulae; Geometrical isomerism: cis–trans and, syn-anti isomerism E/Z notations with C.I.P rules.	T3: 570-625
13-14		Optical Isomerism: Optical Activity, Specific Rotation, Chirality/ Asymmetry, Enantiomers, Molecules with one and two chiral-centres, Distereoisomers, meso-structures, Racemic mixture and resolution, inversion	

Lecture No	Learning Objectives	Topics to be Covered	Reference (Ch./Sec./Page Nos.of Text Book)
15-17		Relative and absolute configuration: D/L and R/S designations.	
18 -19	To understand the transformation of energy from heat into work and vice versa	Thermodynamics - first law Work & heat, internal energy and enthalpy.	
20-22		Thermo chemistry Enthalpy changes accompanying Physical Change and Chemical Change	T1:3.1 – 3.7
23- 25	To understand the concept of entropy and Gibbs energy	Thermodynamics – Second Law Entropy and second law, absolute entropies and Third law, The Gibb's energy	T1: 4.1 – 4.11
26- 29	To understand the redox reactions involved in electrochemical cells, cell potentials and applications of standard potentials	Electrochemistry - The migration of ions, electrochemical cells, The cell potential. Application of standard potentials	T1:9.2 – 9.13
30 - 33	To understand the dependence of rates of reactions on different reaction conditions	The rates of reactions Empirical chemical kinetics, Reaction rates, Temperature dependence of reaction rates	T1: 10.3 – 10.11

Lecture No	Learning Objectives	Topics to be Covered	Reference (Ch./Sec./Page Nos.of Text Book)
34 - 35	Coordination Chemistry To understand the structure, properties, formation, Stability reactivity of Transition metal complexes.	Nomenclature of coordination Compounds	T3: 570-625
36-37		Crystal Field Theory of Octahedral Complexes, Magnetism and Thermodynamic aspects of crystal field splitting.	T3:4.14 – 4.19
38 -40		Tetragonal distortions of Octahedral Complexes (Jahn-Teller Distortions)	T3: 4.20, 3.3 – 3.5, 13.10 – 13,14
		Square Planar and Tetrahedral Complexes.	T3:8.6

Chemistry I (Lab):

S. No.	Name of Experiment
1	To determine the temporary and permanent hardness in the given water sample by complexometric titration using EDTA as standard solution
2	To determine the chloride content in the given water sample by Mohr‟s method
3	To determine the percentage of Available Chlorine in the given sample of Bleaching powder. Iodo metrically.
4	To detect the presence of functional groups in the given organic compound.
5	To detect the presence of elements in the given organic compound.
6	To determine the strength of given HCl solution by titrating it against NaOH solution using pH meter
7	To verify the Beers-Lambert Law

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	50 Minutes	20	08-10-2024	1-18	CB
Test 2	50 Minutes	20	19-11-2024	19-32	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	13-12-2024	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: 06/08/2024

Dr.PIYUSH KUMAR THAKUR
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
ES114	**Thermodynamics**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.DILIP MISHRA

Course Description:
This course provides a mature approach to the basic principle of classical thermodynamics and to apply it to system surroundings interactions; involving work and heat transfer with associated property changes. It deals about using classical thermodynamics principles to develop algebraic relationships among key physical parameters and variable based on analysis of a specified system, using references that provide tabulated physical data that are useful to mechanical engineers & familiarity with construction and performance parameters of Boilers

Text Book T1	Engineering Thermodynamics – P.K. Nag – TMH Publishers
Text Book T2	Thermodynamics- An Engineering Approach – Cengal & Boles – McGraw Hill
Reference Book R1	Fundamental of engineering thermodynamics- R.Yadav ,CPH, Allahabad
Reference Book R2	Thermal Science & Engineering – D.S. Kumar – S.K. Kataria & Sons
Reference Book R3	Fundamental of Thermodynamic- Claus Borgnakke, Richard E. Sonntag, Wiley, Delhi

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
1	Introduction to Thermodynamics	Definitions, Importance of Thermodynamics, Applications.	T1, T2
2	Microscopic vs. Macroscopic Viewpoint	Explanation of both viewpoints with examples.	T1, T2
3	Thermodynamic Systems	Definition of thermodynamic systems and control volumes.	T1, T2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
4	Thermodynamic Properties	Overview of properties: intensive, extensive, and state functions.	T1, T2
5	Thermodynamic Processes, Thermodynamic Cycles	Thermodynamic system, properties and state, processes and cycles, force, energy, pressure, specific volume, and numerical problems	T1, T2
6	Quasi-static Process	Definition and significance of quasi-static processes.	T1, T2
7	To know the concept of heat	Understanding of heat concept, and numerical problems on it	T1, T2
8	To know the application of first law for closed systems	Definition of first law, first law for a change of state, internal energy and enthalpy	T1, T2
9	To know internal energy and enthalpy	Specific heat, internal energy and enthalpy of an ideal gas, first law as a rate equation and numerical problems	T1, T2
10	To study properties of a pure substance	Phase equilibrium, independent property, compressibility factor	T1, T2
11	To know how to use steam tables	Study of steam tables and numerical problems on it	T1, T2
12	Phases of a Pure Substance, P-V-T Surface	Vapor-liquid-solid phases and their behaviour, Understanding the P-V-T surface concept	T1, T2
13	Critical and Triple Points	Definition and significance of critical and triple points.	T1, T2
14	Steady Flow Energy Equation	Application of steady flow energy equation: nozzle and diffuser.	T1, T2
15	Application of Energy Equation	Application in boilers, turbines, compressors, and pumps.	T1, T2
16	Throttling Process	Understanding the throttling process and its applications.	T1, T2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
17	Introduction to the Second Law of Thermodynamics	Limitations of the First Law and introduction to thermal reservoirs.	T1, T2
18	Heat Engines	Definition, components, and performance parameters of heat engines.	T1, T2
19	Heat Pumps	Principles and applications of heat pumps.	T1, T2
20	Kelvin-Planck and Clausius Statements, PMM of the Second Kind	Discussion of both statements and their equivalence, Explanation and impossibility of PMM of the second kind.	T1, T2
21	Reversibility and Irreversibility	Causes and examples of irreversibility in thermodynamic processes.	T1, T2
22	Carnot Cycle, Carnot Theorem	Detailed analysis of the Carnot Cycle, Statement and significance of the Carnot theorem.	T1, T2
23	Absolute Thermodynamic Temperature Scale	Definition and significance of the absolute temperature scale.	T1, T2
24	Introduction to Entropy	Understanding the concept of entropy and its importance in thermodynamics.	T1, T2
25	Clausius Theorem	Detailed discussion on Clausius theorem and its applications.	T1, T2
26	Entropy Principle and Applications	Explanation of entropy principles and various applications.	T1, T2
27	Entropy Change in Processes	Calculation of entropy change in various thermodynamic processes.	T1, T2
28	Maxwell's Equations	Introduction to Maxwell's Relations.	T1, T2
29	T-ds Equations	Detailed explanation of T-ds equations.	T1, T2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
30	Coefficients of Volume Expansion and Compressibility	Understanding volume expansion and compressibility coefficients.	T1, T2
31	Ratio of Specific Heats	Explanation of specific heat and the ratio of specific heat.	T1, T2
32	Ideal Gas Equation of State	Overview of the ideal gas law and its applications.	T1, T2
33	Van der Waals Equation	Explanation of van der Waals equation and corrections for real gas.	T1, T2
34	Mixture of Perfect Gases	Definitions: mass fraction, mole fraction, and properties of mixtures.	T1, T2
35	Properties of Ideal Non-Reactive Gas Mixtures	Calculation of gas constant, molecular weight, specific heat, internal energy, enthalpy, and entropy.	T1, T2
36	Boilers and Classification	Overview of boiler types, including water tube and fire tube boilers.	T1, T2
37	Construction of Cochran and Babcock Wilcox Boilers	Detailed working principles of Cochran and Babcock Wilcox boilers.	T1, T2
38	High Pressure Boiler Overview	Advantages and construction of the Lamont boiler.	T1, T2
39	Boiler Mountings and Accessories	Functions of various boiler mountings and accessories.	T1, T2
40	Definition and Classification of Draught	Understanding different types of draught in boiler operation.	T1, T2
41	Performance Parameters of Boilers	Overview of evaporation rate, equivalent evaporation, and factors affecting boiler performance.	T1, T2
42	Boiler Efficiency, Boiler Trials	Explanation and calculation methods for boiler efficiency, Conducting boiler trials and analyzing performance data.	T1, T2

Evaluation Scheme:

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Test 1	50 Minutes	20	08-10-2024	1-15	CB
Test 2	50 Minutes	20	19-11-2024	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	10 Each	**	---	CB
Comprehensive Exam	3 Hours	40	16-12-2024	1- 42	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: 06/08/2024

Mr.DILIP MISHRA
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
TA115	**Workshop Practice**	**2**	**2**	**0**	**4**

Instructor-in-charge: Mr.HEMANT KUMAR DEWANGAN

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

1. To make the students familiar with the basic manufacturing processes used for producing finished articles out of wood, ferrous and non-ferrous metals.
2. To get the exposure to modern manufacturing courses like the application of non-conventional resources in manufacturing and usage of computers in manufacturing.
3. To get familiar with basics of all manufacturing processes.
4. To acquire knowledge in practical classes (Lab Work) about handling some of the basic general purpose machine tools, carpentry work, foundry, fitting independently.
5. To help in proper "Planning" and time scheduling of work while preparing an object as it avoids unnecessary waste of time, material money and efforts and process.
6. To know the name specification use and other details of "hand tools', "instruments" and "machines".
7. To help to follow the work safety rules regulations to avoid injury and accident himself/herself.

Text Book T1	Elements of Manufacturing Processes by B.S.Nagendra Parashar, R.K.Mittal, PHI, 2003
Reference Book R1	Principles of Manufacturing Materials and Processes by J.S.Campbell, TMH
Reference Book R2	Principles of Manufacturing Materials and Processes by J.S.Campbell, TMH, 1999.
Reference Book R3	Materials and Processes in Manufacturing,E. Paul DeGarmo, J.T.Black , PHI, 8th Edition, 2003.
Reference Book R4	Workshop Manual by P Kannaiah & KL Narayana SciTech Publications, 2005.
NPTEL	https://nptel.ac.in/courses/112/105/112105306/

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text Book)
1	Basics of Manufacturing	Manufacturing Concepts	T 1.1 toT 1.5

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text Book)
2-3	Properties of Materials	Engineering Materials	T 2.1, 2.4 to T 2.8
4-5	Quality aspects in Manufacturing	Measurements and Quality in Manufacturing	T 3
6-12	Basics of metal cutting operation	Theory of Metal Cutting	T 4.1 to T 4.6, T 4.10 to 4.16
13-17	Different operations on lathe	Turning Operations	T 5.1,5.2,5.4, 5.6 to 5.11
18-20	Hole making and allied operations	Drilling and Allied operations	T 6
21-22	Production of flat surfaces	Shaping, Planning and slotting operations	T 7
21-23	Production of complex surfaces	Milling Operations	T 8
24-25	Operations to produce fine surface finish	Finishing Operations	T 9.1 to T 9.5
26-28	Joining processes like welding, brazing, etc.	Mechanical Joining Processes	T 15.1 to T 15.4.2, T 15.5 to T 15.7
29-30	Workshop Projects	Individual and group projects involving fabrication and assembly including showcasing and presenting completed workshop projects	NA

Workshop Practice Lab:

S.No	Name of the Experiment
Carpentry	
1	To perform wood cutting operation.
2	To prepare T-Joint.
3	To prepare half cross lap joint.
Metal Cutting operation (Cutting + Finishing + Fitting)	
4	Demonstrate use of different fitting tools –like work holding, marking, measuring, cutting, finishing and miscellaneous. Student will also
5	To prepare square shape object.
6	To prepare the report with sketch, specifications and applications of fitting tools demonstrated.

S.No	Name of the Experiment
Lathe Operation	
7	To perform turning operation in lathe machine on steel rod.
Welding Operation	
8	To prepare T-joint (mild steel specimen).
9	To prepare butt joint (mild steel specimen).
Drilling Operation	
10	To perform drill operation on prepared Square shape object.

ABOUT SAFETY PRECAUTIONS DO'S & DONT'S	
1	Wear shoes to protect your feet.
2	Do not wear wrist watch while working
3	Beware of the live electrical wires don't attempt or try to touch them.
4	Use hand glows/ Welding Shield
5	Handle the tools/ Machines as per the instruction given by the Faculty
6	Use Proper/Right tools
7	Keep the tools in the right place else that may hurt you
8	Use fire extinguisher to put off the flame
9	Do not touch or pour water on burning live electric wire
10	Use firs aid box or inform the faculty for need of medical assistance

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	50 Minutes	10	09-10-2024	1-15	CB
Test 2	50 Minutes	10	20-11-2024	16-30	OB
Quiz/Assignment/Lab	3 Hours	50	**	1-10 (Sr.No)	CB
Comprehensive Exam	3 Hours	30	18-12-2024	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: 04/08/2024

Mr.HEMANT KUMAR DEWANGAN
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
TA116	**Computer Programming I**	**3**	**2**	**0**	**4**

Instructor-in-charge: Dr.RAVI KIRAN

Learning Outcomes:

1. Learn fundamental knowledge of computer hardware and number systems
2. Learn basic terminology used in computer programming
3. Develop ability to write, compile and debug programs in C language
4. Design programs involving decision structures, loops and functions
5. Understand the dynamics of memory by the use of pointers

Text Book T1	1. C programming By Ritchie & Kernighan 2. C Programming By Bala Guruswamy
Reference Book R1	Programming with C By Gottfried
Reference Book R2	C Programming By Yashwant Kanetkar
Laboratory work:	To implement Programs for various kinds of programming constructs in C Language.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
1-5	Computers Fundamentals	Classification of Computers, Application of Computers, Basic organization of computer, Input and Output Devices, Binary Number System, Computer memory, Computer Software.	On Board
6-10	Algorithms and Programming Languages	Algorithm, Flowcharts, Pseudo code, Generation of Programming Languages.	
11-20	C Language	Structure of C Program, Life Cycle of Program from Source code to Executable, Compiling and Executing C Code, Keywords, Identifiers, Primitive Data types in C, variables, constants, input/output statements in C, operators, type conversion and type casting. Conditional branching statements, iterative statements,	Text-1, Ch,1,2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
21-30	Functions:	Declaration, Definition, Call and return, Call by value, Call by reference, showcase stack usage with help of debugger, Scope of variables, Storage classes, Recursive functions, Recursion vs Iteration.	Text-1, Ch 3
31-40	Arrays, Strings and Pointers	One-dimensional, Two-dimensional and Multi-dimensional arrays, operations on array: traversal, insertion, deletion, merging and searching, Inter-function communication via arrays: passing a row, passing the entire array, matrices. Reading, writing and manipulating Strings, Understanding computer memory, accessing via pointers, pointers to arrays, dynamic allocation, drawback of pointers.	Text-1 Ch 4, 5, 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	50 Minutes	20	09-10-2024	1-20	CB
Test 2	50 Minutes	20	20-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	20-12-2024	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: 07/08/2024

Dr.RAVI KIRAN
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
TA202	**Measurement Technique**	**2**	**2**	**0**	**4**

Instructor-in-charge: Mr.DILIP MISHRA

Learning Outcomes:
This course gives an introduction to the experimental methods and measurement techniques. The objective of the course is to train the students in the operation of various instruments and equipment and the measurement of various parameters in electric, electronic, mechanical engineering applications.

Text Book T1	Experimental Methods for Engineers, J.P.Holman, TMH, 7thEdition, 2000.
Reference Book R1	Measurement Systems; Application & Design, E.O. Doebelin, 4th Edition, 2002.
Reference Book R2	Fundamentals of Momentum, Heat and Mass Transfer Weltay James R., Charles E. Wicks and Robert E. Wilson John Wiley, 4th Edition, 2002.
Reference Book R3	Hydraulics & Fluid Mechanics,P.N.Modi and S.M.Seth,Standard Publication
Reference Book R4	Laboratory Manuals of IcfaiTech, 2003.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text Book)
1-2	Basic concepts of measurement	Definition of Terms	2.1 - 2.5
		Generalized Measurement System	2.6
		Impedence Matching	2.10
		Experiment Planning	2.11
3-4	Analysis of Experimental data	Causes and Types of errors	3.1 - 3.2
		Error Analysis	3.3
		Uncertainty Analysis	3.4

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text Book)
		Evaluation of uncertainties	3.5
5-6	Method of Least Squares	--	3.11
	Regression Analysis	--	3.12
7-8	Graphical analysis & Curve fitting	Graphical analysis & Curve fitting.	3.16
		Choice of Graph Format	3.17
		General Data Analysis	3.18
9-10	Electrical Measurements	Basic analog meters	4.4
		Basic digital meters	4.5
		Basic input circuits	4.6 (uptoPage 172)
11	Electronic voltmeter	---	4.13
	Digital meters		4.14
12	Oscilloscope	---	4.15
13-15	Transducers	Variable resistance, LVDT, Capacitive Transducers Photo electric effects,	4.19-4.24
		Hall effect	4.29
		Digital Displacement Transducers	4.30
		Comparison of analog & digital	4.31
16-17	Area Measurement	Concepts	5.6
		Graphical measurement - Planimeter	5.7 - 5.8
18-19	Pressure measurement	Mechanical devices	6.3
		Dead weight tester	6.4
		Bourdon tube	6.5
		Diaphragm & bellow gauges	6.6

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text Book)
20-21	Flow Measurements	Flow obstruction	7.1 - 7.3
		Sonic nozzle	7.5
		Anemometers	7.6-7.7(Uptopage316)
22-24	Temperature Measurement	Scales	8.1 - 8.3
		Ideal gas thermometer	8.4
		Numericals	8.5
		Temperature measurement by radiation	8.6
25-26	Thermal & Transport Property measurements	Thermal conductivity	9.1-9.3
		Calorimetry Numericals	9.6-9.8
27-28	Strain-Stress & its Measurement	Numericals on Stress & Strain calculations, Concepts-Resistance strain gauge	10.5-10.8

S.No	Laboratory Experiment	No of Experiment
1	Electrical & Electronics	5
2	Mechanical, Instrumentation and others	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	50 Minutes	20	24-09-2024	1-12	CB
Test 2	50 Minutes	20	12-11-2024	13-24	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	06-12-2024	1- 28	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: 06/08/2024

Mr.DILIP MISHRA
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
MA201	**Mathematics III**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.ANIMESH KUMAR SHARMA

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

1. Solution of first & first degree differential equation
2. Solve problems on Laplace transform and inverse Laplace transform.
3. Solution of Partial differential equation

Text Book T1	Applied Mathematics, Dr H K Pathak, Shiksha Sahitya Prakashan
Text Book T2	Ordinary & Partial Differential Equation, M D Raisinghania, S Chand & Company, New Delhi
Reference Book R1	Higher Engineering Mathematics, Jain & Iyanger, Narosa Pub.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
1-2	First Order Differential Equations	Basic concepts and genesis of ordinary differential equations	T2 Ch-1 1.3-1.35
3-4	To find the order and degree of a differential equation	Differential equations of first order and first degree.	T2 Ch-2 2.1-2.76
5-8	Second Order Linear Differential Equations	Statement of existence and uniqueness theorem for linear differential equations, General theory of linear differential equations of second order with variable coefficients	T2 Ch-10 10.1-10.58

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
9-12	Method of variation of parameters	Method of variation of parameters and method of undetermined coefficients, Reduction of order, Coupled linear differential equations with constant coefficients	T2 Ch-7 7.1-7.26
13-16	Definition of Laplace transform	Transform of elementary functions, Properties of Laplace transform, transform of derivative and integrals, Multiplication by t, Division by t,	T1 Ch-3 127-169
17-21	Inverse Laplace transform	Inverse Laplace transforms, Convolution theorem, Unit step function, Unit impulse function, Application to solution of ordinary differential equation.	T1 Ch-4 170-212
22-30	Fourier Series	Euler's formula, functions having points of discontinuity, change of interval, Even and odd functions, Half range series, Harmonic analysis	T1 Ch-1 1-99
31-35	Partial Differential Equation	Formation, Solution by direct integration method, Linear equation of first order	T1 Ch- 241-299
36-42	Homogeneous linear equation	Homogeneous linear equation with constant coefficients, Non homogeneous linear equation. Method of separation of variables.	T l Ch-6 300-353

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	50 Minutes	20	23-09-2024	1-15	CB
Test 2	50 Minutes	20	11-11-2024	16-32	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	04-12-2024	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: 04/08/2024

Dr.ANIMESH KUMAR SHARMA
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
TA204	**Technical Report Writing**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.SHUBHRA TIWARI

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

1. Understand the concept, importance and types of technical written communication.
2. Learn the usage of effective technical report writing and draw benefit from it.
3. Explore skills and ability to develop career in technical writing.
4. Understanding the application of various technical reports writing.
5. Nuances, legal aspects and ethics in technical writing.

Reference Book R1	Technical Report Wrting by Kieran Morgan
Reference Book R2	Managing Your Documentation Projects by JoAnn T Hackos
Reference Book R3	The Insider's Guide to Technical Report Writing by Krista Van Laan
Reference Book R4	Technical Report Writing and Research Methodology (English, Paperback, Dr. Naushad Alam, Dr. Quadri Javeed Ahmad Peer, Dr. Banarsi Lal)

Lecture-Wise-Plan:

Lecture Nos	Learning Objective	Topics to be covered	Reference
1	Understanding technical comm	Technical report Writing - Definition & Purpose	"Chapter 1 - Introduction to Technical Writing" in "Open Technical Communication" on Open ALG (manifoldapp.org)
2,3	Nature of technical comm	Characteristics of Technical report writing	https://alg.manifoldapp.org/read/open-technical-communication/section/0debb16b-f623-4033-a47b-973d65ab0961

Lecture Nos	Learning Objective	Topics to be covered	Reference
4	Focused technical comm	Qualities of good technical report	Microsoft Word - The qualities of a good technical report..doc (tamu.edu)
5	Rhetorical awareness	Rhetorical Awarenss in Tech Comm	1.3 Understanding the Rhetorical Situation – Technical Writing Essentials (bccampus.ca)
6,7	Correctness of technical comm	Legal & Ethical Communication	"Chapter 3 - Ethics in Technical Communication" in "Open Technical Communication" on OpenALG (manifoldapp.org)
8,9	Understand oral technical comm	Oral & Presentation	"2.12 - Oral Presentations" in "Open Technical Communication" on OpenALG (manifoldapp.org)
10,11	Technical documents-details	Parts/ Components of Tech Documents	Components of a Technical Document | Technical Communication Center
12,13	Why is technical comm important?	Description & Importance of Tech Comm	What is the importance of technical report writing? – MVOrganizing
14,15	Detailed rules of technical comm	Implicit & Explicit Rules of Comm: Definition & Examples	"2.14 - Technical Definitions and Descriptions" in "Open Technical Communication" on OpenALG (manifoldapp.org)
16	Know the types of tech documents	Types of Tech Documents	"2.2 - Types of Technical Documents" in "Open Technical Communication" on OpenALG (manifoldapp.org)
17,	Understand need of technical comm	Establishing Goals in Tech Writing	SMART Goals for Technical Writers | by Kesi Parker | Technical Writing is Easy | Medium

Lecture Nos	Learning Objective	Topics to be covered	Reference
18,19,20	Process orientation of technical comm	Technical Writing Process: Pre-writing, Writing and Re-writing	https://study.com/academy/lesson/the-technical-writing-process-prewriting-writing-rewriting.html
21	Practical presentation	Project Work & Presentation	Practical session
22,23	Process orientation of technical comm	Technical re-writing & Editing	Ten Best Practices for Technical Writing and Editing | PerfectIt™ | Proofreading Software for Professionals. (intelligentediting.com)
24	Technical writing - user orientation	Usability Testing & Tech Writing	Usability Testing | Usability.gov
25	Usage of reusables in tech writing	Prototypes & Wireframes	A Comprehensive Guide To Wire framing And Prototyping — Smashing Magazine
26,	Understand types of tech reports	Formal & Informal Tech Reports	"2.2 - Types of Technical Documents" in "Open Technical Communication" on OpenALG (manifoldapp.org)
27,28,29	Practical presentation	Project Work & Presentation	Practical session
30,31	Understand business reports	Business Reports & Proposals	"2.3 - Business Plans" in "Open Technical Communication" on OpenALG (manifoldapp.org)
32	Tech writing-customer orietation	Technical Correspondence	"2.1 - Business Correspondence and Resumes" in "Open Technical Communication" on OpenALG (manifoldapp.org)

Lecture Nos	Learning Objective	Topics to be covered	Reference
33,34	Tech writing- resumes/ cover letters	Writing Resumes & Cover Letters	"2.1 - Business Correspondence and Resumes" in "Open Technical Communication" on OpenALG (manifoldapp.org)
35,36,37, 38	Types of tech documents	Technical Instructions, Manual Writing, Proposal Writing	"2.6 - Instructions" in "Open Technical Communication" on OpenALG (manifoldapp.org)
39,40	Practical presentation	Project Work & Presentation	Practical session

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	50 Minutes	20	23-09-2024	1-20	CB
Test 2	50 Minutes	20	11-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	02-12-2024	1- 40	CB

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

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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: 01/08/2024

Dr.SHUBHRA TIWARI
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
ES201	**Electrical Sciences I**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.ANIL KUMAR VERMA

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

1. To understand the electrical circuits principles, operation and applications of the mesh and nodal analysis & network theorems.
2. To learn and develop the working principle of diodes, transistors, FET & MOSFETS.
3. To understand the working and analysis of amplifiers, feedback amplifiers, oscillators, Boolean Functions and basic of digital logic gates.

Text Book T1	Fundamentals of Electrical Engineering, Leonard S. Bobrow, Oxford University Press, 2nd Edition.1996.
Text Book T2	Principles of Electronics, V.K. Mehta and Rohit Mehta, S. Chand Publication, 2021
Text Book T3	Basic Electronics, B.L. Theraja, S. Chand Publication, 2022
Text Book T4	Basic Electric Circuit Analysis, David E Johnson et al, John Wiley, 5th Edition 2002.
Reference Book R1	Engineering circuit analysis, W.H.Hayt , J.E. Kemmerly, McGraw Hill company, 6th Edition, 2000.
Reference Book R2	Electronic Devices & Circuits, Millman & Halkias McGraw Hill, 2002.
Reference Book R3	Electrical Engineering: Principles and Applications, Alan R. Hambley, Publisher, 2nd Edition 2003.
Reference Book R4	Introductory circuits for Electrical and Computer Engineering, James W Nilsson and Susan A Riedel, PHI, 2002.

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be Covered	(Ch./Sec./Text Book)
1-4	To understand the concept of basic circuit Elements	Introduction to Basic Circuit theory & Circuit elements; active and passive circuits, Types of circuits.	T1(1.1,1.2), R1(1.1 - 1.6)
4-6	To understand the concept of basic electrical laws	Kirchhoff's Current & Voltage Laws	T1(1.3, 1.4), R1(2.2-2.6)
7	To understand the concept of basic sources	Ideal and Practical voltage sources; Independent & Dependent Sources	T1(1.8)
7-10	To understand the methods of circuit Analysis	Circuit analysis and synthesis; Mesh/loop & Junction/ Nodal Analysis	T1(2.1,2.3, R1(3.1 – 3.7)
11-13	To understand the network theorems	Thevenin's and Norton's theorem	T1(2.4), R1(4.5 -4.8)
14-16	To understand the concept of basic theorems	Linearity and Superposition theorems, Maximum power transfer theorems and their applications	T1(2.5,2.6), R1(4.1 – 4.4)
17	To study the circuits having energy storage elements	Energy storage elements (Inductors & Capacitors) their relationships.	T1(1.6, 1.7), R1(6.1 -6.5)
18-19	To study basics of semiconductors,	Semiconductors: intrinsic and extrinsic, Pure and doped semiconductor; minority and majority charge carrier, P-N junction.	T1(6.2)

Lecture No.	Learning Objective	Topics to be Covered	(Ch./Sec./Text Book)
20-21	To study operation and characteristics of ordinary junction diodes and Zener Diodes	Junction Diode & its forward and reverse characteristics, Diode equation and resistances.	T1(6.3,6.4,6.5) T1(6.6)
22-24	To understand the concept of rectifiers and filters	Application of diode; Rectifier circuits & filters	T1(6.3,6.4,6.5) T1(6.6)
25	To study operation and characteristics Zener Diodes	Zener Diode & its characteristics, Regulator circuits	T1(6.3,6.4,6.5) T1(6.6)
26-27	To study operation of transistors	Introducing transistors To study operation of transistors	T1(7.1)
28-29	To study the different types of configurations of transistors	PNP and NPN transistors and their characteristics & operation	T1(7.2,7.3) T1(9.1)
30-31	To study operation of FETs	FETS, their operation & characteristics	T1(8.1)
32-34	To understand the concept of MOSFETs & CMOS	MOSFETS & its characteristics CMOS its Characteristics (No application of CMOS)	T2 Chapter 19 (506-553)
35-36	To understand biasing operation	Biasing the BJT	T1(9.1)

Lecture No.	Learning Objective	Topics to be Covered	(Ch./Sec./Text Book)
37-39	To study the AC model concepts	AC Model of BJT (Low frequency model)BJT Amplifier, Common emitter configuration	T2 chapter 8
40-42	To Understand the feedback amplifiers	Concept on Feedback; positive and negative feedback, Barkhausen criteria for sustained oscillation, principles of Oscillator and Amplifier; types with their application	T2 Chapter 13 (335-363)

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	50 Minutes	20	24-09-2024	1-10	CB
Test 2	50 Minutes	20	12-11-2024	11-20	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-12-2024	1- 42	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: 06/08/2024

Dr.ANIL KUMAR VERMA
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS215	**Data Structure and Algorithm**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mr.ASHISH KUMBHARE

Learning Outcomes:
This course introduces the core principles and techniques for Data structures. Students will gain experience in how to keep a data in an ordered fashion in the computer. Students can improve their programming skills using Data Structures Concepts. After successful completion of the course student will be able to

1. Explore basic data structures such as stacks and queues.
2. Introduce a variety of data structures such as Linked list, Trees, search trees, Graphs
3. Introduce sorting and searching algorithms.

Text Book T1	Fundamentals of Data Structures by Ellis Horowitz & Sartaj Sahni, Computer Science press.
Reference Book R1	Data Structures using C by A. K. Sharma, Pearson Education
Reference Book R2	Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
Reference Book R3	Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson
NPTEL Link	https://nptel.ac.in/courses/106/102/106102064/
SWAYAM Link	https://onlinecourses.swayam2.ac.in/cec19_cs04/preview

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./Page Nos. of Text Book)
1-3	To learn Introduction of Data structure and its types	Introduction of Data structure, Data types: primitive, non-primitive data types, Linear and non linear data structure.	T1 CH-1 1.1, 1.3, 1.4
4-6	To learn application of array and various searching techniques	Array concept (one dimension, two dimension), Linear and Binary Search Algorithms,	T1 CH-2 2.4
6-7	To learn various sorting techniques	Sorting Algorithms: Bubble Sort, Insertion Sort, Selection Sort	T1 CH-7 7.1, 7.2

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./Page Nos. of Text Book)
8-10	To learn various sorting techniques using Divide and Conquer strategy.	Quick Sort, Merge Sort & Radix sort	T1 CH-7 7.3, 7.4, 7.5
11	To learn introduction to linear data structure stack.	Stack concept	T1 CH-3 3.1
12-13	To learn various stack operations.	Operations PUSH, POP, TRAVERSE, Is full, Is empty.	T1 CH-3 3.1, 3.2
14-17	To learn Applications of stack	Infix, Prefix, Postfix representation, Conversion using stack	T1 CH-3 3.3
18-19	To learn introduction to linear data structure Queue and its types.	Introduction, and Types of Queues, Priority Queue, Circular queue, Double Ended Queue,	T1 CH-3 3.1
20	To learn various Queue operations.	Operations (INSERT, DELETE, TRAVERSE)	T1 CH-3 3.1, 3.2
21-22	To learn introduction to linear data structure Linked list and its types.	Linked List, Singly and Doubly Linear link lists, Singly and doubly circular linked list	T1 CH-4 4.1
23-24	To learn various linked List operations	Operations on linked lists insert, delete, Applications of linked lists.	T1 CH-4 4.8,4.9
25-26	To learn introduction to Nonlinear data structure Tree and its types.	Definition of trees and their types, Binary trees, Properties of Binary trees,.	T1 CH-5 5.1, 5.2
27-30	To learn various operations and traversal technique.	Insertion, deletion, Searching and traversal algorithm, Preorder, post order, in-order traversal) , BFS, DFS	T1 CH-5 5.3, 5.4, 5.5
31-32	To learn various applications of tree	Binary Search Trees, Implementations, AVL Trees, B tree,	T1 CH-5 5.6, 5.7
33	To learn introduction to Nonlinear data structure Graph and its types.	Definition of Graph and their types	T1 CH-6 6.1
34-35	To learn various applications of Graph	Adjacency and incident (matrix & linked list) representation of graphs, Weighted Graphs,	T1 CH-6 6.2
36-38	To learn various operations and traversal technique.	Shortest path Algorithm, Spanning tree, Minimum Spanning tree,	T1 CH-6 6.3, 6.4

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./Page Nos. of Text Book)
39-42	To learn various operations and traversal technique.	Kruskal and prims algorithms.	T1 CH-6 6.3, 6.4

Data Structure and Algorithm Lab:

S.No	List of Practical
1	Write a program that implements Search Techniques. 1. Linear Search
2	Write a program that implements Search Techniques. 1. Binary Search.
3	Write a program that implements Sorting Techniques. 1. Bubble Sort.
4	Write a program that implements Sorting Techniques. 1. Selection sort.
5	Write a program that implements Sorting Techniques. 1. Insertion Sort
6	Write a program that implements Sorting Techniques. 1. Quick sort.
7	Write a program that implements operations on STACK
8	Write a program that implements operations on QUEUE
9	Write a program that implements operations on Linked List

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	50 Minutes	20	25-09-2024	1-14	CB
Test 2	50 Minutes	20	13-11-2024	15-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	11-12-2024	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: 02/08/2024

Mr.ASHISH KUMBHARE
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS212	**Digitial Logic Design**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mrs.BHAVANA CHAUDHARY

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

1. To apply the principles of Boolean algebra to manipulate and minimize logic expressions.
2. To use K- maps to minimize and optimize two-level logic functions upto 5 variables.
3. Two-level logic functions with AND,OR,NAND,NOR and XOR gates with minimum number of gate delays or literals.
4. To design combinational circuits using Encoders, Decoders, Multiplexers and Demultiplexers.
5. To analyse the operation of sequential circuits built with various flip-flops.
6. The operation of latches, flip-flops, counters and registers
7. To understand the various memory devices

Text Book T1	Digital Design, M.Morris Mano, Pearson, 5thEdition, 2013
Reference Book R1	Fundamentals of Logic Design, Charles H.Roth,Jr., Cengage Learning,7th Edition,2014
Reference Book R2	Modern Digital Electronics,R. P. Jain, TMH, 4th Edition, 2010
Swayam Link	https://onlinecourses.swayam2.ac.in/cec21_cs16/preview

Lecture-Wise-Plan:

Lecture Nos	Learning Objective	Topics to be covered	Reference
1	Introduction to digital systems	Digital systems, Analog systems Vs Digital systems	T1:1.1
2-5	Concepts of Number systems ,their conversions and usages	Binary, Octal, Hexadecimal numbers,1‘sand2‘sComplements	T1:1.2-1.5
6-8	Binary Systems	Signed Binary Numbers ,Binary codes	T1:1.6-1.7
9-10	To understand the basics of Boolean Algebra	Binary Logic, Theorems & Properties of Boolean Algebra	T1:1.9; 2.3-2.4

Lecture Nos	Learning Objective	Topics to be covered	Reference
11-13	To learn the concepts of SOP,POS Forms	Boolean functions, Canonical forms Digital Logic Gates and ICs	T1:2.1,2.5-2.9
13-15	To learn the simplification of Boolean functions	K-Maps(3&4Variables),Don't care conditions, AND & NOR	T1:3.1-3.3, 3.5-3.8
16-20	To learn the concepts of combinational circuits& their design	Combinational circuits, Analysis and design procedure, Adders, Sub tractors	T1:4.1-4.6
21-25	To learn the concepts of combinational circuits& their design	Multipliers, Comparators ,Decoders and Encoders, MUXs an d DEMUXs	T1:4.7-4.11
26-29	To learn the concepts of sequential circuits	Sequential Circuits, Latches and Flip-Flops	T1:5.1-5.4
30-32	To understand the concepts of synchronous sequential circuits, their analysis.	Analysis of clocked sequential circuits, State Reduction & Assignment	T1:5.5-5.8
33-37	To Understand the design of sequential circuits	Shift Registers, Synchronous Counters Asynchronouscounters,Ripple Counters	T1:6.1-6.5
38-39	To understand the Memory & Programmable logic	Introduction to Memories, RAM and ROM	T1:7.1-7.2,7.5
40-42	Implementation of Boolean functions using these Programmable devices	RAM & ROM, PLA & PAL	T1:7.6-7.7

Digital Logic Design Virtual Lab:

S.No	Name of the Experiment
1	Verification of Gates
2	Implementation Of Boolean Functions Using Logic Gates
3	Implementation of Half Adder and Full Adder using NAND and Basic Gates
4	Half Subtractor
5	Full Subtractor

S.No	Name of the Experiment
6	Comparators
7	Implementation of Multiplexers and De multiplexers
8	Implementation of Decoders
9	SR&D-TYPE Flip-Flops
10	JK& T-TYPE Flip-Flops

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	50 Minutes	20	25-09-2024	1-20	CB
Test 2	50 Minutes	20	13-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	13-12-2024	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: 04/08/2024

Mrs.BHAVANA CHOUDHARY
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
MA301	**Numberical Analysis**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mrs.ARADHANA TIWARI

Scope and Objective of the course:

1. In reality "Solving a Math problem" generally involves finding an answer rather than exact answer.
2. NUMERICAL ANALYSIS is the study of algorithms that use numerical approximation for the problems of mathematical analysis.
3. A numerical method is a complete and definite set of procedures for the solution of a problem, together with computable error estimates. The study and implementation of such methods is the field of numerical analysis/numerical methods.
4. A trick that lets you get closer and closer to an exact answer is a NUMERICAL METHOD.

Text Book T1	Numerical Methods (M. K. Jain , S. R. K. Iyengar , R. K. Jain)
Reference Book R1	Mathematics Numerical Analysis (G Shanker Rao)
Reference Book R2	Numerical Analysis (Schaum's outlines -2nd Edition)

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Chapter/sec./Page Nos of Text/Ref. Books)
1-5	Transcendental and Polynomial equations	Introduction ,Bisection method, Iteration methods based on first degree equation, Method of False Position, Newton-Raphson Method, Secant Method	Ch-1/1-13/T
6-11	Linear algebraic equations and Eigen value problems	Introduction, Direct methods, Iteration methods, Eigen values and Eigen vectors, Bounds on Eigen values, Jacobi method for symmetric matrices.	Ch-2/71-86/T

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Chapter/sec./Page Nos of Text/Ref. Books)
12-16	Interpolation and Approximation	Introduction, Lagrange and Newton Interpolations, Finite difference operators, Interpolating polynomials using finite difference ,Gregory-Newton interpolations	Ch-3/144-158/T
17-21	Differentiation and integration	Introduction , Numerical differentiation, Newton Forward and Backward Interpolation differentiation first and second order differentiation ,	Ch-4/212-231/T
22-27	Differentiation and integration	Method based on Interpolation(For unequal intervals), Numerical Integration , NewtonCote Quadrature formula, Simpson's $1/3^{rd}$ and $3/8^{th}$ rule, Weddle's rule	Ch-4/212-231/T
28-33	Numerical solution of ordinary differential equations	Introduction, Euler's method, Picard's Method	
34-40	Numerical solution of ordinary differential equations	Taylor's Series Method, Runge-Kutta's Fourth order method	Ch-272-296/T

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	50 Minutes	20	23-09-2024	1-15	CB
Test 2	50 Minutes	20	11-11-2024	16-35	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	02-12-2024	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: 04/08/2024

Ms.ARADHANA TIWARI
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS323	**Computer Network**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.NAVEEN KUMAR VAISHNAV

Learning Outcomes:
Data communication and networking are changing the way we live and do the things today. They rely on computer networks and internetworks. This course focuses on networking fundamentals, standards and various underlying protocols to make the network connected for text, audio, video and a conglomerate of them. The security aspect of network is also emphasized. As a result, the technology advances make it possible to communicate faster and offer more services thru IEEE standards and TCI/IP and other protocols.

Text Book T1	Data Communication and Computer Networking, B. A. Forouzan, 5E, MGH, 2013
Reference Book R1	Computer Networks, A. S. Tanenbaum, Pearson Education / Prentice Hall of India, 4th Edition, 2004.
Reference Book R2	Data Communications, Computer Networks and Open Systems, Halsall Fred, Addition-Wesley, 4th Edition, 2004.
Reference Book R3	An Engineering Approach to Computer Networks, S. Kesha, Pearson Education, (2004)

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
1-2	To understand network concept	Introduction to Computer Network & Components of network	T1: 1.1,T1: 3.1,3.2,3.3: T:2.3
3-5	To understand the network topologies	Network Topologies, Internet WAN, LAN, MAN, PAN, OSI Model, TCP IP Protocol suite	T1:1.2.1.3 T1: 7.1,7.2,7.3
6-9	To understand the concept of physical layer and media	Physical Layer: Transmission media copper, Twisted pair wireless	T1:1.2.1.3,1.4 T1: 7.1,7.2,7.3
10-13	To know the concept network components	Repeater, Hubs, Bridges, Switches	T1:12.1,12.2,12.3
14-16	To know the concept of switching techniques	Switching Techniques, Circuit, Packet, Datagram, Message switching, Types of casting	T1:8.1,8.2, 8.3

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
17-18	To know the concept of data link layer	Data link layer & its functions	T1: 10.1,10.2,10.3
19-21	To understand the different flow control techniques	Protocols-Stop and Wait, Sliding Window, Go-Back-N, Selective Repeat	T1: 10.4,10.5
22-24	To know the concept of framing	Framing in data link layer, Error detection & Correction, Hamming code	T1:11.1.11.2
25-26	To understand the Network Layer	Network layer & its functions	T1:18.1
27-28	To understand the concept of network classes	Types of classes, Network ID, Host ID, Class A, Class B	T1:12.1,12.2,12.3
29-30	To understand different classes of network	Class C, Class D, Class E, Subnetting & Numerical problems	T1:12.1,12.2,12.3
31-32	To understand about IPv4, IPv6	IPv4 and IPv6, Link State Routing, Distance Vector Routing	T1:18.1,18.2,18.3, 18.4
33-35	To understand Transport layer & its protocols	Transport Layer Services, Multiplexing and Demultiplexing, TCP & UDP	T1:24.1,24.2, 24.3
36	To understand the Session Layer	Session layer, responsibilities and protocols	T1:24.1
37-38	To understand the Presentation Layer	Presentation Layer, responsibilities and protocols	T1: Page 44
39-40	To understand the Application Layer & its protocols	Application Layer, responsibilities and protocols	T1:25.1, 25.2
41-42	To understand Network Security	Cryptography, Public and Private Key, Algorithms	T1: 31.1,31.2

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	50 Minutes	20	23-09-2024	1-21	CB
Test 2	50 Minutes	20	11-11-2024	22-35	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	04-12-2024	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: 07/08/2024

Mr.NVAEEN KUMAR VAISHNAV
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS312	**Computer Organization and Architecture**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.BHARATI PATEL

Learning Outcomes:
Upon successful completion of the course, student will be:

1. Able to describe the basic hardware components of a computer system.
2. Familiar with the functional units of the processor such as the register file and
3. Familiar with the representation of data, addressing modes and instruction sets.
4. Familiar with the RISC/CISC architectures and memory organization

Text Book T1	Computer Organization & Architecture, Morris Mano,3rd Ed.,Pearson Education/Prentice Hall-New Delhi, 2004.
Text Book T2	Computer Organization, V.C.Hamacher, Z.G. Vranesic and S.G. Zaky, Mc Graw Hill, 5th Edition,2002.
Reference Book R1	Structured Computer Organization, A.S.Tanenbaum:,4th Ed., Pearson Education,/Prentice Hall New Delhi.,2004
Reference Book R2	Advanced Computer Architecture: Parallelism Scalability, Programmability, Kai Hwang, TMH, New Delhi,2002
NPTEL	https://archive.nptel.ac.in/courses/106/105/106105163/

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
1-5	To understand the basic structure of a computer	Functional units, Basic operational concepts, Bus structures, Memory, register, data, instruction, program counter, Accumulator, bus architecture	T1: Ch8 , 241
6-7	addressing modes	Different types of Addressing modes	T1: Ch 8,260
8-12	To understand how a complete instruction executes	Instruction field, Instruction formats, Micro operations, Execution of a Complete Instruction	T1:Ch8,255,222

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
13-20	To understand the control unit organization	Hardwired control, Micro programmed Control Organization, control memory, Address sequencing, design of CU	T1:Ch7,213,214, 231
21-24		Multiplication algorithm: Booth algorithm	T1:Ch 10,340-346
25-28		Division Algorithm: Restoring and non-restoring	T1:348-353
29-30		Floating point arithmetic.	T1: 354-362
31	To understand Input Output Organization	Programmed I/O.,I/O addressing & instruction	T1:Ch 11,381
32-34		Synchronization, RISC,CISC, pipelining	T1:Ch8, 241
35-36	To understand Memory Organization	Basic concepts and Memory hierarchy	T1:Ch 12,445
37		Semiconductor memories RAM, ROM	T1: Ch 12,448
38-39		Memories and interleaving, Virtual memory	T1: Ch 9, 324 Ch 12,469
40		Cache memory and mapping	T1: Ch 12,462,456

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	50 Minutes	20	24-09-2024	1-15	CB
Test 2	50 Minutes	20	12-11-2024	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	06-12-2024	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: 04/08/2024

Dr.BHARATI PATEL
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS313	**Data Structures and Algorithm**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mr.ASHISH KUMBHARE

Learning Outcomes:
This course introduces the core principles and techniques for Data structures. Students will gain experience in how to keep a data in an ordered fashion in the computer. Students can improve their programming skills using Data Structures Concepts. After successful completion of the course student will be able to
1. Explore basic data structures such as stacks and queues.
2. Introduce a variety of data structures such as Linked list, Trees, search trees, Graphs
3. Introduce sorting and searching algorithms.

Text Book T1	Fundamentals of Data Structures by Ellis Horowitz & Sartaj Sahni, Computer Science press.
Reference Book R1	Data Structures using C by A. K. Sharma, Pearson Education
Reference Book R2	Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
Reference Book R3	Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson
NPTEL Link	https://nptel.ac.in/courses/106/102/106102064/
SWAYAM Link	https://onlinecourses.swayam2.ac.in/cec19_cs04/preview

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
1-3	To learn Introduction of Data structure and its types	Introduction of Data structure, Data types: primitive, non-primitive data types, Linear and non linear data structure.	T1 CH-1 1.1, 1.3, 1.4
4-6	To learn application of array and various searching techniques	Array concept (one dimension, two dimension), Linear and Binary Search Algorithms,	T1 CH-2 2.4

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
6-7	To learn various sorting techniques	Sorting Algorithms: Bubble Sort, Insertion Sort, Selection Sort	T1 CH-7 7.1, 7.2
8-10	To learn various sorting techniques using Divide and Conquer strategy.	Quick Sort, Merge Sort & Radix sort	T1 CH-7 7.3, 7.4, 7.5
11	To learn introduction to linear data structure stack.	Stack concept	T1 CH-3 3.1
12-13	To learn various stack operations.	Operations PUSH, POP, TRAVERSE, Isfull, Isempty.	T1 CH-3 3.1, 3.2
14-17	To learn Applications of stack	Infix, Prefix, Postfix representation, Conversion using stack	T1 CH-3 3.3
18-19	To learn introduction to linear data structure Queue and its types.	Introduction, and Types of Queues, Priority Queue, Circular queue, Double Ended Queue,	T1 CH-3 3.1
20	To learn various Queue operations.	Operations (INSERT, DELETE, TRAVERSE)	T1 CH-3 3.1, 3.2
21-22	To learn introduction to linear data structure Linked list and its types.	Linked List, Singly and Doubly Linear link lists, Singly and doubly circular linked list	T1 CH-4 4.1
23-24	To learn various linked List operations	Operations on linked lists insert, delete, Applications of linked lists.	T1 CH-4 4.8,4.9
25-26	To learn introduction to Nonlinear data structure Tree and its types.	Definition of trees and their types, Binary trees, Properties of Binary trees,.	T1 CH-5 5.1, 5.2
27-30	To learn various operations and traversal technique.	Insertion, deletion, Searching and traversal algorithm, Preorder, post order, in-order traversal) , BFS, DFS	T1 CH-5 5.3, 5.4, 5.5

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
31-32	To learn various applications of tree	Binary Search Trees, Implementations, AVL Trees, B tree,	T1 CH-5 5.6, 5.7
33	To learn introduction to Nonlinear data structure Graph and its types.	Definition of Graph and their types	T1 CH-6 6.1
34-35	To learn various applications of Graph	Adjacency and incident (matrix & linked list) representation of graphs, Weighted Graphs,	T1 CH-6 6.2
36-38	To learn various operations and traversal technique.	Shortest path Algorithm, Spanning tree, Minimum Spanning tree,	T1 CH-6 6.3, 6.4
39-42	To learn various operations and traversal technique.	Kruskal and prims algorithms.	T1 CH-6 6.3, 6.4

Data Structure and Algorithm Lab:

SN	List of Practical
1	Write a program that implements Search Techniques. 1. Linear Search
2	Write a program that implements Search Techniques. 1. Binary Search.
3	Write a program that implements Sorting Techniques. 1. Bubble Sort.
4	Write a program that implements Sorting Techniques. 1. Selection sort.
5	Write a program that implements Sorting Techniques. 1. Insertion Sort
6	Write a program that implements Sorting Techniques. 1. Quick sort.
7	Write a program that implements operations on STACK
8	Write a program that implements operations on QUEUE
9	Write a program that implements operations on Linked List

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	50 Minutes	20	24-09-2024	1-14	CB
Test 2	50 Minutes	20	12-11-2024	15-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-12-2024	1- 42	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: 02/08/2024

Mr.ASHISH KUMBHARE
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS317	**Artificial Intelligence**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.BHARATI PATEL

Learning Outcomes:

1. Introduce the basic principles of AI towards problem solving, inference, perception, Knowledge representation and learning.
2. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural Networks
3. Experiment with a machine learning model for simulation and analysis.
4. Explore the current scope, potential, limitations, and implications of intelligent systems.
5. To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.

Text Book T1	Artificial Intelligence by Elaine Rich and Kevin Knight, Tata Mc Graw Hill
Reference Book R1	Principles of Atrificial Intelligence by Nils J.Nilsson, Narosa Publishing House

Lecture-Wise-Plan:

Lecture No	Learning Objectives	Topic to be Covered	Reference (Ch/Sec./Page Nos.of Text Book)
1-4	Overview and Search Techniques	Introduction to AI, Problem Solving, Sate Space Search	15-32
5-7		Blin Search: Depth First search, Breadth first search	48-60
8-10		Informed Search: Heuristic function, Hill climbing search	71-77
11-13		Best first search A* and AO* Search	81-87
14-16		Constraint satisfaction, Game tree	88-95

Lecture No	Learning Objectives	Topic to be Covered	Reference (Ch/Sec./Page Nos.of Text Book)
17-20		Game Playing: min-max algorithm, alpha beta Pruning	135-148
21-24	How to do knowledge Representation	Introduction to KR, knowledge agent, predicate logic, preposional logic	155-159
25-26		Resolution Method, Forward Chaining, Backward Chaining	160-190
27-28	How to Handling Uncertainty and Learning	Source of Uncertainty, Probabilistic	373-375
29-30		Bayes theorem, Limitation of native Bayesian system, Bayesian Belief Network (BBN)	380-386
31-34		Fuzzy Logic, Fuzzy function, Fuzzy measure, Non monotonic reasoning	410-419
35-36	How to handling uncertainty and Learning	Learning Concept of Learning, Learning model, learning decision tree, Paradigms of machine learning	435-447
37-40		Supervised and Unsupervised Larning, Example of learning, Learning by induction, Learning using Neural Networks	448-460

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	50 Minutes	20	25-09-2024	1-15	CB
Test 2	50 Minutes	20	13-11-2024	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	13-12-2024	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: 06/08/2024

Dr.BHARATI PATEL
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS316	**Java Programming**	**3**	**2**	**0**	**4**

Instructor-in-charge: Dr.PALAK KESHWANI

Objective of the Course:
The objective of the Java Programming course is to provide a comprehensive understanding of Java, covering core concepts, object-oriented programming principles, standard libraries, GUI development, data persistence techniques, and networked applications.

Text Book T1	The Complete Reference Java J2SE, Herbert Schildt, 5th Edition, TMH, 2005
Text Book T2	Introduction to Java Programming: Liang, Pearson Education, 7 th Edition
Reference Book R1	Programming with Java: A Primer, E Balagurusamy, 2nd Edition, TMH, 2006.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
1	Introduction to OOPs	Introduction to Java and Java programming Environment, Object Oriented Programming. Classes, objects, methods, variables, constants, expressions,	Chapter1 of T1
2 - 3	Getting Started with Java	First Java program, program components, Edit-Compile-Run cycle,	Chapter2 of T1
4 - 5	Handling parameters	Math class, defining and using a class, arguments and parameters	Chapter3 of T1
6 - 10	Looping concepts	Java's Selection statements (if, switch, iteration, statement, while, do-while, for, Nested loop)	Chapter4 of T1

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
11 – 14	Constructors	Constructors, overloaded methods and constructors, static, abstract, final, this keyword,	Chapter6 of T1
15-17	Exception Handling	Catching exceptions, Propagating exceptions , different types of exception	Chapter 10 of T1
18-20	Multithreading	Java thread model, creating a thread, synchronization, Different methods of a Thread class,	Chapter 11 of T1
21-24	Packages	Package basics, Creating and Importing a package	Chapter 9 of T1
25- 28	Strings and Arrays	Strings, Arrays, Searching, Sorting	Chapter 13 of T1
29-34	Inheritance and Interface	Inheritance basics, Different types of Inheritance, Method Overriding, Interface	Chapter 8 of T1
35-38	Applet Programming	Applet programming	Chapter 12 of T1
39-40	Event Driven Programming,	Delegation-based event model, AWT classes, JDBC	Chapter 20 of 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	50 Minutes	20	25-09-2024	1-14	CB
Test 2	50 Minutes	20	13-11-2024	15-34	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	11-12-2024	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: 08/08/2024

Dr.PALAK KESHWANI
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC311	**Electronic Circuit Analysis**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mr.ROHIT KUMAR

Learning Outcomes:
After successful completion of the course student will be able to
1. Develop the ability to analyse and design digital systems
2. Understand combinational and sequential digital circuits design with timing constraints

Text Books T1	Digital Design Principles & Practices, John F Wakerly, Pearson education, Fourth edition, 2006
Text Books T1	Digital Design Principles & Practices, John F Wakerly, Pearson education, Fourth edition, 2006
Reference Books R1	Modern Digital Electronics, RP Jain, TMH, Fourth edition, 2010.
Reference Books R2	FPGA Based System Design, Wayne Wolf, First Edition 2009,Pearson
Reference Books R3	Computer Logic Design, M.Morris Mano, Prentice-hall 1972

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
1-2	Learning basic definitions.	Introduction to S/W & H.W aspects of digital design.	T1: 1.1,1.2, 1.3, 1.4, 1.5
3-4	To introduce advanced integrated circuits.	Introduction to PLD, ASIC and digital design levels.	T1: 1.7, 1.8, 1.10
5	Introduction to parameters of logic families	Logic signals and gates, Logic Families,	T1: 3.1,3.2
6-7	Digital Logic Families	Logic families introduction, Characteristics of Digital ICs	R1: 4.1 to 4.2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
8-10	Learning Bipolar logic families	RTL,DCTL, I^2L, DTL,	R1: 4.3 to 4.8
11-12	Learning Bipolar logic families	TTL, ECL	R1: 4.9 & 4.11
13-16	Learning Unipolar logic families.	CMOS logic levels, MOS transistors. CMOS inverter, NAND, NOR and Non-inverting gates, AND-OR-INVERT & OR-AND-INVERT gates and Fan-in	T1: 3.3
17-19	To study steady state behavior of CMOS.	CMOS steady state electrical behavior.	T1:3.4, 3.5
20-22	To dynamic behaviour of CMOS.	CMOS dynamic electrical behaviour	T1: 3.6, 3.7
23-25	Combinational logic Circuits design.	Timing hazards. Timing diagrams, propagation delay. Timing specifications and analysis	T1: 4.4
26-28	To understand the basics of HDL	Hardware Description Language,	T1: 5.1,5.2
29-30	Combinational logic Circuits design.	Combinational logic circuits design using VHDL for Decoders, Encoders, Three state devices	T1: 6.4, 6.5, 6.6
31-33	Combinational logic Circuits design.	Multiplexers, EX-OR and parity circuits, comparators, adders, Subtractors, ALUs using VHDL	T1: 6.7- 6.11
34-36	Sequential logic circuits design.	Bi-stable elements, Latches and flip-flops	T1: 7.1,7.2
37-39	Sequential logic circuits design.	Clocked synchronous state machine analysis (state machine structure and output logic).	T1: 7.3
40- 42	Sequential logic circuits design.	Clocked synchronous state machine design.(characteristic equations and analysis of state machines with D Flip-flops)	T1: 7.4

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	50 Minutes	20	23-09-2024	1-12	CB
Test 2	50 Minutes	20	11-11-2024	13-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	04-12-2024	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: 04/08/2024

Mr.ROHIT KUMAR
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC312	**Analog Communication**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mr.ROHIT KUMAR

Learning Outcomes:
After successful completion of the course student will be able to:
The objective of the course is to Understand basic elements of a communication system. Analyze baseband signals in time domain and in frequency domain. Understand various analog modulation and demodulation techniques and analyze the performance of modulation and demodulation techniques in various transmission environments.

Text Books T1	Modern Digital and Analog Communication Systems by B P Lathi, Ding International 4th edition, Oxford University Press
Text Books T1	Electronics & Communication System – George Kennedy and Bernad Davis, 4th Edition TMH 2009.
Reference Books R1	Principles of Communication Systems by Herbert Taub , Donald L Schilling & Goutam Saha,3rd Edition , Tata McGraw-Hill .
Reference Books R2	Communication Systems by Simon Haykin 4th edition, Wiley India.
Reference Books R3	Communication Systems: Analog and Digital by R.P. Singh, S.D. Sapre, Mc Graw Hill 3rd Ed., 2012.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
1	To understand the concept of communication.	Introduction to communication system, Need for modulation	T 1:1,1.2,1.3
2	To know the importance of FM	Frequency Division Multiplexing, Amplitude Modulation	T1: 3.1,T1:5.1
3	To understand the importance of TD & FD	Definition, Time domain and frequency domain description	T1: 3.2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
4-6	To understand the concept of Fourier Transform	Introduction to Fourier Transform and Inverse Fourier Transform.Properties of Fourier Transform	T1: 1-4.1,1-4.2
7-9	To know the concept of PSD	Spectrum Analysis using Fourier Transform Power spectral density (PSD).	T1: 1-4.3
10-12	To understand the AM concepts	AMPLITUDE MODULATION Single tone modulation, power relations in AM waves	T1: 3.1, 3.2
13-14	Know the concept of Generation of AM	Generation of AM waves, square law Modulator, Switching modulator	T1: 3.2
15-16	Know the concept of Detection of AM	Detection of AM Waves, Square law detector, Envelope detector,	T1:4.1- 4.5
17	Know the concept of suppressed carrier	Double side band suppressed carrier modulators	T1:4.1- 4.5
18	Know the concept of DSBSC	Generation of DSBSC Waves, Balanced Modulators	T1:4.1- 4.5
19-20	To understand the Types of DSBSC	Ring Modulator, Coherent detection of DSB-SC Modulated wave COSTAS Loop.	T1:4.1- 4.5
21-22	To understand the concept of Angle modulation	ANGLE MODULATION Basic concepts, Frequency Modulation:	T1: 5.1,5.2,5.3
23-25	To understand the spectrum analysis methods	Single tone frequency modulation Spectrum Analysis of Sinusoidal FM Wave Narrow band FM, Wide band FM	T1: 5.1,5.2,5.3

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
26-28	To know the concept of FM detection methods	Constant Average Power, Transmission bandwidth of FM Wave Detection of FM Waves: Balanced Frequency discriminator	T1: 5.1,5.2,5.3
29-30	To understand the comparison of AM & FM	Zero crossing detector, Phase locked loop, Comparison of FM and AM.	T1: 5.1,5.2,5.3
31-33	To understand the concept of Noise in communication	NOISE Resistive Noise Source (Thermal),Arbitrary Noise Sources, Effective Noise Temperature,	T1: 2.1,2.2,2.3, 2.4,2.5 R1:7.2,R2:2.10
34-35	Impact of noise in cascaded circuits	Average Noise Figures, Average Noise Figure of cascaded networks	T1: 2.1,2.2,2.3, 2.4,2.5
36-37	Properties and representation of Noise	Narrow Band noise, Quadrature representation of narrow band noise & its properties	T1: 2.1,2.2,2.3, 2.4,2.5R1:8.2-8.4,9.2 R2:2.11-2.13
38-39	To understand the Noise in impact on AM DSB & SSB	Noise in Analog communication System Noise in DSB and SSB System Noise in AM System,	T1: 2.1,2.2,2.3, 2.4,2.5
40-42	To understand the Concept of pre & de emphasis	Threshold effect in Angle Modulation System, Pre-emphasis and de-emphasis.	T1: 2.1,2.2,2.3, 2.4,2.5

List of Experiment:

S. No.	Name of the Experiment
1	Study of 1KHz and 10KHz time domain and Frequency Domain Signal using MATLAB Simulink
2	Study of Amplitude modulated signal and its spectrum using MATLAB Simulink
3	Amplitude Modulation and Demodulation
4	Study of Voice Transmission
5	DSB-SC Modulation and Demodulation
6	Frequency Division Multiplexing(FDM)

S. No.	Name of the Experiment
7	Frequency Modulation and Demodulation
8	Pre-Emphasis and De-Emphasis
9	Pulse Amplitude Modulation &Demodulation
10	Pulse Width Modulation and Demodulation
11	Pulse Position Modulation and Demodulation

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	50 Minutes	20	24-09-2024	1-14	CB
Test 2	50 Minutes	20	12-11-2024	15-32	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	06-12-2024	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: 02/08/2024

Mr.ROHIT KUMAR
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC313	**EM Fields and Waves**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mrs.BHAVNA CHAUDHARY

Scope & Objective of the course:
The objective of this course is to provide the students with the basic understanding of electromagnetic fields and waves. The material covered is fundamental to the training of Electrical engineers.

Text Book T1	Electromagnetic with Applications, John D.Kraus, 5thEdition, TMHl, 1999.
Text Book T2	Antennas For All Applications, John D Kraus, 3rdEdition, TMH, 2006.
Reference Book R1	Elements of Electromagnetic, Matthew N.O. Sadiku, 3rdEdition, Oxford University Press, 2005.
Reference Book R2	Fundamentals of Applied Electromagnetic ,Fawwaz TUlaby, 2ndEdition PHI, 2001.
Reference Book R3	Engineering Electromagnetic, WH Hayt, JABuck, 7thEdition, TMH, 2006.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./Page Nos.of Text Book)
1-4	Introduce the fundamental concepts culminating in Maxwell's equations	Maxwell's equations, Constitutive relations and Boundary conditions	T1:2.6-2.8, 2.12(pg81-87), 2.13,2.15,2.16.
5-7	Understand the propagation of waves Through space and various media	Plane Wave propagation in dielectric and conducting media	T1:4.1-4.6,4.7 (pg189- 193)
8	To understand how the velocity of wave changes With time	Relative Phase velocity and Index of Refraction and Group Velocity	T1:4.8,4.9

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./Page Nos.of Text Book)
9-10	How energy is stored and transmitted in EM wave	EnergyRelationsand Pointing Vector	T1:4.10
11-13	Understand various types of polarization in EM waves and their characteristics	Wave Polarization	T1:4.11-4.13
14-16	Behavior of plane waves at the interface between two media	Oblique Incidence: Reflection and Refraction	T1:4.14
17-18	To understand how the two approaches of field and circuit theory are related to each other	Relation between offie ld and circuit theory	T1:3.1-3.2.
19-21	Analysis of various cases of transmission lines from both circuit theory and field theory point of view	Transmission Lines	T1:3.3,3.4
22-24	How to solve transmission line problems using Smith Chart	Impedance matching Smith Chart	T1:3.4,3.5 Moredetailsin Ref.Book1.
25-27	Discussion of transmission systems with emphasis on waves of higher order ie having components of E or H in the direction of propagation, their field configuration, cut-off Wave lengths and attenuation	Waveguides with rectangular rand cylindrical cross-section	T1:8.2-8.5
28-29	Antenna Basics	Time varying potentials (Retarded vector and scalar potential) and antenna parameters	R1:9.6 T2:2.2-2.10
30-32	Knowledge of basic types of antennas.	Short Dipole,?/2dipoleand it's Radiation Resistance	T2:5.2-5.6
33-36	Arrays and various radiation pattern	Arrays: Pointsource,Two isotropic sources, Pattern multiplication point sources (Broad Side and End Fire array), Binomial array	T2:4.2-4.15

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./Page Nos.of Text Book)
37-40	Types of Antennas	Reflector Antenna, different type Of parabolic antenna, Horn Antennas	T2:8.1,8.5-8.7, 6.19-6.20

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	50 Minutes	20	24-09-2024	1-20	CB
Test 2	50 Minutes	20	12-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-12-2024	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: 05/08/2024

Mrs.BHAVNA CHAUDHARY
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC314	**Digital Signal Processing**	**3**	**2**	**0**	**4**

Instructor-in-charge: Mr.ROHIT KUMAR

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

1. Analyze and implement digital systems using the DFT and the Fast Fourier Transform (FFT).
2. Analyze digital signal processing systems using Laplace- Transform and Z-transform.
3. Design frequency-selective digital filters.
4. Design digital filters using windows.
5. Use MATLAB for DSP system analysis and design

Text Book T1	Digital Signal Processing: A Practical Approach", Emmanuel CI feachor & Barrie W. Jervis, Pearson Education, Second Ed., 2003
Reference Book R1	Algorithms for Statistical Signal Processing ",John G Proakis et.al,Pearson Education.,2002..
Reference Book R2	Mitra S K "Digital Signal Processing: A Computer Based Approach", TMH, 3rd. ed.2005.
Reference Book R3	Oppenheim & Schafer, ―Digital Signal Processing‖, Pearson Education,2002
Reference Book R4	B.Venkataramani & M Bhaskar,"Digital Signal Processors: Architecture, Programming and Applications", TMH, 2002.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
1	General Introduction to DSP & filter design and filter specifications	Framework for Digital filter design	T1:6.1-6.4 R2:7.1.1-7.1.3
2-3	Standard design procedure for analog low pass, high pass, Band pass, and Band stop filters from given specifications	Design of analog low pass filter: Butterworth & Chebyshev approximations	T1:8.9.1.1 - 8.9.1.2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
4-5	Standard design procedure for analog low pass, high pass, Band pass, and Band stop filters from given specifications	Frequency transformation in analog domain	T1: 8.9.2
6	Design of IIR filters with given specifications	Digital IIR filter design concepts. Pole-zero placement method	T1:8.1-8.5
7	Design of IIR filters with given specifications using the analog filter design	Impulse Invariant method & Matched Z-transform method	T1:8.6-8.7
8-10	Design of IIR filters with given specifications using the analog filter design	Bilinear Z-Transform method	T1:8.8-8.9
11-12	Filter structures for IIR filters	Realization structures for IIR filters	R1:7.2-7.4
13-14	Design of FIR filters using various design methodologies	FIR Filter Design Concepts. Concepts of linear phase	T1:8.13R2:6.4
15-16	Design of FIR filters using various design methodologies	FIR Filter Design using Window method	T1: 7.1-7.4R2:4.4.1-4.4.54
17	Design of FIR filters using various design methodologies	FIR Filter Design using optimal method	T1:7.5
18	Design of FIR filters using various design methodologies	FIR Filter Design using frequency sampling method	R2:7.7
19	Filter structures for FIR filters.	Realization structures for FIR filters	T1:7.6
20-22	Introduction to multi rate signal processing.	Multi-rate DSP: Decimation & Interpolation, Multistage approach	R2:7.7
23	Filter design for multirate filters	Design of practical sampling rate converters	T1:7.7

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
24	Efficient filter structures for implementing multirate filters.	Sampling rate conversion using polyphase filter structures	T1:7.10.1,7.10.2
25-26	Introduction to the adaptive filter theory.	Adaptive filters: Concepts/Basic Wiener Theory	R2:6.3
27-28	To design and study the performance of LMS filters	Basic LMS adaptive algorithm	T1:9.1-9.2
29-30	Some practical applications of DSP filters	Applications of DSP	R2:10.1-10.2.3
31-32	To know the difference between the Von Neumann architecture and Harvard architecture.	Introduction to programmable DSP's and DSP architectures	T1:9.3
33	Comparison of various DSP processors	General purpose DSPs and selection criteria for DSPs	R2:10.3
34-35	To study in detail the architecture and programming of the TMS 320C5X DSP processor.	DSP TMS 320C5X:Architecture	T1:9.6
36-37	To study in detail the architecture and programming of the TMS 320C5X DSP processor	Addressing Modes	R2:10.4
38	To study in detail the architecture and programming of the TMS 320C5X DSP processor	Instruction Set	R4:4.3-4.9
39-40	To study in detail the architecture and programming of the TMS 320C5X DSP processor	Application Programs in C5X	R4:6.1-6.3
41-42	RISC and CISC processor	Architecture of processor	

List of Experiments:

S. No.	Name of the Experiment
1	Waveform Generation
2	Basic Operations On D.T Signals
3	Properties of Discrete Time System
4	Sampling Rate Conversion
5	Discrete Convolution
6	Discrete Fourier Transform
7	Fast Fourier Transform Algorithms
8	Design of FIR Filters
9	Design of Butterworth Filters
10	Design of Chebyshev Filters
11	Design of IIR Filters using MATLAB Code

Evaluation Scheme:

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	50 Minutes	20	25-09-2024	1-20	CB
Test 2	50 Minutes	20	13-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	11-12-2024	1- 40	CB

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Date: 06/08/2024

Mr.ROHIT KUMAR
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC315	**Control Systems**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mrs.BHAVNA CHAUDHARY

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

1. Know about various parts of processing industries, power plants and manufacturing industries.
2. The techniques used in control system analysis are used even in non-engineering applications.
3. The various concepts and principles involved in the analysis of control systems

Text Book T1	Control systems Engineering,NagrathI.J.andM.Gopal,NewAge International.,4thedition,2005
Reference Book R1	Control Systems,A.NagoorKani,RBAPublications,1998
Reference Book R2	Automatic Control Systems,B.C.Kuo,PrenticeHallofIndia, 7thEdition,2003
Reference Book R3	Control Systems: Principles and design,M.Gopal,Tata-McGrawHill, 2003.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference(Ch./Sec./ Page Nos. of Text Book)
1,2	Concept of automatic control	Introduction to the control System and servomechanisms; examples	1.1-1.4,1.6
3,4	Introduction to the modeling of physical systems	Differential equations of physical systems; mechanical systems and Electrical analogies	2.1,2.2
5,6	Modelling using transfer functions	Concept of Transfer Function, and derivation for D.C servo motor	2.4
7,8	Control system block-diagrams	Block diagrams and reduction methods	2.5

Lecture Nos.	Learning Objective	Topics to be covered	Reference(Ch./Sec./ Page Nos. of Text Book)
9,10	Representation using signal flow graph	Construction of Signal flow graphs; Mason's Gain formula and its applications	2.6
11,12	Concept of feedback	Feedback systems and effect of feedback on sensitivity and system dynamics	3.1-3.3
13	Do	Effect of feedback on control systems with disturbance signals Regenerative feedback	3.4-3.6
14.	Feedback control system example	Temperature feedback control system	3.7
15,16	Control system components	D.C and A.C servomotors, Potentiometers and synchros	4.3
17	Time domain analysis of Control system	Test signals and time domain Response of first order system	5.1to5.3
18,19	Do	Response of second order system; time domain specifications	5.4
20,21	Do	Steady state errors and error constants for various types of systems	5.5
22	Analysis of controlsystems for stability	Stability of control systems and Effect of root locations	6.1,6.2
23-25	Do	Routh Hurwitz stability criterion	6.3,6.4,6.6
26	Root locus method of analysis	Concept of root locus and Magnitude and angle criteria	7.1,7.2

Lecture Nos.	Learning Objective	Topics to be covered	Reference(Ch./Sec./ Page Nos. of Text Book)
27,28	Do	Rootlocusconstructionrules; examples	7.3
29,30	Frequency response methods	Introduction to Frequency Responseandcorrelationwith timeresponse,Polarplots	8.1-8.3
31,32	Do	Bodeplots	8.4,8.5
33	Do	Experimental determination of Transfer function using Bode plot	8.6
34	Nyquist analysis of control systems	Principle of argument and introduction to Nyquist stability criterion	9.1-9.3
35,36	Do	Nyquist stability analysis: examples	9.3
37,38	Design concepts	Introduction to control systems design	10.1,10.2
39,40	Introduction to state variables	Concept of state variable model	12.1,12.2
41,42	State variable model	Representation of continuous System using state variable method	12.3

Evaluation Scheme:

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	50 Minutes	20	25-09-2024	1-20	CB
Test 2	50 Minutes	20	13-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	13-12-2024	1- 40	CB

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Date: 04/08/2024

Mrs.BHAVNA CHAUDHARY
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE311	**Analysis of Structure II**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.HEMANT KUMAR DEWANGAN

Learning Outocmes:
After completion of the course the students will be able to:

1. Make student to understand three moment equation.
2. To understand the method of strain energy.
3. To understand the method of moment distribution.

Text Book T1	Basic structural analysis (vol. I &II) – S.S. Bhavikatti
Text Book T2	Theory of structures – B. C. Punmia
Reference Book R1	Theory of structures – S. Ramamurtham

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text
1	Method of three moment	Indeterminate beams	T1, T2,
2-3	Method of three moment	Principle of super position	T1, T2, R1
4-5	Method of three moment	Analysis by consistent deformation method	T1, T2, R1
6	Method of three moment	Theorem of three moment, sinking of supports	T1, T2,
7-8	Method of three moment	Shear force and bending moment diagram	T1, R1
9-11	Method of strain energy	Strain energy of linear elastic system due to axial loads	T1, T2
12-13	Method of strain energy	Bending moment and torsion , castigliano’s second theorem	T1, T2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text
14-16	Method of strain energy	Application to indeterminate beams and rigid frame, stresses due to lack of fit	T1, T2
17-18	Method of moment distribution	Moment distribution method	T1, T2
19-20	Method of moment distribution	Application to indeterminate beams and rigid frames.	T1
21-23	Method of moment distribution	Application to indeterminate beams and rigid frames without sway problems.	T1, T2
24	Method of moment distribution	Application to indeterminate beams and rigid frames with sway problems.	T1
25-27	Method of slope deflection and column analogy	Slope deflection method	T1, T2
28-29	Method of slope deflection and column analogy	Application to indeterminate beams and rigid frames without or with sway problem	T1, T2
30-32	Method of slope deflection and column analogy	Basics of column analogy method and application for fixed beams.	T1, T2
33-35	Influence lines by muller Breslau principle	Qualitative and quantitative influence lines of indeterminate beams by muller Breslau Principle	T1, T2
36-38	Influence lines by muller Breslau principle	Application to propped cantilevers	T1, T2
39-40	Influence lines by muller Breslau principle	Application to continuous beams.	T1, T2

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	50 Minutes	20	23-09-2024	1-20	CB
Test 2	50 Minutes	20	11-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	04-12-2024	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: 06/08/2024

Mr.HEMANT KUMAR DEWANG
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE312	**Design of Concrete Structures I**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.DILIP MISHRA

Scope & Objective of the course:

1. To educate the student about the concept of reinforced cement concrete and different method of design of reinforced concrete.
2. To educate the student about concept of working stress method to analysis and design of beam.
3. To educate the student about concept of limit state method to analysis and design of beam and columns

Text Book T1	Fundamentals of reinforced concrete design by M.L. Gambhir, Prentice Hall ofIndia Private Ltd.,New Delhi.
Text Book T2	Reinforced concrete structural elements-behaviour, analysis and design by Purushotam, Tata Mc.Graw Hill, New Delhi
Reference Book R1	Limit State design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jai, Laxmi publication Pvt.Ltd., New Delhi

Lecture-Wise-Plan:

Lecture No.	Topic	Description	Reference/ Text Book
1	Introduction to RC Design	Overview of reinforced concrete structures, indeterminate structures	T1
2	Loads and Stresses	Study of different loads, load combinations, and their impact on RC structures	T1
3	Introduction to Working Stress Method	Basics of the working stress method and its application in RC design	T1
4	Limit State Method (IS-456:2000)	Introduction to limit state design, comparison with working stress method	T1
5	Limit State of Collapse: Flexure	Analysis of structures under flexural stress	T1

Lecture No.	Topic	Description	Reference/ Text Book
6	Limit State of Collapse: Shear and Torsion	Shear, torsion, and bond failure mechanisms	T1
7	Analysis of Rectangular Beams	Design and analysis using the limit state method	T1
8	Analysis of T-Sections	Design and analysis of T-sections using limit state method	T1
9	Beams with Compression Reinforcement	Design principles for beams reinforced in compression	T1
10	Design for Shear	Analysis and design principles for shear in beams as per IS code	T1
11	Design for Torsion	Torsion analysis in RC beams, IS code provisions	T1
12	Bond and Development Length	Study of bond failure and development length of bars as per IS code	T1
13	Simply Supported Beams	Design examples, detailing of simply supported beams	T1
14	Continuous Beams	Design examples, detailing of continuous beams	T1
15	Introduction to Slabs	Overview of different types of slabs and their design	T1
16	One-Way Slab Design	Analysis and design using IS coefficients for one-way slabs	T1
17	Two-Way Slab Design	Analysis and design using IS coefficients for two-way slabs	T1
18	Placement of Reinforcement in Slabs	Guidelines for reinforcement placement in different types of slabs	T1
19	Design of Flat Slab	Direct method of flat slab design, IS code provisions	T1
20	Detailing of Flat Slab Reinforcement	Detailing of reinforcement in flat slabs, practical considerations	T1
21	Introduction to Staircase Design	Overview and fundamentals of staircase design	T1
22	Design of Straight Staircase	IS code provisions and design example for a straight staircase	T1

Lecture No.	Topic	Description	Reference/ Text Book
23	Design of Dog-Legged Staircase	IS code provisions and design example for a dog-legged staircase	T1
24	Introduction to Canopy Design	Overview and purpose of canopy (portico) design	T1
25	Design of Canopy	Step-by-step process for designing a canopy, practical examples	T1
26	Columns: Introduction	Classification and design principles of RC columns	T1
27	Short Columns	Design and analysis of short columns, IS code provisions	T1
28	Uni-Axial Bending in Columns	Design principles for columns with uni-axial bending	T1
29	Bi-Axial Bending in Columns	Design principles for columns with bi-axial bending	T1
30	Long Columns	Design principles for long columns, use of design charts	T1
31	Column Interaction Diagrams	Use of column interaction diagrams for bi-axial bending cases	T1
32	Wall Footing Design	Design principles of wall footing for load-bearing walls	T1
33	Isolated Footing Design	Step-by-step process for designing isolated footing for columns	T1
34	Combined Footing Design	Design and analysis of combined footing for columns	T1
35	Foundation Serviceability: Deflection	Analysis of foundation deflection limits as per codal provisions	T1
36	Foundation Serviceability: Cracking	Analysis of cracking in foundations, codal provisions for serviceability	T1
37	Detailing in Foundation Design	Practical considerations and detailing of reinforcement in foundations	T1
38	Introduction to IS-456-2000	Overview of IS-456-2000 code and its relevance in RC design	T1
39	Design for Serviceability	Design examples focusing on serviceability (deflection, cracking)	T1

Lecture No.	Topic	Description	Reference/ Text Book
40	Design Examples and Case Studies	Practical design examples of beams, slabs, columns, and footings	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	50 Minutes	20	24-09-2024	1-15	CB
Test 2	50 Minutes	20	12-11-2024	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	06-12-2024	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: 08/08/2024

Mr.DILIP MISHRA
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE313	**Design of Steel Structure I**	**3**	**0**	**0**	**3**

Instructor-in-charge: MS.JYOTI PATEL

Scope and Objective of the Course:

1. To know about the merit of steels structure.
2. To know about the shape and grades of structural steel available.
3. To know about the different methods of design and the advantages of limit state design over other methods.
4. To understand the behavior of structural steel under tension , compression and flexure.

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

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference/Text Book
1	Materials and method	Types of structural steel, physical and mechanical properties	T1
2-3	Materials and method	Advantages of steel as a structural material. Rolled section – tapered flange and parallel flange	T1
4-5	Materials and method	Built up sections , convention for member axes, plastic theory	T1
6	Materials and method	Shape factor , method of design , partial safety factor , loads and load combinations.	T1
7-8	Materials and method	Numerical	T1

Lecture Nos.	Learning Objective	Topics to be covered	Reference/Text Book
9-10	Fastners	Location details of fastners, bearing type bolts.	T2
11	Fastners	Friction grip type bolting, welds and weldings.	T2
12-13	Fastners	Advantages and disadvantages of welded conections	T2
14-16	Fastners	Lap and butt joints, truss joint	T2
17-18	Tension members	Design strength due to yielding of cross section	T1
19	Tension members	Rupture of critical section , block shear	T1
20-21	Tension members	Design of axially loaded tension members	T1
22-23	Tension members	Steel angle under tension	T1
24	Tension members	Numerical	T1
25-26	Compression members Compression members	Design strength , effective length of compression members.	T1
27-29		Design of axially loaded compression member	T1
30-32	Compression members	Steel angle under compression . design of column bases	T1
33-34	Flexural member	Design strength in bending , effective length for lateral torsional buckling.	T1
35-38	Flexural member	Design of laterally supported and unsupported beams.	T1

Lecture Nos.	Learning Objective	Topics to be covered	Reference/Text Book
39-40	Flexural member	Numerical	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	50 Minutes	20	24-09-2024	1-20	CB
Test 2	50 Minutes	20	12-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-12-2024	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: 05/08/2024

Ms.JYOTI PATEL
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE314	**Construction Planning and Management**	**3**	**0**	**0**	**3**

Instructor-in-charge: Ms.JYOTI PATEL

Scope & Objective of the course:

1. To develop fundamental knowledge of project management and cost control
2. To learn about various techniques for project planning, scheduling and monitoring
3. To develop awareness of safety and quality control

Text Book T1	Construction engineering and management – S. Seetharaman
Text Book T2	Project planning and control with PERT and CPM – B. C. Punmia

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Book
1	Introduction	Objectives and functions of construction management	T1, T2,
2-3	Introduction	Stages in construction stages in planning	T1, T2,
4-6	Introduction	Bar chart and milestone charts, project feasibility reports	T1, T2,
7-8	Introduction	Scheduling job layout and line of balance technique	T1, T2,
9-10	Construction Scheduling	PERT- necessity for good scheduling,	T1, T2,
11-12	Construction Scheduling	Elements of network, development of network	T1, T2
13-14	Construction Scheduling	PERT – time estimates, time computation, network analysis	T1, T2

Lecture Nos.	Learning Objective	Topics to be covered	Book
15-16	Construction Scheduling	Slack, critical path	T1, T2
17-18	Construction Scheduling	CPM – steps in CPM project planning	T1
19-20	Construction Scheduling	Network analysis,	T1
21-23	Construction Scheduling	Activity times and floats	T1
24	Construction Scheduling	Critical activities and critical path determination	T1
25-27	Cost control and Resource Allocation	Cost control in construction – importance , objectives of cost control	T1, T2
28-29	Cost control and Resource Allocation	Economic analysis of engineering projects, economic studies	T1, T2
30-32	Cost control and Resource Allocation	Resource allocation, resource leveling, project updating, construction cost monitoring	T1, T2
33-35	Construction safety and Quality control	Importance, cases of accidents , safety measures, responsibility for safety	T1, T2
36-38	Construction safety and Quality control	Safety benefits to various parties, safety clauses in contract.	T1, T2
39-40	Construction safety and Quality control	Quality control in construction-element of quality.	T1, T2

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	50 Minutes	20	25-09-2024	1-20	CB
Test 2	50 Minutes	20	13-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	11-12-2024	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: 05/08/2024

Ms.JYOTI PATEL
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE315	**Advance Geodesy**	**3**	**2**	**0**	**4**

Instructor-in-charge: Ms.JYOTI PATEL

Scope & Objective of the Course:

1. To be familiar with various aspects of triangulations.
2. To deal with the relevant computations , errors and observations.
3. To gain the knowledge of tachometry various system and instruments.
4. To learn the concepts of photographic and aerial surveying.
5. To learn and apply the concept of hydrographic surveying.

Text Book T1	Surveying (vol I & II) – B.C. Punmia
Text Book T2	Surveying (vol II & III) R. Agor
Reference Book R1	Surveying (vol I & II) – T.P. Kanetkar
Reference Book R2	Surveying (vol I & II) – C venkataramaih

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference/ Text Book
1	Trilateration and Traingulation	Principle of Trilateration, Reduction of observation ,	T1
2-3	Trilateration and Traingulation	Principle and classification of triangulation system.	T1
4	Trilateration and Traingulation	Triangulation chains , strength of figures,	T1
5-6	Trilateration and Traingulation	Station marks and signals, satellite station, intersected and resected point.	T1
7-8	Trilateration and Traingulation	Field works	T1

Lecture Nos.	Learning Objective	Topics to be covered	Reference/ Text Book
9-10	Adjustment computations	Weighting of observations , treatment of random errors	T2
11	Adjustment computations	Probability eq, normal law of error, most probable value,	T2
12-13	Adjustment computations	Propagations of errors and variances, principle of least square	T2
14-16	Adjustment computations	Observations and correlative normal equation.	T2
17-18	Adjustment computations	Adjustment triangualtion fig and level nets	T2
19	Tacheometery	Definitions , principle of stadia system	T1
20-21	Tacheometery	Instrument constant, substance and tangential systems,	T1
22-23	Tacheometery	Construction and use of reduction tacheometers , range finders	T1
24	Tacheometery	EDM instruments , total station	T1
25	Photographic and aerial surveying Photographic and aerial surveying	Photo theodolite,	T1
26-27		Principle of photogrammetry,	T1
28-30	Photographic and aerial surveying	Stereo photogrammetry, aerial surveying, scale and distortion of the vertical and tilted photograph	T1
31-32	Photographic and aerial surveying	GPS GIS study	T2
33-36	Hydrographic surveying	Introduction, shore line survey , soundings method, gauges ,	T1

Lecture Nos.	Learning Objective	Topics to be covered	Reference/ Text Book
37-40	Hydrographic surveying	Problem related to hydro graphic surveying, sounding party, method of locating soundings, reduction of soundings.	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	50 Minutes	20	25-09-2024	1-20	CB
Test 2	50 Minutes	20	13-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	13-12-2024	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: 06/08/2024

Ms.JYOTI PATEL
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS432	**Network Security**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.PALAK KESHWANI

Learning Outcomes:
The objective of this course is to teach the concepts of securing computer network protocols, based on the application of cryptography techniques. This course covers the underlying principles and techniques for network and communication security.

Text Book T1	Cryptography And Network Security – Principles and Practices, William Stallings, Prentice Hall of India, Fifth Edition, 2011
Reference Book R1	Cryptography and Network Security Atul Kahate, Tata McGrawHill, 2003.
Reference Book R2	Security in Computing Charles B. Pfleeger, Shari Lawrence Pfleeger, Third Edition, Pearson Education, 2003.
NPTEL Link	https://nptel.ac.in/courses/106/105/106105031/

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.ofTextBook)
1	To learn Introduction of Network Security	Introduction of Network Security	T1 CH-1 1.1, 1.2
2-3	To learn Need for Security	Need for Security – Concept & Types of Attacks	T1 CH-1 1.3, 1.4,1.5
4-5	To learn concept of encryption	Introduction to encryption, Classical encryption Techniques	T1 CH-2 2.1,2.2
6-10	To learn various encryption standards	Block ciphers standard, Data encryption standard, Advanced encryption standard	T1 CH-3 3.1,3.2
11-14	To learn symmetric cipher encryption DES algorithm	Symmetric ciphers- triple DES concept, DES- Modes of operation	T1 CH-3 3.4,3.5

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.ofTextBook)
15-17	To learn public keycryptography	Confidentiality using Symmetric Encryption, Public key cryptography	T1 CH-88.1,8.2
18-20	To learn public keycryptography RSA Algorithm	Concept and working of RSA	T1 CH-99.1,9.2
21-23	To learn Key management and distribution technique	Key management Techniques,Key Distribution Techniques	T1 CH-10 10.1,10.2
24	To learn public KeyCryptosystems	Other public Key Cryptosystems	T1 CH-10 10.2
25	To learn Diffie Hellmen Algorithm	Diffie Hellmen working	T1 CH-10 10.2,10.3
26-27	To learn concept ofHash Function	Cryptographic Hash functions – concept, uses, Cryptographic Hash functions –SHA	T1 CH-11 11.1,11.2
28	To learn Message authentication Codes	Introduction to Message authentication Codes (MAC),	T1 CH-11 11.3
29-30	To learn different MAC algorithm	Message authentication Codes (MAC) – HMAC, Message authentication Codes (MAC) – DAA, Hash and MAC algorithms – MD5	T1 CH-12 12.1,12.3,12.4
31	To learn concept ofDigital Signature	Introduction to Digital signatures	T1 CH-13 13.1
32-33	To learn Digital Signature technique	Digital signatures – DSS, Digital signatures –DSA,	T1 CH-13 13.2,13.3
34-35	To learn Authenticatio nprinciples	Application of X.509 Certificates. Authentication principles, Authentication applications- Kerberos V4 & V5	T1 CH-14 14.1,14.2
36	To learn Web securityconcept	Introduction to Web security, Working concept of Web security	T1 CH-17 17.1,17.2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.ofTextBook)
37	To learn Web security	Web security - Secure Electronic Transaction	T1 CH-17 17.3
38	To learn E-Mailsecurity	Introduction E-Mail security, Working concept of E-Mail security	T1 CH-1515.2
39	To learn IP Security	Introduction to IP Security, Working concept of IP Security	T1 CH-16 16.1,16.2
40	To learn Applicationof IP Security	Application of IP Security	T1 CH-15 15.1

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	50 Minutes	20	23-09-2024	1-10	CB
Test 2	50 Minutes	20	11-11-2024	11-20	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	02-12-2024	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: 05/08/2024

Dr.PALAK KESHWANI
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS322	**Programming Language and Complier Construction**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.PALAK KESHWANI

Learning outcomes
Upon successful completion of the course, student will be able to:

1. Understand the working of compiler.
2. Understand the intermediate code generated by compiler.
3. Develop small compiler using tools.

Textbook T1	Aho, A .V. Lam, M., Sethi, R. and Ullman, J D., ― Compilers: Principles, Techniques and Tools, 2nd 2007 Ed., Pearson Education.
Textbook T2	Tremblay, J.P. and Sorenson, P G., ―Theory and Practice of Compiler Writing‖, SR Publications, 1st edition, 1985.
Reference Book R1	Compiler Design, O.G. Kakde, 4th edition, Laxmi Publication.
NPTEL	https://nptel.ac.in/courses/106105190

Lecture-Wise-Plan:

Lecture Nos.	Learning Objectives	Topics to be covered	References (Ch./Sec./Page Nos. of Text Book)
1-3	To understand the basics of compiler.	Introduction to Compiler, single and multi-pass compilers, Phases of Compilers, Compiler writing tools, Bootstrapping, Backpatching.	T1: Ch 1, 1-12
4-6	To understand the working of lexical analyzer.	Lexical analysis: Role of lexical analyzer, specification and recognition of tokens, Regular expression, Finite automata from regular expression	T1: Ch 3, 109-166

Lecture Nos.	Learning Objectives	Topics to be covered	References (Ch./Sec./Page Nos. of Text Book)
7-10	To understand Top DownParsing techniques.	Context free grammars, Top down Parsing : elimination of left recursion,recursive descent parsing, Predictive Parsing	T1: Ch 4, 192-231
11-15	To understand Bottom UpParsing techniques	Bottom Up Parsing : Bottom Up Parsing : Operator precedence parsing, LR parsers, Construction of SLR, Construction of SLR parse tables for Ambiguous grammar	T1: Ch 4, 233-257
16-20	To understand Bottom UpParsing techniques	Canonical LR and LALRparsing tables, YACC	T1: Ch 4, 259-297
21-22	To learn the syntax directedtranslation schemes.	Syntax directed definitions: Inherited and synthesized attributes, Dependency graph,bottom up and top down evaluation of attributes	T1: Ch 5, 303-309
23-24	To learn the syntax directedtranslation schemes.	Construction of syntax trees, Postfix notation ,bottom up andtop down evaluation of attributes, S- attributed and L attributed definitions	T1: Ch 5, 310-313
25-30	To learn the concept ofintermediate code generation.	Three address code, quadruples,triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.	T1: Ch6, 357-421
31-34	To learn the principles ofparameter passing and runtime memory management.	Run time environments, storage organization and allocation strategies, parameter passing, symbol tables, dynamic storage allocation	T1: Ch 7, 427-440

Lecture Nos.	Learning Objectives	Topics to be covered	References (Ch./Sec./Page Nos. of Text Book)
35-37	To learn the code optimization techniques to improve the performance ofa program.	Code Optimization- Sources ofoptimization, optimization of basic blocks, data flow analysis, code generation from DAG, peephole optimization.	T1: Ch 8, 533-553
38-40	To learn the concept of codegeneration.	Code Generation- Issues in code generation, basic blocks and flow graphs, register allocation, the target machine, and simple Code generator.	T1: Ch 8, 505-512, 525-535, 553-557

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	50 Minutes	20	23-09-2024	1-15	CB
Test 2	50 Minutes	20	11-11-2024	11-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	04-12-2024	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: 07/08/2024

Dr.PALAK KESHWANI
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS412	**Block Chain Technology**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mrs.NISHA THAKUR

Learning Outcomes:
The learning objectives of this course are to:

1. Enhance/develop students' ability to understand Blockchain Technology, Ethereum, Hyperledger Fabric, Distributed Application Development(smart contracts development, API)
2. By the end of the course, students will be able to Understand how blockchain systems (mainly Bitcoin and Ethereum) work, Design, build, and deploy smart contracts and distributed applications, Integrate ideas from blockchain technology into their own projects

Text Book T1	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).
Text Book T2	Blockchain Explained: A Pragmatic Approach by Srihari Kapu
Reference book R1	Mastering Blockchain by Imran Bashir

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
1-7	Overview of Blockchain Technology	Defining Blockchain and Distributed Ledger, Blockchain Properties Decentralized, Transparent, Immutable and secure. Blockchain Applications. Types of Blockchain: Public, private, and consortium based blockchain, Why to use Blockchain, History of Blockchain.	T l Ch-l 1.4,1.5,1.6,1.9 Notes/PDF

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
8-13	Introduction to computing models and P2P networking	Centralized, Decentralized and Distributed Systems, Decentralization vs distributed, P2P systems, propertied of P2P systems, P2P communication architecture. P2P network applications: File sharing, P2P network for blockchain	T2 Ch-2 2.1,2.2,2.3,2.9 Notes/PDF
14-19	Foundational Concepts Blockchain Data Structure	Cryptographic Hash Functions, Digital Signatures, Public Keys as Identities, Decentralized Identity management, Hash Pointers, Hash chain and Merkel tree.	T1 Ch-3 3.2,3.4 T2 Ch3 3.6,3.8 Notes/PDF
20-25	Consensus Mechanisms	Consensus Mechanisms – POW, POS and other Consensus Mechanisms - Proof of storage and so on. Transactions incentivizing and mining.	T1 Ch-5 5.7,5.8 Notes/PDF
26-30	Blockchain & Cryptocurrency	Cryptocurrency as the first blockchain application. Mechanics of Bitcoin, Storing and Using Bitcoins, Mining in Bitcoin, Limitations of Bitcoin and alternative cryptocurrencies.	T1 Ch-4 4.5, 4.6 T2 Ch4 4.8,4.10 Notes/PDF
31-36	Smart Contracts and Ethereum	History, Purpose and types of smart contracts, Introduction to Ethereum, bitcoin vs Ethereum stack. P2P network in Ethereum, consensus in Ethereum, Concept - Smart contracts, Developing and executing smart contracts in Ethereum. State and data structure in Ethereum. Ethereum Virtual Machine.	T2 Ch-5 5.4,5.8 Notes/PDF
37-42	Private and Consortium based Blockchain: Hyperledger	Need for the consortium. Hyperledger stack, Multichain blockchain. Innovation in Hyperledger, distributed applications in hyperledger.	T1 Ch-5,Ch6 5.9, 6.4,7.1 T2 Ch6 6.8,7.4,7.9 Notes/PDF

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	50 Minutes	20	24-09-2024	1-13	CB
Test 2	50 Minutes	20	12-11-2024	14-25	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	06-12-2024	1- 42	CB

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

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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: 05/08/2024

MRS.NISHA THAKUR
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS443	**Internet of Things**	**3**	**2**	**0**	**4**

Instructor-in-charge: Dr.K NAGAIAH

Scope and Objective:

1. To introduce the terminology, technology and its applications
2. To introduce the concept of M2M (machine to machine) with necessary protocols
3. To introduce the Python Scripting Language which is used in many IoT devices
4. To introduce the Raspberry PI platform, which is widely used in IoT applications
5. To introduce the implementation of web-based services on IoT devices

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
1-3	Introduction to Internet of Things	Definition and Characteristics of IoT, Physical Design of IoT	T1 - 19-23
4		IoT Protocols, IoT communication models,	T1- 24-32
5		Iot Communication APIs IoT enabaled Technologies–	T1- 33-39
6		Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols,	Notes By Instructor
7		Embedded Systems,	T1- 38
8		IoT Levels and Templates Domain Specific IoTs	T1-38-44
9		Home, City, Environment, Energy, Retail, Logistics	T1 48-49

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
10		Agriculture, Industry, health and Lifestyle	T1-49-50
11 - 13	IoT and M2M	IoT and M2M	T1-65-67
14		Software defined networks, network function virtualization	T1-69-73
15		SDN	T1-69
16-17		NFV	T1-70-73
18-20		YANG- NETCONF, YANG	T1 -71-84
21-22		SNMP NETOPEER	T1 -91-93
23	Introduction to Python	Introduction to Python- Language features of Python, Data types, data structures,	T1 -121-129
24-26		Control of flow, functions, modules, packaging, file handling, data/time operations, classes	T1 -129-138
27		classes, Exception handling Python packages - JSON,	T1 -141
28-30		XML,HTTPLib, URLLib, SMTPLib	T1 -145-146
31	IoT Physical Devices and Endpoints	IoT Physical Devices and Endpoints	T1 -151-152
32-34		Introduction to Raspberry PI- Interfaces (serial, SPI, I2C) Programming	T1 -154-162
35-37		Python program with Raspberry PI with focus of interfacing external gadgets controlling output, reading input from pins.	T1 -162-164

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
38-40	IoT Physical Servers and Cloud Offerings	Introduction to Cloud Storage models and communication APIs Webserver	T1 -171-173
41-42		Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API	T1 -178-179 T1 -188
43		Real Time Examples	T1 -193-237

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	50 Minutes	20	24-09-2024	1-15	CB
Test 2	50 Minutes	20	12-11-2024	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-12-2024	1- 40	CB

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Date: 06/08/2024

Dr.K NAGAIAH
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CS438	**Big Data and High Performance Computing**	**3**	**2**	**0**	**4**

Instructor-in-charge: Dr.RAVI KIRAN

Learning Outcomes:

1. Provide the essential knowledge for the students to understand big data computer system, storage, management, processing, and visualization
2. Provide training in state-of-the-art big data processing frameworks
3. Provide training in big data applications
4. Provide the students with prerequisite for graduate level study in computer science
5. Prepare the students for industrial career.

Text Book T1	Title: Big Data Fundamentals: Concepts, Drivers & Techniques Author: Wajid Khattak, Paul Buhler, Thomas Erl Publisher: John Wiley & Sons, Inc ISBN: 13: 9780134291079
Reference Book R1	BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications
Reference Book R2	BIG DATA, Black BookTM , DreamTech Press, 2015 Edition

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
1-6	Understanding Big Data	Concepts and Terminology Datasets Data Analysis Data Analytics Descriptive Analytics Diagnostic Analytics Predictive Analytics Prescriptive Analytics Business Intelligence (BI) Key Performance Indicators (KPI) Big Data Characteristics Different Types of Data Structured Data Unstructured Data Semi-structured Data	T1:- Chpt 1

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
		Metadata Background History Technical Infrastructure and Automation Environment Business Goals and Obstacles	
7-13	Business Motivations and Drivers for Big Data Adoption	Marketplace Dynamics Business Architecture Business Process Management Information and Communications Technology Data Analytics and Data Science Digitization Affordable Technology and Commodity Hardware Social Media Hyper-Connected Communities and Devices Cloud Computing Internet of Everything (IoE)	T1:- Chpt 2
14-20	Big Data Adoption and Planning Considerations	Privacy Security Provenance Limited Realtime Support Distinct Performance Challenges Distinct Governance Requirements Distinct Methodology Clouds Big Data Analytics Lifecycle Business Case Evaluation Data Identification Data Acquisition and Filtering Data Extraction Data Validation and Cleansing Data Aggregation and Representation Data Analysis Data Visualization Utilization of Analysis Results	T1:- Chpt 3
21-26	Enterprise Technologies and Big Data Business Intelligence	Online Transaction Processing (OLTP) Online Analytical Processing (OLAP) Extract Transform Load (ETL) Data Warehouses Data Marts Traditional BI Ad-hoc Reports Dashboards Big Data BI	T1:- Chpt 4

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
27-32	Big Data Storage Concepts	Clusters File Systems and Distributed File Systems NoSQL Sharding Replication	T1:- Chpt 5
33-36	Big Data Processing Concepts	Parallel Data Processing Distributed Data Processing Hadoop Processing Workloads Batch Transactional Cluster Processing in Batch Mode Batch Processing with MapReduce Map and Reduce Tasks	T1:- Chpt 6
37-40	Big Data Storage Technology	On-Disk Storage Devices Distributed File Systems RDBMS Databases NoSQL Databases Characteristics	T1:- Chpt 7
41-42	Big Data Analysis Techniques	Quantitative Analysis Qualitative Analysis Data Mining Statistical Analysis A/B Testing Correlation Regression Machine Learning	T1:- Chpt 8

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Test 1	50 Minutes	20	25-09-2024	1-20	CB
Test 2	50 Minutes	20	13-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	11-12-2024	1- 40	CB

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Date: 06/08/2024

Dr.RAVI KIRAN
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
E420	**Artificial Intelligence**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.K NAGAIAH

Scope and Objective:
To train the students to understand different types of AI agents, various AI search algorithms, fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation, reasoning. Study of Markov Models enable the student ready to step into applied AI.

Text Book T1	Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice-Hall, 2010
Reference Book R1	Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hillpublications, Third Edition, 2009.
Reference Book R2	George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving,Pearson Education, 6th ed., 2009

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
1-2	Introduction to AI, ,	Introduction to AI, • Problem Solving, State space search,	T1 Chapter 1, 2, 3, 4.
3-4	Search methods	Blind search: Depth first search, Breadth first search,	T1 Chapter 1, 2, 3, 4.
5-6	Informed search:	Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction.	T1 Chapter 1, 2, 3, 4.
7-10	Game tree Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.	Game tree Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.	T1 Chapter 1, 2, 3, 4.

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
11-12	Knowledge Representation	Introduction Approaches to knowledge Represetation	T1 Chapter 5,6.
13-14		Knowledge Representation Using Semantic Network	T1 Chapter 5,6
15		Extended Semenytic Networks for KR Knowledge Representation Using Frames	T1 Chapter 5,6
16-18	Expert Systems and Applications	Intro Phases in Building Expert System, ES Architrcture ES Verses Traditional Trurh maintaonace System	T1 Chapter 5,6
19- 20	Expert Systems and Applications	Applications of Expert System List of Shells and Tools Uncertainity Measure.	T1 Chapter 5,6
21-26	Machine Learning Paradiggms	Intrduction Machine Learning System Supervised Unsupervised Learning Inductive Learning Decision Trees Deductive Learning Clustring Support Vector Machine	T1 Chapter 9 & 10
27-31	Artificial Nueral Networks	Introduction Single Layer, Feed Forward Networks Multi Layes Feed Forward Networks Radial Basis Function Networks Design Issues Of Artificial Nueral Networks Recurrent Networks	T1 chapter 9 & 10
32-36	Advanced knowledge representation Techniques	Case Grammar, Semantic Web Natural Language Processing Introduction Sentence Analysis Phase,	T1 Chapter 11

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
37-40	Advanced knowledge representation Techniques	Grammar and Phrases Types of Parsers Semantic Anaysis Universal Networking knowledge	T1 Chapter 11

Evaluation Scheme:

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	50 Minutes	20	23-09-2024	1-15	CB
Test 2	50 Minutes	20	11-11-2024	16-30	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	02-12-2024	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: 02/08/2024

Dr..K NAGAIAH
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC422	**Image Processing**	**3**	**2**	**0**	**4**

Instructor-in-charge: Dr.K NAGAIAH

Scope and Objective:
This is a basic course in digital image processing and aims at providing an understanding of some of the fundamental condpets involved. It shall deal with the fundamentals of images. The various discrete transforms that are used extensively in image processing and their application to data compression are dwelt with. In addition, the course covers some basic enhancement and restoration techniques and coding. The course also briefly covers image understanding, image classification and recognition along with some neural networks.

Text Book T1	Digital Imagel Processing, Rafael C. Gonzalez & Richard E. Woods, Pearson Education Asia, Second Ed., 5th. Indian reprint 2003.
Text Book T2	Digital Imagel Processing Using MATLAB, Rafael C. Gonzalez & Richard E. Woods, Steven L. Eddins, Pearson Education Asia, Second Ed., 3rd . Indian reprint 2005.
Reference Book R1	Digital Image Processing, Anil K. Jain, PHI, 1998, Indian reprint 2003
Reference Book R2	Digital Image Processing and Analysis, Bhabatosh Chanda & Dwijesh Dutta Majumdar, PHI, 2002
Reference Book R3	Fundamentals of Electronic Image Processing, Arthur R. Weeks, PHI, 1999, Indian reprint 2003.

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
1	Introduction	Introduction to digital image processing and systems	TB:2.2
2-3	Digital Image Fundamentals	Image Sampling and Quantization	TB: 2.3.4- 2.4.5
4-6	Image Enhancement in Frequency Domain	Fourier Transform, DFT and its properties	TB: 4.2.1-4.2.2
7-8	Implementation	2D convolution	TB: 4.6.3-4.6.4

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
9	Implementation	Fast Fourier Transform	TB: 4.6.6
10	Image enhancement in spatial domain	Introduction to Image Enhancement	TB: 3.1
11-12	Basics of gray level transformations	Image enhancement-gray level transformations	TB: 3.21-3.2.4
13-14	Histograms	Image enhancement- histogram processing	TB:3.3-3.3.3
15-16	Basics of spatial filtering	Image enhancement by spatial filtering	TB: 3.5.-3.6.1 3.7.1-3.7.3
17-18	Filtering of images	Image enhancement-filtering in frequency	TB: 4.2.3-4.4.3
19	Image degradation models, noise models	Image restoration-image degradation models	I TB: 5.1-5.2.2; 5.5
20-21	Estimation of degrading function	Image restoration-removal of linear motion blur	TB: 5.6.3
22-23	Image restoration - filters	Image restoration-Inverse filtering, constrained least squares	TB: 5.7 - 5.9
24-25	Fundamentals and models of image compression	Fundamentals of image compression	TB: 8.1-8.2
26-27	Information theory for image compression	Elements of information theory for compression	TB: 8.3.1-8.3.2
28-30	Coding theorems	Fundamentals of image coding	TB: 8.3.3-8.3.4
31-33	Error-free image compression	Error-free image compression	TB: 8.4.1-8.4.4
34-36	Lossy image compression, compression standards	Lossy image compression, compression standards	TB: 8.5.1-8.5.2 8.6.1-8.6.2
37-38	Image segmentation	Image segmentation	TB:10.1-10.1.3 10.3.1-10.3.3
39-40	Image representation	Representation	TB:11.1

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	50 Minutes	20	24-09-2024	1-20	CB
Test 2	50 Minutes	20	12-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	06-12-2024	1- 40	CB

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Date: 04/08/2024

Dr.K NAGAIAH
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC431	**Digital Systems**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mrs.BHAVNA CHAUDHARY

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

1. Develop the ability to analyse and design digital systems
2. Understand combinational and sequential digital circuits design with timing constraints

Text Book T1	Digital Design Principles & Practices, John F Wakerly, Pearson education, Fourth edition, 2006
Reference Book R1	Modern Digital Electronics, R P Jain, TMH, Fourth edition, 2010.
Reference Book R2	FPGA Based System Design, Wayne Wolf, First Edition 2009, Pearson
Reference Book R3	Computer Logic Design, M. Morris Mano, Prentice-hall 1972

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Reference Chap/Sec
1,2	Codes - Weighted and Non-weighted codes and its Properties	Different code representations in digital system	T1: 1.1,1.2, 1.3,1.4, 1.5
3,4	Parity check code and Hamming code.	Basic Theorems and Properties, Switching Functions- Canonical and Standard Form. Boolean algebra and logical operations in Boolean algebra	T1: 1.7, 1.8, 1.10
5	Combinational Logic Circuits: Adders, Subtractors	Analyze the redundant terms and minimize the expression using K-maps	T1: 3.1,3.2
6,7	Comparators, Multiplexers,	Identify the redundant terms and minimize the expression using tabular method	R1: 4.1 to 4.2

Lecture Nos.	Learning Objective	Topics to be Covered	Reference Chap/Sec
8-10	Analysis and design of combinational logic:	Decoders, Encoders, Digital multiplexers, Adders and subtractors, Look ahead carry, Binary comparators Programmable Logic Devices, Complex PLD, FPGA.	R1: 4.3 to 4.8
11-12	Learning Sequential Circuit Design	Design of a synchronous counter, Design of a synchronous mod-n counter using clocked JK, D, T and SR flip-flops. Mealy and Moore models, State machine notation, Construction of state diagrams.	R1: 4.9 & 4.11
13-16	Applications of Digital Circuits:	Mealy and Moore models, State machine notation, Construction of state diagrams.	T1: 3.3
17-19	Design of code converter Circuits.	Design of a Sequence Detector, Guidelines for construction of state graphs, Design Example – Code Converter.	T1:3.4, 3.5
20-22	Fundamentals: Basic Architectural Distinctions between Combinational and Sequential circuits	Design of Sequential Circuits using ROMs and PLAs, CPLDs and FPGAs, Serial Adder with Accumulator, Design of Binary Multiplier, Design of Binary Divider	T1: 3.6, 3.7
23-25	Learning of MOS & CMOS open drain and tri-state outputs, CMOS transmission gate	minimization of complete and incomplete state machines and to write a minimal cover table	T1: 4.4
26-28	To understand Finite state machine capabilities and limitations	Understand how synchronous sequential circuit works	T1: 5.1,5.2
29-30	Learning Classification of Integrated circuits, comparison of various logic families	Illustrate minimization of complete and incomplete state machines and to write a minimal cover table.	T1: 6.4, 6.5, 6.6
31-33	Learning of Combinational logic Circuits design.	Basic Bi stable elements, Latches,	T1:6.7-6.11
34-36	Learning of Sequential logic circuits design.	The master-slave flip flops (pulse-triggered flip-flops): SR flip-flops, JK flip-flops,	T1: 7.1,7.2

Lecture Nos.	Learning Objective	Topics to be Covered	Reference Chap/Sec
37-39	To study Sequential Circuits	Registers, binary ripple counters, and synchronous binary counters.	T1: 7.3
40-42	.Learning of VHDL, Verilog	Introduction to Verilog / VHDL programming language, Verilog / VHDL program of logic gates,	T1: 7.4

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Test 2	50 Minutes	20	11-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	04-12-2024	1- 40	CB

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Date: 05/08/2024

Mrs.BHAVNA CHAUDHARY
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC414	**Internet of Things**	**3**	**0**	**0**	**3**

Instructor-in-charge: Dr.K NAGIAH

Scope and Objective:

1. To introduce the terminology, technology and its applications
2. To introduce the concept of M2M (machine to machine) with necessary protocols
3. To introduce the Python Scripting Language which is used in many IoT devices
4. To introduce the Raspberry PI platform, which is widely used in IoT applications
5. To introduce the implementation of web-based services on IoT devices

Text Book T1	Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN:9788173719547
Text Book T2	Getting Started with Raspberry Pi, Matt Richardson &Shawn Wallace, O'Reilly (SPD), 2014, ISBN:9789350239759
Reference Book R1	Design the Internet of things A Drian Wc Even, Hakim Cassimally , Jhon Wiley and Sons Ltd.
Reference Book R2	IoT Programming: A Simple and Fast Way of Learning IoT, Kindle Edition.

Lecture-Wise-Plan:

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
1-3	Introduction to Internet of Things	Definition and Characteristics of IoT, Physical Design of IoT	T1 - 19-23
4		IoT Protocols, IoT communication models,	T1- 24-32
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6		Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols,	Notes By Instructor
7		Embedded Systems,	T1- 38

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
8		IoT Levels and Templates Domain Specific IoTs	T1-38-44
9		Home, City, Environment, Energy, Retail, Logistics	T1 48-49
10		Agriculture, Industry, health and Lifestyle	T1-49-50
11 - 13	IoT and M2M	IoT and M2M	T1-65-67
14		Software defined networks, network function virtualization	T1-69-73
15		SDN	T1-69
16-17		NFV	T1-70-73
18-20		YANG- NETCONF, YANG	T1 -71-84
21-22		SNMP NETOPEER	T1 -91-93
23	Introduction to Python	Introduction to Python- Language features of Python, Data types, data structures,	T1 -121-129
24-26		Control of flow, functions, modules, packaging, file handling, data/time operations, classes	T1 -129-138
27		classes, Exception handling Python packages - JSON,	T1 -141
28-30		XML,HTTPLib, URLLib, SMTPLib	T1 -145-146

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
31	IoT Physical Devices and Endpoints	IoT Physical Devices and Endpoints	T1 -151-152
32-34		Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming	T1 -154-162
35-37		Python program with Raspberry PI with focus of interfacing external gadgets controlling output, reading input from pins.	T1 -162-164
38-40	IoT Physical Servers and Cloud Offerings	Introduction to Cloud Storage models and communication APIs Webserver	T1 -171-173
41-42		Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API	T1 -178-179 T1 -188
43		Real Time Examples	T1 -193-237

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Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
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Date: 05/08/2024

Dr.K NAGIAH
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
EC430	**Machine Learning**	**3**	**2**	**0**	**4**

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 leaning. The course emphasizes various techniques, which have become feasible with increased computational power and our ability to produce and capture huge volumes of data. The topics covered in the course include 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 will also be covered

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 N. J. Nilson, Introduction to Machine Learning, Stanford, Online Link http://robotics.stanford.edu/people/nilsson/mlbook.htm D. Michie, D.J. Spiegelhalter, C.C. Taylor (eds), Machine Learning, Neural and Statistical Classification, Ellis Horwood publishers, Online Link http://www.amsta.leeds.ac.uk/~charles/statlog Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer, 2009. Online Link http://statweb.stanford.edu/~tibs/ElemStatLearn/printings/ESLII_print10.pd
	Hal Daume III, A Course in Machine Learning, 2015. Online Link http://ciml.info/ 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	Reference (Ch./Sec./Page Nos.of Text Book)
1-5	Overview of ML	Introduction to Machine Learning, Probability theory, Decision theory	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	R1[Ch-3]
10-14	Overview & Techniques of liner models	Liner Models for classification: Discriminant Functions, Probabilistic Generative Classifiers,	R1[Ch-4]
15-19	Overview & Techniques of Bayesian Learning	Bayesian Learning Techniques: Bayes optimal classifier, , Naive Bayes Classifier	TB[Ch-6]
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	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	Class Notes, R1[Ch-7]
31-34	How to do Graphical Models Representation	Graphical Models: Bayesian Belief Networks, Hidden Markov Models	TB[Ch-6], class notes
35-38	Unsupervised Learning concept	Unsupervised Learning: Mixture Models, K-means Clustering,	TB[Ch-6], R1[Ch-9]
39-40	Reinforcement Learning:concept	Reinforcement Learning: Q Learning, Non-deterministic rewards & actions, Temporal difference learning, Generalizatio	TB[Ch-13]

Evaluation Scheme:

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	50 Minutes	20	25-09-2024	1-12	CB
Test 2	50 Minutes	20	13-11-2024	13-26	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	11-12-2024	1- 40	CB

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

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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: 06/08/2024

Dr.PINKEY CHOUHAN
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE412	**Environmental Engineering**	**3**	**0**	**0**	**3**

Instructor-in-charge: Mr.HEMANT KUMAR DEWANGAN

Scope & Objective of the Course:

1. To give an overview of importance of proper sewage disposal and various sewerage systems.
2. To introduce the students the estimation of domestic sewage and other sewer appurtenances.
3. To impart knowledge about the different industrial waste treatment techniques.
4. Outcomes of the course: A student must be capable of designing a sewer system for a city taking into consideration the variations in flow.
5. The student will be socially responsible and aware of the social, environmental and health implications of solid waste and its management

Text Book T1	Environmental engineering – Peavy & Rowe
Text Book T2	Waste Water Engineering – S. K. Garg
Text Book T3	Waste Water Engineering – B. C. Punmia

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./ Page Nos.of Text Book)
1	Estimation of sewage	Sewage and sewerage , definitions and some common terms	T1, T2, T3
2-3	Estimation of sewage	Object of sewage disposal, system of sanitation. Conservancy systems, water system sewage system	T1, T2,
4-6	Estimation of sewage	Amount of sewage- Estimation of domestic and storm sewage,	T1, T2, T3

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./ Page Nos.of Text Book)
7-8	Estimation of sewage	Variations in the quantity of sewage, desihn of sewers ,	T1, T2, T3
9-10	Sewage Treatment	Characteristics of sewage- physical, chemical. Biological,	T1, T2,
11-12	Sewage Treatment	Sewage Treatment – Preliminary systems, Racks and screens	T1, T2
13-14	Sewage Treatment	Primary Treatment system -plain sedimentation, detention time and over flow rates	T1, T2
15-16	Sewage Treatment	Onsite waste water treatment – Septic tank imhoff tank, Oxidation pond.	T1, T2
17-18	Secondary Treatment System	Attached growth process, Trickling filter, standard and high rates, efficiency formula,	T1, T3
19-20	Secondary Treatment System	Operational problems of trickling filter, suspended growth process, principle of suspended growth process	T1, T3
21-23	Secondary Treatment System	Activated sludge process, oxidation ditch aeration and mixing techniques, operational problems of activated sludge systems.	T1 , T3
24	Secondary Treatment System	Stablisation tools aerobic and facultative lagoon.	T1 , T3
25-27	Sewage sludge Treatment and sewage Disposal	Importance , Amount and characteristics of sludge , sludge digestion , Aerobic anaerobic digestion	T1, T2 ,T3
28-29	Sewage sludge Treatment and sewage Disposal	Disposal by dilution, self purification of polluted streams, factor affecting self purification	T1, T2, T3
30-32	Sewage sludge Treatment and sewage Disposal	Waste treatment , Summary of industrial waste.	T1, T2, T3
33-35	Solid Waste Management	Solid waste management, source and characteristics, environmental and health	T1, T2, T3

Lecture Nos.	Learning Objective	Topics to be Covered	Reference (Ch./Sec./ Page Nos.of Text Book)
36-38	Solid Waste Management	Refuse characteristics collection method,	T1, T2 ,T3
39-40	Solid Waste Management	Disposal of solid waste by land filling, composting and incineration methods, composting refuse	T1, T2, T3

Evaluation Scheme:

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	50 Minutes	20	23-09-2024	1-20	CB
Test 2	50 Minutes	20	11-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	04-12-2024	1- 40	CB

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Date: 01/08/2024

Mr.HEMANT KUMAR DEWANGAN
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE417	**Design of Bridge Structure**	**3**	**0**	**0**	**3**

Instructor-in-charge: Ms.JYOTI PATEL

Scope & Objective of the Course:
Bridge is an important facility required for the passage of railways, road ways footpaths and even for carriage of fluids. The constant increase in traffic loads associated with economic growth in modern societies imparts large demands to build such structures. Therefore the structure analysis and design of bridge is essential for the structural engineering students.

Text Book T1	Principles and practice of Bridge Engineering – S. P. Bindra
Text Book T2	Bridge Deck Behaviour – E. C. Hambly
Text Book T3	Bridge Analysis simplified – Bakht B. and Jaegar

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
1	Introduction	Classifications	T1, T2, T3
2-3	Introduction	Investigations and planning	T1, T2, T3
4-6	Introduction	Choice of type of bridges	T1, T2,
7-8	I. R. C Specifications.	IRC and other international specifications on live loads for road bridges,	T1, T2,
9-10	I. R. C Specifications.	Various forces acting on bridges, load distribution theories	T1, T2, T3
11-12	I. R. C Specifications.	Courbon's method, Hendry jaeger method, Grillage analogy	T1, T2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
13-14	Superstructure	General design considerations, analysis and design of reinforced concrete slab culverts,	T1, T2
15-16	Superstructure	Tee beam and slab bridges, design principles of prestressed bridges	T1, T2, T3
17-18	Superstructure	Continuous bridges , box girder	T1, T3
19-20	Superstructure	Balanced cantilever bridges	T1, T3
21-23	Substructure	Various parts of substructure , various types of substructures	T1 ,T3
24	Substructure	Load acting on substructures	T1 , T3
25-27	Substructure	Design of pier and pier cap,	T1, T2
28-29	Substructure	Design of different types of foundations- open pile and well foundations,	T1, T2
30-32	Substructure	Pile and well foundation construction aspects and related issue.	T1, T2, T3
33-35	New Era Methodology	Technology for design and construction of bridges	T1, T2
36-38	New Era Methodology	Seismic resistant design provisions	T1, T2, T3
39-40	New Era Methodology	Load test on bridge.	T1, T2 , T3

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	50 Minutes	20	25-09-2024	1-20	CB
Test 2	50 Minutes	20	12-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	06-12-2024	1- 40	CB

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Date: 05/08/2024

Ms.JYOTI PATEL
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE418	**Foundation Engineering**	**3**	**0**	**0**	**3**

Instructor-in-charge: Ms.JYOTI PATEL

Scope & Objective of the Course:
To learn about techniques related with construction of different types of foundations.
Outcome of the course : To be able to plan and handle issues related with construction of different types of foundations.

Text Book T1	Soil mechanics and foundations – Pumia B.C.
Text Book T2	Soil mechanics and foundations Engineering – Arora K.R.
Text Book R1	Basic and applied soil mechanics – Gopal Ranjan and Rao.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
1	Site Investigation and selection of Foundation	Introduction, Scope and objectives,	T1, T2, R1
2-3	Site Investigation and selection of Foundation	Method of exploration boring, sampling, disturbed and undisturbed sampling,	T1, T2, R1
4-6	Site Investigation and selection of Foundation	Sampling techniques, bore log and report, penetration test	T1, T2, R1
7-8	Site Investigation and selection of Foundation	Data interpretation, selection of foundation based on soil condition.	T1, T2, R1
9-10	Shallow Foundation	Introduction, Location and depth of foundation, codal provision, bearing capacity of shallow foundation on homogeneous deposits	T1, T2,

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
11-12	Shallow Foundation	Bearing capacity from insitu tests, factor influencing bearing capacity, codal provision, settlement	T1, T2 , R1
13-14	Shallow Foundation	Components of settlement, settlement of foundation on granular and clay deposits	T1, T2
15-16	Shallow Foundation	Allowable and maximum different settlement of buildings, codal provision, method of minimizing settlement.	T1, T2
17-18	Footing and Rafts	Types of foundation, structural design of spread footing,	T1, R1
19-20	Footing and Rafts	Design aspects of combined and mat foundation, codal provision.	T1, R1
21-23	Piles	Types of piles, factor influencing the selection of pile, carrying capacity in granular and cohesive soils,	T1, R1
24	Piles	Static and dynamic formulae, capacity from insitu test (SPT and SCPT)	T1,R1
25-27	Piles	Piles subjected to uplift, Negative skin friction, group capacity,	T1, T2
28-29	Piles	Settlement of pile group, interpretation of pile load test, pile caps, codal provisions.	T1, T2
30-32	Retaining Walls	Earth pressure theory, plastic equilibrium in soil, Active and passive state,	T1, T2, R1
33-35	Retaining Walls	Rankine's theory, Coloumb wedge theory, classical and limit equilibrium solution, earth pressure on retaining walls of simple configuration,	T1, T2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
36-38	Retaining Walls	Pressure on wall due to single line load alone,	T1, R1
39-40	Retaining Walls	Graphical method, Stability of retaining wall.	T1, T2, R1

Evaluation Scheme:

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	50 Minutes	20	24-09-2024	1-20	CB
Test 2	50 Minutes	20	12-11-2024	21-40	OB
Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	09-12-2024	1- 40	CB

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Date: 06/08/2024

Ms.JYOTI PATEL
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE421	**Water Resources Development**	**3**	**0**	**0**	**3**

Instructor-in-charge: Ms.JYOTI PATEL

Scope & Objective of the Course:

1. To understand basic concepts of irrigation and water requirements of crops.
2. To understand the concept of design of canal.
3. To learn about water logging
4. To understand the concepts of reservoir planning.

Outcome of the Course :-

1. Students are able to understand the different types of irrigation.
2. Student should be able to design the canal.
3. Students should be able to understand the behaviour of river.

Text Book T1	Irrigation Engineering and Hydraulic structure- S. K. Garg
Text Book T2	Irrigation Engineering – B.C. Punmia
Reference Book R1	Irrigation , water Resources and water power Engineering – Dr. P. N. Modi.

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
1	Method of Irrigation and Water Requirement of crops	Need for irrigation, Advantages and disadvantages of irrigation,	T1, T2,
2-4	Method of Irrigation and Water Requirement of crops	Development of irrigation in India, Types of irrigation system- Flow irrigation, Tank irrigation, lift irrigation, Tube well irrigation	T1, T2, R1
5-6	Method of Irrigation and Water Requirement of crops	Soil water crop relationship, soil group in India	T1, T2,

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
7-9	Method of Irrigation and Water Requirement of crops	Method of irrigation, requirement of irrigation methods, surface and sub surface irrigation.	T1, T2, R!
10	Canal Irrigation	Classification of canal, parts of canal irrigation system, canal alignment, lay-out of canal system,	T1, T2,
11-12	Canal Irrigation	Cross section of canal, losses in irrigation system, water requirements of irrigation channel	T1, T2
13-15	Canal Irrigation	Kennedy's silt theory, Lacey's theory, Lacey's regime equations.	T1, T2
16	Canal Irrigation	Maintenance of irrigation channels, sediment transport, silting of canals and its control.	T1, T2
17-18	Water logging and it's control	Causes and ill effect of water logging, prevention and control, reclamation of water logged and saline lands,	T1, R1
19-20	Water logging and it's control	Surface drainage, Design of lined channels	T1, R1
21-22	Water logging and it's control	Benefits of lining, economics of lining,	T1, R1
23-24	Water logging and it's control	Procedure and design of lined canals, distribution of canal waters, types of outlet.	T1, R1
25-27	River Behaviour	River characteristics, river patterns, classification of river training works,	T1, T2
28-29	River Behaviour	Methods of river training embankment , bank protection, spurs cutoffs, pitvhed island.	T1, T2, R1
30-32	River Behaviour	Flood control, flood estimation, levels and embankments, economics of flood control.	T1, R1

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
33-35	Reservoir planning	Introduction , types of reservoir, storage zone of a reservoir, mass curve and demand curve	T1, R1
36-38	Reservoir planning	Determination of reservoir capacity, safe field, flood routing, graphical method	T1, T2
39-40	Reservoir planning	Trial and error method, reservoir sedimentation, life of reservoir.	T1, T2. R1

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Quiz/Assignment/Lab	Throughout the Semester	20	**	---	CB
Comprehensive Exam	3 Hours	40	02-12-2024	1- 40	CB

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Date: 05/08/2024

Ms.JYOTI PATEL
Instructor-in-charge

The ICFAI University, Raipur

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

Course Code	Course Title	L	P	T	U
CE422	**Computer Aided Design in Civil Engineering**	**3**	**0**	**0**	**3**

Instructor-in-charge: Ms.JYOTI PATEL

Scope and Objective of the Course:
The theory practical experiences and relevant soft skills associated with this course are to be taught and implemented.
a. Interpret the given 2-Dimension drawing
b. Use CAD software for drafting and editing 2-Dimensional drawing

Text Book T1	Computer Aided design in civil Engineering – H. P. Pitroda
Text Book T2	Computer Aided design in civil Engineering – Dr. C N Chandrappa

Lecture-Wise-Plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
1	Fundamentals of computer Aided drawing	CAD software – meaning, various drafting, software for civil engineering application	T1, T2,
2-3	Fundamentals of computer Aided drawing	System requirement for drawing software, Advantages and Disadvantages	T1, T2,
4-6	Fundamentals of computer Aided drawing	Features of CAD screen	T1, T2,
7-8	Fundamentals of computer Aided drawing	Initial setting required to start new drawing from scratch	T1, T2,
9-10	Fundamentals of computer Aided drawing	Coordinate systems used in CAD	T1, T2,

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
11-12	CAD commands	Draw command – line, poly line, construction line, rectangle, polygon, circle, ellipse, hatch,	T1, T2
13-14	CAD commands	Modify command – erase, copy, mirror, offset, trim, move, extend, rotate, array, scale, chamfer, fillet, explode, stretch, join, brake, divide,	T1, T2
15-16	CAD commands	Enquiry – list, area, distance, mass property	T1, T2
17-18	CAD commands	Changing properties of entity-line type, color, scale, font size color style, Layer command.	T1
19-20	Introduction on to 2 Dimension command	Enter form of dimension style	T1
21-23	Introduction on to 2 Dimension command	Type of dimensions – quick dimension, linear dimension and continuous dimension	T1
24	Introduction on to 2 Dimension command	Align dimension, angle dimension and radius, diameter	T1
25-27	Introduction on to 2 Dimension command	Modify dimension style	T1, T2
28-29	Introduction on to 3 Dimension command	Necessity of 3 dimensional view	T1, T2
30-32	Introduction on to 3 Dimension command	Isometric drawing – meaning and necessity, use of isometric snap	T1, T2
33-35	Introduction on to 3 Dimension command	Isometric axes, isocircle, isotext.	T1, T2

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
36-38	Introduction on to 3 Dimension command	3 – Dimensional drawing – use of extrude	T1, T2
39-40	Introduction on to 3 Dimension command	Pressfull command	T1, T2

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Test 1	50 Minutes	20	25-09-2024	1-20	CB
Test 2	50 Minutes	20	13-11-2024	21-40	OB
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Comprehensive Exam	3 Hours	40	11-12-2024	1- 40	CB

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Date: 05/08/2024

Ms.JYOTI PATEL
Instructor-in-charge