Faculty of Science and Technology

First Semester, 2021 – 22
Course Handouts

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The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
ES 101	**Thermodynamics**	3	0	3

Instructor-in-charge: Mr. DILIP MISHRA

Learning Outcomes:
After successful completion of the course student will be able to
1. To apply theory and practice of zero, first and second laws of thermodynamics for closed and open systems.
2. To learn the complete concept of entropy, properties of water, entropy generation and entropy change in solid liquid and gases.

Textbook(s) T1	Fundamentals of Thermodynamics, Van Wylen, G.J & R E Sonntag, John Wiley, 6th Edition, 2004
Reference book(s) R1	Thermodynamics, P.K. Nag, Tata Mc Graw Hill Publishing Company limited, New Delhi, 3rd Edition, 2004.
R2	Fundamentals of Engineering thermodynamics, Michael J Moran and Howard N Shapiro, John Wiley, 5th Edition, 2004
R3	Thermodynamics, An Engineering Approach Yunus A. Cengel and Michael A Boles. Tata Mc Graw Hill Publishing Company limited, New Delhi,5th Edition, 2006

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
1	Basic introduction on thermodynamics	Introduction	Ch1.1-1.7 (T 1)
2-3	Units, concepts and definitions	Thermodynamic system, properties and state, processes and cycles, force, energy, pressure, specific volume, Zeroth law and numerical problems	Ch2.1-2.11 (T 1)
4-6	To study properties of a pure substance	Phase equilibrium, independent property, compressibility factor	Ch3.1-3.4 (T 1)
7-8	To know how to use steam tables	Study of steam tables and numerical problems on it	Ch3.6-3.7 (T 1)
9-10	To know the concept of work	Definition of work, understanding of piston work	Ch4.1-4.5 (T 1)
11-12	To know the concept of heat	Understanding of heat concept, and numerical problems on it	Ch4.6-4.8 (T 1)
13-15	To know the application of first law for closed systems	Definition of first law, first law for a change of state, internal energy and	Ch5.1-5.5 (T 1)

		enthalpy	
16-17	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	Ch5.6-5.9 (T 1)
18-20	Application of first law for control volume systems	Conservation of mass in control volume, first law for a control volume, SSSF process and examples on it	Ch6.1-6.4 (T 1)
21-22	To know the transient process	Study of USUF process, numerical problems on it	Ch6.5 (T 1)
23-26	Application of second law of thermodynamics	Heat engines and refrigerators, the Kelvin plank statement, reversible and irreversible processes, study of Carnot cycle and efficiency of a cycle	Ch7.1-7.6 (T 1)
27-28	To know the thermodynamic temperature scale	Thermodynamic and ideal gas temperature scale, numerical problems on it	Ch7.7-7.8 (T 1)
29-30	To know the entropy	Claussius inequality, study of entropy as a property, thermodynamic property relations, entropy change of reversible and irreversible processes, entropy generation and principle of increase of entropy	Ch8.1.-8.8 (T 1)
31-33	To know entropy change in solids, liquids and gases	Entropy change in solid, liquid and gases, polytropic process, entropy as rate equation, numerical problems	Ch8.9-8.12 (T 1)
34-36	Application of second law for control volume systems	Second law for control volume, study of entropy for both reversible and irreversible processes, principle of increase of entropy	Ch9.1-9.4 (T 1)
37-38	To know the concept of efficiency	Understanding efficiency, numerical problems	Ch9.5 (T 1)
39-40	To know the energy analysis of thermodynamic systems	Irreversibility and Availability, second law efficiency, energy balance equation, numerical problems	Ch10.1-10.3 (T 1)

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	16	16/11/2021	1-12	CB
Test 2	60 Minutes	17	07/12/2021	13- 27	CB
Test 3	60 Minutes	17	25/01/2021	28- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	16-02-2022	1- 40	CB

** To be announced in the class

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.

Mr. DILIP MISHRA
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
MA-101	**Mathematics-I**	**3**	**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 (T)	Engineering Mathematics, Dr Hari Arora, S K Kataria & Sons
Reference book(s) 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)
1-4	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 1 Ch-12 441-560
5-7	Introduction to linear transformations,	Introduction to linear transformations, The matrix of a linear transformation, Matrix operations, Determinants.	T 1 Ch-12 441-560
8-9	Inverse of a matrix	The inverse of a matrix, Characterizations of invertible matrices	T 1 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 1 Ch-12 441-560
13-14	Orthogonal transformation	Reduction of a matrix to diagonal form. Orthogonal transformation of symmetric matrix to diagonal form	T 1 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 1 Ch-6 155-201
26-31	Indeterminate forms	Indeterminate forms, Cauchy's rules for Indeterminate form, L' Hospital rules	T 1 Ch-7 202-236
32-41	Multivariable Calculus	Partial differentiation, Homogeneous function, Euler's Theorem, Total derivative of composite function. Minima and Maxima, Jacobians.	T 1 Ch-11 351-440

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	17/11/2021	1-12	CB
Test 2	60 Minutes	17	08/12/2021	13- 28	CB
Test 3	60 Minutes	16	24/01/2022	29- 42	CB
Quizzes (2)	20 Minutes each	10		**	CB
Comprehensive Exam	3 Hours	40	14/02/2022	1- 42	CB

** To be announced in the class

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.

Dr. SHANTI SWARUP DUBEY
INSTRUCTOR-IN-CHARGE

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science & Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
PH 101	**Physics I (Mechanics and wave optics)**	**3**	**2**	**3**

Instructor In-charge: Dr. RAVI SHRIVASTAVA

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 2. Developing the application of concepts to problems of practical interest. 3. Improving the concepts and improving the problem solving skills of students.

Textbook (s) **T1**	"Physics", Robert Resnick, David Halliday and Kenneth S. Krane Vol. 1 and 2, John Wiley, 5th ed., 2002.
Reference book (s) **R1**	Robert Resnick, David Halliday and Jearl Walker, Fundamentals of Physics, John Wiley, 6th ed., 2001.
R2	"Physics", Cutnell and Johnson, John Wiley, 5th ed., 2001.
R3	"Principles of Physics", Raymond A. Serway and John W. Jewett, Jr., Harcourt College Publishers, 3rd ed., 2002.

Lecture wise plan

Lecture Nos.	Learning objectives	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
1-3	To analyze collisions between two objects and apply law of conservation of linear momentum to study collisions	Collisions, Momentum and Impulse, Conservation laws, Two-body collisions	6.1-6.5
4-5	To understand the concept of Center of mass and apply Newton's laws to describe the motion of the center of mass of a complex system	Motion of a complex object, Two and Many-particle systems, Center of Mass, Conservation of momentum in a system of particles etc.	7.1-7.5
6-7	To study rotational motion with appropriate variables and relating them to one another	Rotational motion, Rotational variables, quantities as vectors, Rotation with constant angular acceleration, Linear and Angular variables etc.	8.1-8.5
8-12	To study causes of rotation and the concepts of translational motion in a new form	Torque, Rotational inertia, Torque due to gravity, Combination of rotational and translational motion	9.1-9.7

13-15	Applying Newton's laws for rotational motion and to understand the relation between angular velocity and angular momentum	Angular momentum of a single & system of particles, Conservation of angular momentum etc	10.1-10.4, 10.6
16-17	To understand the concept of work and energy through work-energy theorem	Work done by const. Force, Power, Work and KE in rotational motion, Work-Energy theorem and its General proof etc.(pg. No.240) and its limitations (pg. No. 242)	11.1-11.7 (exclude 11.5)
18	To understand the law of conservation of mechanical energy and apply to study number of problems in translational and rotational motion	Conservative forces, P.E, Conservation of energy etc	12.1-12.3
19	To understand the work done by conservative and non-conservative forces	Work done by ext. force, Frictional force, Center of Mass Energy etc	13.1-13.4
20-24	Basic ideas about free, damped and forced harmonic vibrations	Simple Harmonic Oscillator, Damped Harmonic Motion, Forced Oscillations	17.1-17.9
25-29	To understand the characteristics of different kinds of waves	Types of waves, Traveling waves, Energy in waves, Interference of waves, Standing waves etc	18.1-18.10
30-32	To understand Interference phenomena in light waves	Two-Source Interference, Double-Slit interference, Interference due to thin films	41.1-41.5
33-35	To understand the Diffraction phenomena in light waves	Wave theory of light, Single-Slit diffraction, Intensity calculation etc	42.1-42.4
36-37	To understand the diffraction phenomena in multiple slits	Multiple slits, Diffraction gratings, Dispersion and Resolving power	43.1-43.3
38-42	To understand the Polarization phenomena and obtaining polarized light due to different techniques	Polarization of electromagnetic waves, polarization by sheet, reflection, double refraction and scattering	44.1-44.6 (exclude 44.5, double scattering optional)

Physics I (Lab)

S. No.	Name of Experiment
1	Error Analysis and Graph Drawing
2	Study of Small Oscillation using a bar Pendulum
3	To measure the acceleration due to gravity using a simple pendulum.
4	To verify Kirchhoff's Law of Voltage and Current.
5	Resonance in LCR circuit
6	I-V Characteristic of a Solar Cell
7	Diffraction Grating
8	To find the frequency of a wave inputted from a function generator using Cathode Ray Oscilloscope (CRO)
9	To determine the dispersive power of a material of prism using Spectrometer
10	To determine the refractive index of the material of prism using Spectrometer

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	19/11/2021	1-12	CB
Test 2	60 Minutes	17	10/12/2021	13- 28	CB
Test 3	60 Minutes	16	21/01/2022	29- 42	CB
Lab	Throughout the Semester	10		**	CB
Comprehensive Exam	3 Hours	40	09/02/2022	1- 42	CB

** To be announced in the class

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.

Dr. RAVI SHRIVASTAVA
INSTRUCTOR-IN-CHARGE

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science & Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CH 101	**Chemistry**	**3**	**2**	**3**

Instructor-in-charge: Dr. PIYUSH THAKUR

Learning Outcomes:

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

1. It provides a comprehensive survey of underlying physical principles that govern the properties and behavior of chemical systems.
2. To understand the basic principles of spectroscopy
3. Mechanistic pathways of organic reactions. Gives an idea about reactions and reagents.

Textbook (s) T1	The Elements of Physical Chemistry, Peter Atkins and Julio de Paula, Fourth edition, Oxford University Press, 2005.
T2	Concise Inorganic Chemistry, J.D.Lee, Black Well Science, OUP, 5th Edition, 1996
T3	Organic Chemistry, R.T. Morrison and R.Boyd, Prentice- Hall, Sixth Edition, 2002.
Reference book (s)R1	Physical Chemistry, Ira N. Levine, Fifth Edition, Tata McGraw-Hill, 2002.
R2	Ernest L Eliel, Stereochemistry of Carbon Compounds, Tata McGraw-Hill Edition, 2002.
R3	Huheey, Keiter & Keiter, Inorganic Chemistry, Pearson Education, 2003.

Lecture Wise Plan

Lecture Nos.	Learning objectives	Topics to be covered	Reference (Ch./Sec./ Page Nos. of Text Book)
01-02	To understand the transformation of energy from heat into work and vice versa	**Thermodynamics** - first law Work & heat, internal energy and enthalpy.	T1 2.1 – 2.8
03-04	To understand the role of enthalpy in chemistry	Thermo chemistry Enthalpy changes accompanying Physical Change and Chemical Change	T1 3.1 – 3.7
04-06	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

07-10	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
11 – 12	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
13 -14	To understand the basic principles of spectroscopy	Spectroscopy General features of spectroscopy, Further Rotational spectroscopy, Vibrational information spectroscopy, Vibrational Raman spectra of diatomic molecules.	T1 19.1 – 19.15-20.1
15		The Beer-Lambert Law, The Franck-Condon principle	T1 505 & 512
16 - 17	Coordination Chemistry To understand the structure, properties, formation, Stability reactivity of Transition metal complexes.	Werner's work, recent studies on complexes, Effective atomic number	T2 195 – 200
18 - 19		Nomenclature of coordination Compounds	T2 230 – 232
20 - 21		Crystal Field Theory of Octahedral, Complexes, Magnetism and Thermodynamic aspects of crystal field splitting.	T2 204 – 214, 225 – 226
22		Tetragonal distortions of Octahedral Complexes (Jahn-Teller Distortions)	T2: 214 - 217
23 - 24		Square Planar and Tetrahedral Complexes.	T2 217 – 221
25 - 26	Stereo chemistry To understand the perspective and spatial orientations of atoms in an organic molecule.	Enantiomers, Chirality	T3 4.7 – 4.13
27		Configuration, Specification, Reactions of Stereo isomers	T3 4.14 – 4.19
28 -29		Conformational Isomerism, Factors affecting the stability of conformations and stereoisomerism of cyclic compounds	T3, 4.20, 3.3 – 3.5, 13.10 – 13,14
30		Geometric Isomerism	T3 8.6
31	Organic reaction mechanisms To understand the mechanistic pathways of organic reactions..	Nucleophilic aliphatic substitution reactions	T3 5.7 – 5.11
32		SN^2 Reaction, Stereochemistry	T3 5.12 – 5.14
33 -34		SN1 Reaction, Stereochemistry, Relative stability of carbocations	T3 5.15 – 5.22
35		SN^2 Vs SN^1	T3 5.23

36 - 37	Gives an idea about reactions and reagents	Elimination reactions, E^2 mechanism	T3 8.13 – 8.20
38 – 39		E^1 mechanism	T3 8.21 – 8.25
40 - 41		Electrophilic addition reaction	T3 9.2 – 9.9, 9.11, 9.15 – 9.19

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. Iodometrically.
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 Quizzes conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec. No.)	Remarks
Test 1	60 Minutes	17	18/11/2021	1-15	CB
Test 2	60 Minutes	17	09/12/2021	16- 30	CB
Test 3	60 Minutes	16	21/01/2022	31- 42	CB
Quizzes (2)	20 Minutes each	10		**	CB
Comprehensive Exam	3 Hours	40	07/02/2022	1- 42	CB

** To be announced in the class

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.

Dr. PIYUSH THAKUR
INSTRUCTOR-IN-CHARGE
Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course Code	Course Title	L	P	U
TA102	**Workshop Practice**	**3**	**2**	**4**

Course Instructor: 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 computes 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.

Textbook(s) T1	Elements of Manufacturing Processes by B.S.Nagendra Parashar,R.K.Mittal,PHI,2003
Reference book(s) R1	Principles of Manufacturing Materials and Processes by J.S.Campbell,TMH
R2	Principles of Manufacturing Materials and Processes by J.S.Campbell, TMH, 1999.
R3	Materials and Processes in Manufacturing, E.Paul DeGarmo, J.T.Black, PHI, 8th Edition, 2003.
R4	Workshop Manual by P Kannaiah & K L 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. OfText Book)
1	Basics of Manufacturing	Manufacturing Concepts	T 1.1toT 1.5
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
13-17	Different operations on lathe	Turning Operations	T 5.1,5.2,5.4, 5.6 to5.11

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	Mechanical Joining Processes	T 15.1to T 15.4.2, T 15.5 to T 15.7
29-30	Using non-conventional resources in manufacturing	Non-Conventional Resources in Manufacturing	T 17.1 to T 17.3, T 17.4.3, T 17.4.4

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 + drilling + fitting)	
4	Demonstrate use of different fitting tools –like work holding, marking, measuring, cutting, finishing and miscellaneous. Student will also prepare the report with sketch, specifications and applications of fitting tools demonstrated.
5	To prepare square shape object.
6	To perform drill operation on prepared Square shape object.
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).
Foundry & Furnace	
10	To study the mould of any pattern and casting of simple pattern.

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	8	20/11/2021	1-12	CB
Test 2	50 Minutes	8	11/12/2021	13- 23	CB
Test 3	50 Minutes	8	25/01/2022	24- 30	CB
Lab	Throughout the Semester	50		1-10 (Sr. No.)	CB
Comprehensive Exam	3 Hours	26	18/02/2022	1- 30	CB

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.

<div align="right">

Mr.HEMANT KUMAR DEWANGAN
INSTRUCTOR-IN-CHARGE

</div>

Date: 01/10/2021

The ICFAI University, Raipur

Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
TA103	**Computer Programming- I**	**3**	**0**	**3**

Instructor-in-charge: Mr.ASHISH KUMBHARE

Learning Outcomes:

1. The course covers the basics of programming and demonstrates fundamental programming techniques, customs and terms including the most common library functions and the usage of the pre processor.
2. This course helps the students in gaining the knowledge to write simple C language applications, mathematical and engineering problems.
3. This course helps to undertake future courses that assume this programming language as a background in computer programming. Topics include variables, data types, functions, control structures, pointers, strings, arrays, pointer and structure.

Textbook(s)		
	T1	Programming in ANSI C by E Balagurusamy, Tata McGraw Hill.
	T2	The C Programming Language by Brian Kernighan and Dennis Ritchie 2nd edition
Reference book(s)	R1	Let Us C Yashavant Kanetkar BPB.
	R2	Object Oriented Programming With C++ By Bala Gurusamy, Tata McGraw Hill.
NPTEL Link		**https://nptel.ac.in/courses/106/104/106104128/**

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference(Ch. /Sec./Page Nos. of Text Book)
1	To learn Introduction to Programming	Introduction to Programming	T1 CH-1 1.1,1.2
2	To learn background of programming	Programming Languages: Machine Level Languages, Assembly Level Languages, High Level Languages, and Programming Design Methodologies: Top Down and Bottom UP Program	T1 CH-1 1.3,1.4,1.5
3-4	To learn Elements of programming	Program Execution and Translation Process, Problem solving using Algorithms and Flowcharts.	T1 CH-1 1.6,1.7
6	To learn Introduction to C Programming	Features of C and its Basic Structure, Simple C programs	T1 CH-1 1.8,1.9
7-8	To learn Constant, variable in C Programming	Constants, Concept of an Integer and Variable, Rules for naming Variables and assigning values to variables	T1 CH-2 2.3,2.4, 2.5,2.6

		Arithmetic Operators, Unary Operators, Relational and Logical Operators, The Conditional Operator, Library Functions, Bitwise Operators, The Increment and Decrement Operators, The Size of Operator, Precedence of operators.	
9-10	To learn operators in C Programming	Arithmetic Operators, Unary Operators, Relational and Logical Operators, The Conditional Operator, Library Functions, Bitwise Operators, The Increment and Decrement Operators, The Size of Operator, Precedence of operators.	T1 CH-3 3.1,3.2,3.3,3.4,3.5, 3.6,3.7
11-12	To learn Data types in C Programming	Data Types and Input /Output Operators	T1 CH-2 2.7,2.8
13-16	To learn Control Statements and Decision Making Statement	The if statement, The if-else statement, Nesting of if statements, The conditional expression, The switch statement,	T1 CH-5 5.1,5.2,5.3,5.4,5.5, 5.6,5.7
17-20	To learn looping statement	The while loop, The do…while loop, The for loop, The nesting of for loops, The break statement and continue statement.	T1 CH-6 6.1,6.2,6.3,6.4,6.5
21	To learn concept of function	Function Philosophy, Function Basics, Function Prototypes	T1 CH-9 9.1,9.2
22-23	To learn function parameters concept	Passing Parameters: Passing Parameter by value and Passing Parameter by reference	T1 CH-9 9.3,9.4,9.5,9.6
24-25	To learn parameter passing	passing string to function, Passing array to function, Structures and Functions Recursion	T1 CH-9 9.9,9.10,9.11,9.12, 9.13,9.16
26-28	To learn Concept of array	One Dimensional Arrays, Multidimensional Arrays, Strings	T1 CH-7 7.1,7.2.7.3,7.7,7.8, 7.9
29-30	To learn basics of pointers	Basics of Pointers, Pointers and One-dimensional Arrays	T1 CH-11 11.1,11.2,11.3
31	To learn Pointer Arithmetic	Pointer Arithmetic, Pointer Subtraction and Comparison	T1 CH-11 11.4,11.5,11.6
32-33	To compare pointer and array	Similarities between Pointers and One-dimensional Arrays.	T1 CH-11 11.7,11.8,11.9
34-35	To learn Basics of Structures	Basics of Structures, Arrays of Structures,	T1 CH-10 10.1,10.2
36	To learn structure operations	Pointers to Structures, Self-referential Structures,	T1 CH-10 10.8,10.9
37	To learn Introduction to Object oriented Programming	Introduction to Object oriented Programming, Difference between POP and OOP	R2 CH-1 1.2,1.3,1.4
38-40	To learn Features of Object oriented Programming	Features of OOP, Class, object, Encapsulation, Inheritance, Polymorphism	R2 CH-1 1.5,1.6

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	17/11/2021	1-16	CB
Test 2	60 Minutes	17	09/12/2021	17- 28	CB
Test 3	60 Minutes	16	24/01/2022	29- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	11/02/2022	1- 40	CB

** To be announced in the class

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.

Mr.ASHISH KUMBHARE
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

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

Course Instructor: Dr. SANJAY KUMAR YADAV

Learning Outcomes: This course is designed to familiarize students with the necessary background about marketing, advertising and sales, product lines and new product development, branding, pricing, channels of marketing, marketing promotion

Textbook(s) T1	Rovwer J.C. & Daniel : Management & Practice, John Wiley & Sons
T2	Koontz & Eldritch : Management, International Student, Edn. Tokyo 1980
T3	R.D Agrawal : Organization & Management, Mc Graw Hill, New Delhi
T4	Diwan & Agrawal : Management, Principle and Practices, Excel Books
T5	Subroto Sengupta / Tata McGraw Hill
T6	Principles of Business Management, SBPD Publication

Lecture-wise plan:

Session	Topics	Reference (Ch./Sec./Pg No)
1	Concept of Management: Definition Management	T1(3,4,5)
2	Functions and Responsibilities of Management, Levels of Management	T2(8,9), T1(10)
3	Levels of Management	T2(18)
4	Management Thought and Thinkers	T1(27)
5	Robert Owen, F.W.Taylor	T1(21)
6	Henry Fayol etc.	T3(29), (02)
7	Neo Classical Theories	T2(40), T4(21)
8	Planning: Objective	T2(33)
9	Types and level of planning	T1(38)
10	Strategies and Policies	T3(31)
11	SWOT analysis	
12	Decision Making-Meaning, Importance	
13	Organizing	T4(26)
14	Nature and purpose of organizing	T3(28)
15-16	Nature& Scope of Staffing	
17-18	Manpower Planning	
19-22	Organization structure	T1(13)
23	Organization	T1(12)
24	Line and Staff authority	T2(45)
25	Delegation of authority	T1,(65)

26	Directing:	
27	Controling	
28	Creativity	T1(66)
29	Innovation Motivation-	T1(76)
30	Motivation Theories	T1(77)
31	Motivation Theories	T1(78)
32	Leadership,.	T3(48)
33-34	Leadership theories	T3(49-51)
35-36	Communication,	T1 (78)
37	Diversity	
38	Controlling	T2(88)
39	Meaning, Process and Control Techniques,	T1 (102)
40	Process and Control Techniques	T1 (104)

* The course instructor might make minor changes in the session plan. In such case, the class will be informed in advance.

Evaluation Scheme:
Student evaluation is based on the series of Assessment Tests and 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	16	24.09.2021	1-10	Closed Book exam
Test 2	50 Minutes	17	28.10.2021	11-20	Closed Book exam
Test 3	50 Minutes	17	07.12.2021	21-40	Closed Book exam
Quizzes (2)	20 Minutes each	5 each		Continuous	Closed Book exam
Comprehensive Examination	3 Hrs	40	04/01/2022	1-40	Closed Book exam

* The dates mentioned are tentative.

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.

Dr. SANJAY KUMAR YADAV
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
MA201	**Mathematics-III**	**3**	**0**	**3**

Instructor-in-charge: Dr. SHANTI SWARUP DUBEY

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(s) 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
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	T1 Ch-4 170-212

		ordinary differential equation.	
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 Assessment Tests and Tests conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	23/09/2021	1-12	CB
Test 2	60 Minutes	17	17/11/2021	13- 28	CB
Test 3	60 Minutes	16	08/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10		**	CB
Comprehensive Exam	3 Hours	40	06/01/2022	1- 42	CB

** To be announced in the class

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.

Dr. SHANTI SWARUP DUBEY
INSTRUCTOR-IN-CHARGE

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
ES201	**Electrical Sciences I**	**3**	**0**	**3**

Instructor-in-charge: Mr.K.NAGAIAH

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 nodel 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 and Boolean Functions

Textbook(s) T1	Fundamentals of Electrical Engineering, Leonard S. Bobrow, Oxford University Press, 2nd Edition.1996.
T2	Principles of Electronics By V.K. Mehta ROHIT MEHTA
Reference book(s)	
R1	Engineering circuit analysis, W.H.Hayt , J.E. Kemmerly, McGraw Hill company, 6th Edition, 2000.
R2	Electronic Devices & Circuits, Millman & Halkias McGraw Hill, 2002.
R3	Electrical Engineering: Principles and Applications, Alan R. Hambley, Publisher, 2nd Edition 2003.
R4	Basic Electric Circuit Analysis, David E Johnson et al, John Wiley, 5th Edition 2002.
R5	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)
1-2	To understand the concept of basic circuit Elements	Introduction to Basic Circuit theory & Circuit elements	T1(1.1,1.2), R1(1.1 - 1.6)
3-4	To understand the concept of basic electrical laws	Kirchhoff's Current & Voltage Laws	T1(1.3, 1.4), R1(2.2-2.6)
5	To understand the concept of basic sources	Independent & Dependent Sources	T1(1.8)
6-7	To understand the methods of circuit Analysis	Mesh & Nodal Analysis Ideal Amplifier (op-amp) application	T1(2.1,2.3, R1(3.1 – 3.7)

8-9	To understand the network theorems	Thevenins & Nortons theorem	T1(2.4), R1(4.5 -4.8)
10-11	To understand the concept of basic theorems	Linearity, Superposition, Maximum power transfer theorems	T1(2.5,2.6), R1(4.1 – 4.4)
12	To study the circuits having energy storage elements	Energy storage elements (Inductors & Capacitors) their relationships & their natural responses	T1(1.6, 1.7), R1(6.1 -6.5)
13-14	To study forced and free response of a circuit	First order & second order System responses	T1(3.2, 3.3), R1(7.1 -7.6)
15	To study basics of semiconductors,	Semiconductors: intrinsic and doped; p-n junction	T1(6.2)
16-17	To study operation and characteristics of ordinary junction diodes and Zener Diodes	Junction Diode & its characteristics	T1(6.3,6.4,6.5) T1(6.6)
18-20	To understand the concept of rectifiers and filters	Rectifier circuits & filters Application of diode	T1(6.3,6.4,6.5) T1(6.6)
21	To study operation and characteristics Zener Diodes	Zener Diode & its characteristics	T1(6.3,6.4,6.5) T1(6.6)
22-23	To study operation of transistors	Introducing transistors To study operation of transistors	T1(7.1)
24-25	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)
26-27	To study operation of FETs	FETS, their operation & characteristics	T1(8.1)
28-29	To understand the concept of MOSFETs & CMOS	MOSFETS & its characteristics CMOS its Characteristics (No application of CMOS)	T2 Chapter 19 (506-553)
30-31	To understand biasing operation	Biasing the BJT	T1(9.1)
32-34	To study the AC model concepts	AC Model of BJT (Low frequency model)BJT Amplifier, Common emitter configuration	T2 chapter 8
35-36	To Understand the feedback amplifiers	Concept on Feed back & application	T2 Chapter 13 (335-363)
37-40	To understand the digital logic basics	Digital logic gates & its Truth Tables, Boolean Algebra & Boolean Functions	T2 Chapter (729- 773)
41	To understand the operation of digital circuits	Basic digital circuits	T2 Chapter (729-773)
42	To understand the operation of Two port network	Understanding of Two port Network	T2 Chapter (729-773)

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	27/9/2021	1-13	CB
Test 2	60 Minutes	17	19/11/2021	14- 28	CB
Test 3	60 Minutes	16	10/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	12/01/2022	1- 42	CB

** To be announced in the class

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.

Mr. K.NAGAIAH
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
TA204	**Technical Report Writing**	**3**	**0**	**3**

Team of Instructors: Ms. RASHMI KULKARNI

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.

Text books T1	
Reference books R1	Technical Report Wrting by Kieran Morgan
R2	Managing Your Documentation Projects by JoAnn T Hackos
R3	The Insider's Guide to Technical Report Writing by Krista Van Laan
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
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
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)
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

Classroom Practical

S.No	Name of the Practical
1	Applications and types of technical documents
2	Preparation and presentation of various technical documents
3	Projects and presentations on the basis of technical report writing structure

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	24/09/2021	1-15	CB
Test 2	60 Minutes	17	18/11/2021	16- 29	CB
Test 3	60 Minutes	16	09/12/2021	30- 40	CB
Practical	Throughout the Semester	10		---	CB
Comprehensive Exam	3 Hours	40	08/01/2022	1- 40	CB

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.

Ms. RASHMI KULKARNI
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
EC211	**Digital Logic Design**	**2**	**2**	**3**

Instructor-in-charge: Dr. K.KISHORE KUMAR

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 up to 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 analyze 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 books	
T1	Digital Design, M. Morris Mano, Pearson, 5th Edition, 2013
Reference books	
R1	Fundamentals of Logic Design, Charles H. Roth, Jr., Cengage Learning,7th Edition, 2014
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's and 2's Complements	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
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 &4 Variables), 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 and 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 Asynchronous counters, 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
6	Comparators
7	Implementation of Multiplexers and Demultiplexers
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 Quizzes conducted during the course of semester followed by a comprehensive examination.
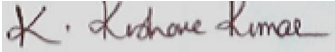
Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	28/09/2021	1-12	CB
Test 2	60 Minutes	17	19/11/2021	13- 28	CB
Test 3	60 Minutes	16	10/12/2021	29- 42	CB
Lab	Throughout the Semester	10	**	**	CB
Comprehensive Exam	3 Hours	40	08/01/2022	1- 42	CB

** To be announced in the class

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: 01/10/2021

Dr. K.KISHORE KUMAR
Instructor-In-charge

The ICFAI University, Raipur

Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
EC212	**Electronic Device& Circuits**	**3**	**0**	**3**

Instructor-in-charge: Dr.K.KISHORE KUMAR

Learning Outcomes:
After successful completion of the course student will be able to
1. Understand the basic electronic devices and its working principles and applications.
2.Learn the concepts of Amplifiers, rectifiers methods and their applications
3.Relate small-signal models of BJTsto their behavior in practical electronic circuits
4. Use the knowledge of small signal models to design electronic circuits to predict & measure the performance of electronic circuits.

Text books	
T1	Electronic Devices and Circuits ,R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition, 2006
Reference books	
R1	Electronic Devices & Circuits, Millman & Halkias McGraw Hill, 2002
R2	Electronic Devices and Circuits,David.A.Bell,Oxford University Press,India5th Edition, 2008
R3	Electronic Devices & Circuits ,S. Shalivananan, N.Suresh Kumar, A.Vallava Raj, Tata McGraw Hill, 2003.

Lecture-wise plan			
Lecture Nos	**Learning Objective**	**Topics to be covered**	**Reference**
1-3	Introduction to semiconductor physics	Classification of Materials , Semiconductor Materials, n –type and p-type semiconductors	1.1-1.5
4-6	Introduction to two terminal PN Junction Diode	PN junction construction working ,VI characteristics ,Symbol	1.6-1.10
7-9	Applications of PN Junction Diode-Rectifiers	Rectifier Circuits, Types of Rectifiers , Half wave and Full wave rectifiers	2.7-2.8
10-11	Applications of PN Junction Diode-Clippers	Clippers Circuits, series and parallel clipper circuits with and without biasing voltage	2.9
12-13	Introduction to Zener Diode	Zener Diode construction, working , VI characteristics, symbol	1.14

14-17	Introduction to Bipolar Junction Transistor	BJT construction, working, characteristics, Current components, Types and symbols	3.1-3.3
18- 19	Configurations of BJT	Common Base circuit, Common Emitter circuit and Common Collector circuits	3.4 -3.7
20-21	Common Base Configuration	Transistor alpha, Input and Output characteristics of transistor in Common Base	3.4
22-24	Common Emitter and Common Collector Configuration	Input and Output characteristics of transistor in Common Emitter, and Common collector configurations	3.6-3.7
25-26	BJT Applications	BJT as an amplifier and switch, Regions of operation of BJT	3-5
27-28	DC Biasing of BJTs	Introduction to DC Load line analysis ,DC Load line and Bias point	4.1-4.2
29-31	Introduction to BJT Biasing	Base Bias, Collector-to-base bias and Voltage-divider bias and their comparisons	4.3-4.6
32-35	Introduction to Field Effect Transistors	FET construction, working, characteristics, Types and symbols	5.1-5.3
36-38	Introduction to MOSFETs	MOSFET construction, working, characteristics, Types and symbols	5-6-5.8
39-40	Introduction to special purpose Electronics devices	Voltage variable capacitor devices, Thermistors	20.3,20.11
41-42	Introduction to special purpose Electronics devices	Schottky, PIN ,current limiting diodes and power switching & control devices	R2:22.4

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	28/09/2021	1-12	CB
Test 2	60 Minutes	17	19/11/2021	13- 28	CB
Test 3	60 Minutes	16	10/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	10/01/2022	1- 42	CB

** To be announced in the class

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.

Dr. K.KISHORE KUMAR
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS 211	**Object Orient Programming**	**3**	**2**	**4**

Instructor-in-charge: Ms. NISHA THAKUR

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

1. Isolate and fix common errors in C++ programs
2. Manipulate various C/C++ Datatypes, such as arrays, strings, and pointers
3. Use memory appropriately, including proper allocation/deallocation procedures
4. Apply object-oriented approaches to software problems in C++
5. Understand and use the basic programming constructs of C/C++
6. Write small-scale C++ programs using the above skills

Text BookT1	E. Balagurusamy – Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill, 2011.
T2	Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition, Pearson India
Reference book(s) R1	Herbert Schildt, The complete reference C++Fourth Edition Tata McGraw- Hill

Lecture wise plan

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books) R1
1	To learn the OOPs fundamentals	What is OOPs? Procedure Oriented Programming vs. Object Oriented Programming.	255
2-4	To learn the OOP's principles	Abstraction Encapsulation, Polymorphism and Inheritance	257-260
5-7	To learn about Classes and Objects	Objects and Instances Class Members	289
8-9	To know about Language Constructs	Programming basics, data type, loops and decisions, Control statements	70-88
10-13	To Learn about Class Member functions and Objects	Classes and Member functions Constructors and destructors	289-324
14-16	To learn about Strings Objects	Creation and Manipulation of Strings String I/O	683-693

17-19	To define and use operators for user defined types	Operator Overloading and multiple overloading with type conversion	384-414
20-23	To learn about Inheritance	Class Single and Multiple Inheritance,	417-425
24-25	To learn about Inheritance	Member Specifiers Derived classes	426-430
26-28	To learn about Polymorphism and need and importance of Virtual Functions	Virtual Function, function call binding, late binding	444-447
29-30	To learn about Polymorphism and need and importance of Virtual Functions	Friend and static function, this operator	332, 310-315, 297-302
31-33	To learn about handling the file Object	Creating and Manipulating File and Streams	488
34-35	To learn about handling the file Object	Mechanism, try, throw and catch	494
36-37	To learn about handling the file Object	Catching all Exceptions, Multiple catches	495
38-40	To learn about handling the file Object	Programs related to exception handling	506

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	28/9/2021	1-11	CB
Test 2	60 Minutes	17	22/10/2021	12- 25	CB
Test 3	60 Minutes	16	22/11/2021	26- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	18/12/2021	1- 40	CB

** To be announced in the class

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.

Ms.NISHA THAKUR
Instructor-In-charge

Date: 01/10/21

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS315	**Database Management System**	**3**	**0**	**3**

Instructor in charge: Mr. NAVEEN KUMAR VAISHNAV

Learning Outcome –

After successful completion of the course student will be able to:
1. To understand basic concepts and implementation issues of Data base System.
2. To learn ER-modeling, Data models, Normalization and Functional dependencies, Relational Algebra, Implementation and Advanced Concepts.
3. To learn the hands-on database operations in SQL interface.

Textbook T1	Data base System Concepts,SilberschatzA,KorthHF,andSudarshanS,TMH,2002
Referencebook(s) R1	Data base Management Systems, Ramakrishna R.& Gehrke J, 3rdEdition,Mc-GrawHill, 2002
R2	Data base Systems The Complete book, Hector GMolina, Jeffrey D.Ullman and Jennifer Widom,Pearson Education,2002
NPTEL	https://nptel.ac.in/courses/106/105/106105175/
SWAYAM	https://onlinecourses.swayam2.ac.in/cec19_cs05/preview

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
1	Introduction to Data base Systems	Course overview, Overview of modern DBMS	T1: 1.1-1.13
2-4	Data modeling	Basic elements of ER model, Data base Design through ER-model	T1: 7.1-7.10
5-9	Understanding Relational model	Relation as a mathematical model, ER to Relational model	T1: 2.1- 2.6
10-14	Introduction to SQL constructs	SELECT…FROM, WHERE… GROUP BY… HAVING… ORDERBY…	T1: 3.1-3.9
15-19	Understanding additional SQL structures	INSERT, DELETE, UPDATE, VIEW definition and use, Temporary tables, Nested queries	T1: 4.1-4.5
20-25	Data base design through Functional Dependencies & Normalization	Functional dependencies, Normal Forms: 1NF,2NF, 3NF, BCNF, Multi-valueddependencies:4NF,5NF	T1: 8.1-8.9
26-28	Formal Query Languages	Relational algebra operators, Relational algebra queries	T1: 61.-6.4
29-32	Integrity constraints	Integrity constraints: Not null, unique,	T1: 4.4-4.5

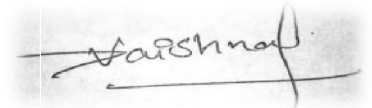|		check, primary key, foreign key, references, Triggers.	
32-36	Query processing	Query execution	T1: 12.1-12.8
37 - 40	Transaction Management	Concurrency control, Deadlock Issues	T1: 14.1-14.10

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lecture No)	Remarks
Test 1	60 Minutes	17	28/09/2021	1-14	CB
Test 2	60 Minutes	17	20/11/2021	15- 25	CB
Test 3	60 Minutes	16	11/12/2021	26-40	CB
Quizzes (2)	20 Minutes each	10	28/12/2021	**	CB
Comprehensive Exam	3 Hours	40	22/01/2021	1- 40	CB

** To be announced in the class

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.

Mr. NAVEEN KUMAR VAISHNAV
INSTRUCTOR-IN-CHARGE

Date – 01/10/21

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

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

Course Instructor: Dr. SANJAY KUMAR YADAV

Learning Outcomes: This course is designed to familiarize students with the necessary background about marketing, advertising and sales, product lines and new product development, branding, pricing, channels of marketing, marketing promotion

Textbook(s) T1	Rovwer J.C. & Daniel : Management & Practice, John Wiley & Sons
T2	Koontz & Eldritch: Management, International Student, Edn. Tokyo 1980
T3	R.D Agrawal : Organization & Management, Mc Graw Hill, New Delhi
T4	Diwan & Agrawal : Management, Principle and Practices, Excel Books
T5	Subroto Sengupta / Tata McGraw Hill
T6	Principles of Business Management, SBPD Publication

Lecture-wise plan:

Session	Topics	Reference (Ch./Sec./Pg No)
1	Concept of Management: Definition Management	T1(3,4,5)
2	Functions and Responsibilities of Management, Levels of Management	T2(8,9), T1(10)
3	Levels of Management	T2(18)
4	Management Thought and Thinkers	T1(27)
5	Robert Owen, F.W.Taylor	T1(21)
6	Henry Fayol etc.	T3(29), (02)
7	Neo Classical Theories	T2(40), T4(21)
8	Planning: Objective	T2(33)
9	Types and level of planning	T1(38)
10	Strategies and Policies	T3(31)
11	SWOT analysis	
12	Decision Making-Meaning, Importance	
13	Organizing	T4(26)
14	Nature and purpose of organizing	T3(28)
15-16	Nature& Scope of Staffing	
17-18	Manpower Planning	
19-22	Organization structure	T1(13)
23	Organization	T1(12)
24	Line and Staff authority	T2(45)
25	Delegation of authority	T1,(65)
26	Directing:	

27	Controling	
28	Creativity	T1(66)
29	Innovation Motivation-	T1(76)
30	Motivation Theories	T1(77)
31	Motivation Theories	T1(78)
32	Leadership,.	T3(48)
33-34	Leadership theories	T3(49-51)
35-36	Communication,	T1 (78)
37	Diversity	
38	Controlling	T2(88)
39	Meaning, Process and Control Techniques,	T1 (102)
40	Process and Control Techniques	T1 (104)

The course instructor might make minor changes in the session plan. In such case, the class will be informed in advance.

Evaluation Scheme:

Student evaluation is based on the series of Assessment Tests and 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	16	24.09.2021	1-10	Closed Book exam
Test 2	50 Minutes	17	28.10.2021	11-20	Closed Book exam
Test 3	50 Minutes	17	19.11.2021	21-40	Closed Book exam
Quizzes (2)	20 Minutes each	5 each	**	Continuous	Closed Book exam
Comprehensive Examination	3 Hrs	40	04/01/2022	1-40	Closed Book exam

* The dates mentioned are tentative.

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: 01/10/21

Dr. SANJAY KUMAR YADAV
Course Instructor

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
ME 222	**Design of Machine Elements**	**3**	**0**	**3**

Instructor-in-charge: Mr. DILIP MISHRA

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

1. To apply theory and practice of Design of Mechanical Elements to real life design applications.
2. To learn the qualitative analysis using failure theories, equations to illustrate the concepts and to gain the knowledge of different joints, bearings, gears and other fixed and flexible machine elements.
3. To understand the working and analysis of shear force and bending moment, design fundamentals, application of strength of material principles, selection of components, and selection of materials for a given application.

Textbook (T)	Mechanical Engineering design, J E Shigley, Eighth Edition, Mc-Graw Hill, 2008.
Reference book(s) R1	V B Bhandari, Design Of Machine Elements, Tata Mc-Graw Hill publishing Co, Second Edition 2007.
R2	Robert L Norton, Machine Design an integrated approach, Third edition, Pearson Education Asia, 2006
R3	Robert C Juvinall, Kurt M Marshek, Fundamentals of machine component design, 4th edition, John Wiley & Sons, Inc, Singapore, 2005.
NPTEL	https://nptel.ac.in/courses/112/105/112105125/

Lecture wise plan

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
1	Fundamentals of mechanical design	Mech. engineering design, stress & strain, design factor and factor of safety, etc.	Ch1 T1
2-3	Engineering materials and their properties	Types of materials, Material selection, properties, etc	Ch.2 T1
4-7	Load and Stress analysis	Equilibrium, FBD, SF & BM diagrams, Normal stresses and shear stresses for beams in bending, torsion and stress concentration, etc	Ch.3 T1
8-10	Theories of Failure and failure resulting from static loading	Failure theories, max shear stress theory and distortion energy theory for ductile materials, etc	Ch.5 T1

11-13	Fatigue failure resulting from variable loading	SN diagram, endurance limit, Low cycle and high cycle fatigue, fluctuating stresses, cumulative Fatigue damage, etc	Ch 6 T1
14-16	Detailed design of non-permanent joints	Screws, Fasteners, Bolted connections, etc.	Ch.8 T1
17-19	Detailed design of permanent joints	Symbols, types of welded joints, stresses in welded joints in torsion and bending, etc	Ch.9 T1
20-22	Detailed design of Mechanical Springs	Stresses in helical springs, spring materials, critical frequency of helical springs, etc	Ch.10T1
23-25	Detailed design of Rolling-contact bearings	Types and life of bearings, selection of ball and cylindrical roller bearing, etc	Ch.11 T1
26-29	Detailed design of Journal bearings	Types of Lubrication, hydrodynamic theory, thrust bearings, etc	Ch.12T1
30-32	Detailed design of Gears	Types of gears, force analysis on spur, bevel, helical and worm gearing, etc	Ch.13T1
33-34	Detailed design of Shafts	Shaft materials, shaft layout, shaft design for stress, critical speeds for shaft, etc	Ch.7 T1
35-37	Design of flexible machine elements	Flexible Machine elements	Ch.17 T1
38-40	Numerical	Rigid and Flexible Machine elements	-

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	16	24/09/2021	1-12	CB
Test 2	60 Minutes	17	28/10/2021	13- 27	CB
Test 3	60 Minutes	17	19/11/2021	28- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	06/01/2022	1- 40	CB

** To be announced in the class

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Mr. DILIP MISHRA
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
ME 314	**Control Systems**	**3**	**0**	**3**

Instructor-in-charge: Dr. MANORANJAN DASH

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

1. Know about various parts of process 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

Textbook(s) T1	Control systems Engineering, Nagrath I. J. and M. Gopal, New Age International., 4[th]edition, 2005
Reference book(s) R1	Control Systems, A. Nagoor Kani,RBAPublications,1998
R2	Automatic Control Systems, B.C. Kuo, Prentice Hall of India, 7[th]Edition, 2003
R3	Control Systems: Principles and design, M. Gopal, Tata-McGraw Hill, 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 servo mechanisms; examples	1.1-1.4,1.6
3,4	Introduction to the modeling of physical systems	Differential equations of physical systems; mechanical systems and electric a 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
9,10	Representation using signal flowgraph	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

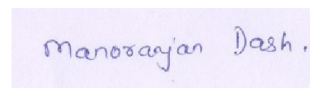| 13	Do	Effect of feedback on control systems with disturbance signals regenerative feedback	3.4-3.6
14.	Feedback control system example	Temperature feedback control system	3.7
15,16	Control system components	D.C and A.C servo motors, potentiometers and synchros	4.3
17	Time domain analysis of controlsystem	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 control systems 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
27,28	Do	Root locus construction rules; examples	7.3
29,30	Frequency response methods	Introduction to Frequency Response and correlation with time response, Polar plots	8.1- 8.3
31,32	Do	Bode plots	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:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	28/09/2021	1-12	CB
Test 2	60 Minutes	17	20/11/2021	13- 28	CB
Test 3	60 Minutes	16	11/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	-----	**	CB
Comprehensive Exam	3 Hours	40	12/01/2022	1- 42	CB

** To be announced in the class

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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.

Manoranjan Dash.

Dr. MANORANJAN DASH

Date: 01/10/2021   **Instructor-In-charge**

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
ME 312	**Power Plant Engineering**	**3**	**0**	**3**

Instructor-in-charge: Mr.HEMANT KUMAR DEWANGAN

Learning Objectives:

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

1. Learn the concept of production of electrical energy using various mechanical related equipment.
2. Learn the various thermodynamic substances like water, steam, gas, nuclear being used extensively as the energy carrying source inside these machines.
3. Learn the other non-conventional energies like wind, solar, geothermal energy conversion processes also discussed.
4. Get that the main focus of the course still lies in the area of thermal power plants but new renewable energy concept also being introduced.

Textbook(s)/Reference book(s):

Textbook(s)	
T1	Power Plant engineering, P K Nag, Tata McGraw Hill, 3rd Edition,2008
Reference book(s)	
R1	Power Plant Technology, M.M.EI-Wahil, McGraw-hill, International Edition 1984
R2	Power Plant Engineering, Arora, Domkundwar, Dhanpat Rai & Co, 5thEdition, New Delhi
NPTEL	https://nptel.ac.in/courses/112/107/112107291/

Lecture-wise Plan:

Lecture No.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. Of Text Book)
01	Chapter 01 – Introduction	Economics of Power Generation: Introduction to various types of power plants, load-duration curves, location, various types of costs	T1.1 to T1.4
02		Indian Energy scenario and Coal –fuelled electricity generating unit.	T1.5 to T1.6
03	Chapter 02 – Analysis of Steam Cycles	Introduction to different cycles	T2.1
04		Steam power plant, Rankine cycle	T2.2
05		Carnot cycle, reheating of steam, regeneration,	T2.3 to T2.9
		Feed water heating, deaerator	

06		Typical layout of steam power plant, super critical pressure cycles	T2.12 to T2.14
07		Various efficiencies in steam power plant and cogeneration of power and process heat.	T2.15 to T2.17
08	Chapter 03 – Combined cycle power generation	Introduction to Combined cycle power generation	T3.1
09		Flaws of steam as working fluid, vapour power cycles	T3.1
10		Binary vapour cycles, coupled cycles combined cycle plants and gas turbine steam turbine power plant.	T3.2 to T3.6
11	Chapter 04 – Fuels and Combustion	Introduction to fuels and combustion	T4.1 to T4.6
12		Fuels-coal, coal analysis, fuel oil. stoichiometric air, actual air-fuel ratio	T4.7 to T4.21
13	Chapter 05 – Combustion Mechanism	Combustion Equipment and Firing methods: equipment for burning coal, fuel bed combustion, mechanical stokers	T5.1 to T5.5
14		Pulverized coal firing system, fluidized bed combustion	T5.7 to T5.10
15	Chapter 06 – Steam Generators	Types, fire tube boilers	T6.1 to T6.2
16		Water tube boilers, economizers, super heaters, reheaters, air preheater	T6.3 to T6.8
17		Fluidized bed boilers electrostatic precipitators	T6.9 to T6.10
18		Ash handling system, feed water treatment, deaeration	T6.12 to 6.14
19	Chapter 07 – Steam turbines	Introduction	T7.1
20		Flow through nozzles, turbine blading	T7.2 to T7.3
21		Simple impulse and reaction turbine	T7.4
22	Chapter 08 – Condenser, feed water and circulating water systems	Introduction	T8.1
23		Types of condensers	T8.2 to T8.3
24		Feed water heaters, cooling tower	T8.4 to T8.7
25	Chapter 09 – Nuclear power plant	Types of Nuclear Reactors	T9.15
26		Pressurised water reactor(PWR)	T9.16
27		Boiling water reactor(BWR)	T9.17
28		Liquid metal fast breeder reactor, heavy water reactor	T9.18 to T9.19
29	Chapter 10 - Hydroelectric power plants	Introduction, advantages and disadvantages of water power	T10.1 to T10.2
30		Surge tanks, draft tube	T10.23
31		Classification of hydroelectric power plants	T10.9
32		Hydraulic turbines	T10.10
33	Chapter 11 – Diesel engine power plant	applications of diesel engines in power plants	T11.1
34		Schematic layout of diesel engine power plant	T11.4
35		Combustion in a CI engine and super charging	T11.5 to T11.7
36	Chapter 12 – Gas turbine power plant	Introduction	T12.1
37		Components of gas turbine plant	T12.2
38	Chapter 13- Non-conventional Power generation	Direct Energy Conversion	T13.1
39		thermoelectric power generation, geothermal energy and fuel cells	T13.2 to T13.4
40		Environmental Degradation and use of renewable energy	T14.1 to T14.9

Evaluation Scheme:
Student evaluation is based on the series of 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	17	28/09/2021	1-12	CB
Test 2	50 Minutes	17	20/11/2021	13- 28	CB
Test 3	50 Minutes	16	11/12/2021	29- 40	CB
Quiz 1	10 Minutes	5	30/12/2021	1-20	CB
Quiz 2	10 Minutes	5	31/12/2021	21-40	CB
Comprehensive Exam	3 Hours	40	22/01/2022	1- 40	CB

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: 01/10/2021

Mr.HEMANT KUMAR DEWANGAN
Instructor-In-charge

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
EC 312	**Analog Communication**	**3**	**2**	**4**

Instructor-in-charge: Mr.K.NAGAIAH

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 environment

Textbook(s) T1	Modern Digital and Analog Communication Systems by B P Lathi, Z Ding International 4th edition, Oxford University Press
Reference book(s)	
R1	Principles of Communication Systems by Herbert Taub , Donald L Schilling & Goutam Saha,3rd Edition , Tata McGraw-Hill .
R2	Communication Systems by Simon Haykin 4th edition, Wiley India.
R3	Communication Systems: Analog and Digital by R.P. Singh, S.D. Sapre, Mc Graw Hill 3rd Ed., 2012.
R4	Electronics & Communication System – George Kennedy and Bernad Davis, 4th Edition TMH 2009.

Lecture-wise plan:

Lecture No.	Learning Objective	Topics to be covered	(Ch./Sec./Text Book)
1	To understand the concept of communication.	**FOURIER TRANSFORM** 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
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
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,R_2:2.10
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 R_2:2.11-2.13
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
40-41	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 Experiments:

Expt. 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)
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
12	Verification of Sampling Theorem

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	27/09/2021	1-13	CB
Test 2	60 Minutes	17	19/11/2021	14- 28	CB
Test 3	60 Minutes	16	10/12/2021	29- 41	CB
AC Lab		20			CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	10/01/2021	1- 41	CB

** To be announced in the class

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.

Mr. K.NAGAIAH
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
EC 313	**Electromagnetic Fields and Waves**	**3**	**0**	**4**

Instructor-in-charge: Dr.MANORANJAN DASH

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.

Textbook(s) T1	Electromagnetic with Applications, John D.Kraus, 5thEdition, TMHl, 1999.
T2	Antennas For All Applications, John DKraus,3rd Edition,TMH,2006.
Reference book(s) R1	Elements of Electromagnetic, Matthew N.O.Sadiku, 3rd Edition, Oxford University Press, 2005.
R2	Fundamentals of Applied Electromagnetic, Fawwaz TUlaby, 2nd Edition PHI, 2001.
R3	Engineering Electromagnetic, WH Hayt, JABuck,7th Edition, TMH,2006.

Lecture-wiseplan:

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
9-10	How energy is stored and transmitted in EM wave	Energy Relations and Pointing Vector	T1:4.10 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 of field 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 More details in Ref.Book1.
25-27	Discussion of transmission systems with emphasis on waves of higher order ie having components of E or Hin the direction of propagation, their field configuration, cut-off wavelengths and attenuation	Waveguides with rectangular and 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, ?/2dipole and it's Radiation Resistance	T2:5.2-5.6
33-36	Arrays and various radiation pattern	Arrays: Point source, Two isotropic sources, Pattern multiplication point sources (Broad Side and End Fire array), Binomial array	T2:4.2-4.15
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 Quizzes conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	28/09/2021	1-12	CB
Test 2	60 Minutes	17	20/11/2021	13- 28	CB
Test 3	60 Minutes	16	11/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	-----	**	CB
Comprehensive Exam	3 Hours	40	22/01/2022	1- 42	CB

** To be announced in the class

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.

Manoranjan Dash.

Dr. MANORANJAN DASH

Date: 01/10/2021   **Instructor-In-charge**

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
EC 223	**Digital Electronics and Computer Organization**	3	3	4

Instructor-in-charge: Dr. MANORANJAN DASH

Scope & Objective of the course:

The objective of the course is to impart knowledge of the basic tools for the design of digital circuits and to provide methods and procedures suitable for a variety of digital design applications. The course also introduces fundamental concepts of computer organization. The course also provides laboratory practice using MSI devices.

Textbook(s) T1	Digital Design, M. Morris Mano, PHI, 3rd Edition, 2002.
T2	Computer System Architecture, M. Morris Mano, PHI, 3rd Edition, 2002.
Reference book(s)R1	Fundamentals of Logic Design, Charles H.Roth, Jr, Thomson Brooks/Cole, 5th Edition, 2004.
R2	Modern Digital Electronics, R.P .Jain, TMH, 3rd Edition, 2004
R3	"Digital Principles and Design", Donald D. Givone., MH, 2003.
R4	"Switching & Finite Automata Theory", Kohavi,2nd Edition, 2005.

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos. of Text Book)
1	To understand the basics of Boolean Algebra	Digital systems, Binary Logic, Theorems & Properties of Boolean Algebra	T1:1.1,1.9;2.3
2	To learn the concepts of SOP, POS Forms	Boolean functions, Canonical forms, Digital Logic Gates, ICs	T1:2.4-2.8
3	Concepts of Number systems, their conversions and usages	Binary, Octal, Hexa decimal numbers, Complement, Signed Binary Numbers and codes	T1:1.2-1.7
4-6	To learn the simplification of Boolean functions	K-Maps (4,5 Variables) don't care conditions, NAND & NOR, X-OR Functions	T1:3.1-3.3,3.5-3.8
7	To understand the basics of HDL	Hardware Description Language	T1:3.9
8	To learn the concepts of combinational circuits & their design	Combinational circuits, Analysis and design procedure	T1:4.1-4.3

9-11	To learn the concepts of combinational circuits & their design	Adders, Subtractors, Multipliers	T1:4.4-4.6
12-14	To learn the concepts of combinational circuits & their design	Comparators, Decoders, Encoders, MUXs, DEMUXs	T1:4.7-4.10
15-17	To learn the concepts of sequential circuits	Sequential Circuits, Latches, Flip-Flops	T1:5.1-5.3
18-19	To understand the concepts of sequential circuits, their analysis.	Analysis of clocked sequential circuits, HDL for sequential Circuits, State Reduction and Assignment	T1:5.4-5.6
20-22	To Understand the design of sequential circuits	Shift Registers, synchronous Asynchronous counters, Ripple Counters	T1:6.1-6.5
23-24	Implementation of Boolean functions using these programmable devices	RAM, ROM, PLA, PAL	T1:7.2,7.5-7.7
25-28	To Understand the design of sequential circuits using HDL	RTL, HDL description, Binary Multiplier, Control Logic	T1:8.1,8.2,8.4-8.7
29-31	To learn the concepts of Logic Families	TTL, MOS, CMOS Logic families, Switch-lever modeling with HDL	T1:10.1-10.3, 10.5,10.7-10.10
32-33	To understand the arithmetic operations of Binary numbers	Multiplication and Division Algorithms	T2:10.3,10.4
34-37	To Understand the concepts of Memories.	Memory hierarchy & different types of memories, Auxiliary and Cache Memory	T2:Ch12.1, 12.2,12.3,12.5
38-40	To Understand the concepts of Data Transfer Techniques	Data transfer techniques, Bus interface	T2:Ch11.2-11.4

List of Experiments:

S. No.	Name of the Experiment (on Hardware)
1	Realization of Boolean Functions with Logic Gates
2	Adders and Subtrators with Logic Gates and IC's
3	Multiplexers and Demultiplexers
4	Encoders & Decoders
5	BCD-to seven segment decoder
6	Study of various Flip-Flops using logic gates & ICs
7	4-Bit shift register, 4-Bit Universal shift register
8	Up/Down Decode Counter, Divide by 16 Counter

S.No.	Name of the Experiment(on software VHDL, Suggested book for VHDL is *"AVHDLPrimer"*,byJ.Bhaskar,PearsonEducationIndia)
1	Logic Gates (NOT, AND, NAND, OR, NOR, XOR)
2	Half Adder, Full Adder, Half Subtractor and Full Subtractor
3	Encoders & Decoders (Basic)

4	Multiplexers and Demultiplexers (Basic)
5	Flip-Flops (RS,D) and D-Latch
6	Divide by 16 Counter

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	24/09/2021	1-12	CB
Test 2	60 Minutes	17	18/11/2021	13- 28	CB
Test 3	60 Minutes	16	09/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	-----	**	CB
Comprehensive Exam	3 Hours	40	06/01/2022	1- 42	CB

** To be announced in the class

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.

Manoranjan Dash.

Dr. MANORANJAN DASH
Date: 01/10/2021   **Instructor-In-charge**

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
EC315	**Control Systems**	**3**	**0**	**3**

Instructor-in-charge: Dr. MANORANJAN DASH

Learning Outcomes:
After successful completion of the course student will be able to
1. Know about various parts of process 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

Textbook(s) T1	Control systems Engineering, Nagrath I.J. and M. Gopal, New Age International.,4th edition, 2005
Reference book(s) R1	Control Systems, A. Nagoor Kani, RBA Publications,1998
R2	Automatic Control Systems, B.C. Kuo, Prentice Hall of India, 7th Edition,2003
R3	Control Systems: Principles and design, M. Gopal, Tata-McGraw Hill, 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 servo mechanisms; examples	1.1-1.4,1.6
3,4	Introduction to the modeling of physical systems	Differential equations of physical systems; mechanical systems and electric a analogies	2.1,2.2
5,6	Modeling 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
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 servo motors, 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 control systems 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
27,28	Do	Root locus construction rules; examples	7.3
29,30	Frequency response methods	Introduction to Frequency Response and correlation with time response, Polar plots	8.1- 8.3
31,32	Do	Bode plots	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:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	28/09/2021	1-12	CB
Test 2	60 Minutes	17	20/11/2021	13- 28	CB
Test 3	60 Minutes	16	11/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	-----	**	CB
Comprehensive Exam	3 Hours	40	12/01/2022	1- 42	CB

** To be announced in the class

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Manoranjan Dash.

Dr. MANORANJAN DASH
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
EC323	**Microelectronic Circuits**	**3**	**0**	**3**

Instructor-in-charge: Dr.K.KISHORE KUMAR

Learning Outcomes:

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

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

Lecture wise plan

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
1-2	Characteristics and type of amplifiers.	Amplifiers, Circuit Models, Frequency response of amplifiers	T 1 Ch-l 1.4,1.5,1.6
3-4	BJT Structure, I-V Characteristics, working as a switch and amplifier	Device structure &Physical operation, I-V Characteristics, BJT as an Amplifier & switch	T1 Ch-5 5.1,5.2,5.3
5-6	Analysis of BJT circuits under DC conditions	BJT circuits at DC	T1 Ch-5 5.4
7-8	Biasing and small signal models of BJT	Biasing in BJT amplifier circuits, Small signal operation & Models	T1 Ch-5 5.5, 5.6
9-10	BJT as a single stage amplifier and its high frequency models.	Single stage BJT Amplifiers BJT Internal capacitances &High frequency model	T1 Ch-5 5.7,5.8
11-12	Structure and I-V Characteristics of MOSFET.	Device structure & Physical operation, I-V Characteristics	T1 Ch-4 4.1,4.2
13-14	Working of MOSFET as amplifier, switch and its circuits at DC.	MOSFETS Circuits at DC,MOSFET as an amplifier and as a switch	T1 Ch-4 4.3, 4.4
15-17	Biasing and small signal models of MOSFET.	Biasing in MOS amplifier circuits, Small signal operation & Models	T1 Ch-4 4.5, 4.6
	MOSFET as a single stage	Single stage MOS Amplifiers, MOSFET	T1 Ch-4

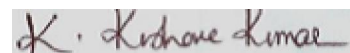|			
18-19	amplifier and its high frequency models.	Internal capacitances & High frequency model	4.7, 4.8
20-22	To Understand the concept of Differential Amplifiers.	The MOS Differential pair.	TI Ch-7 7.1
23-24	Operation of MOS Differential amplifier.	Small signal operation of MOS Differential pair	T1 Ch-7 7.2
25-26	Practical characteristics of MOS Differential pair.	Non-ideal characteristics of MOS Differential pair.	T1 Ch-7 7.4
27-28	Effect of active load on MOS differential amplifier.	MOS Differential amplifier with active load.	T1 Ch-7 7.5
29-30	To Understand the concept ofFeedback concept	General Feedback structure, Properties of Negative feedback, Four basic feedback topologies	T1 Ch-8 8.1,8.2,8.3
31-32	Analysis of Series-Shunt & Series-Series feedback amplifier	Series-Shunt and Series-Series feedback amplifier	T1 Ch-8 8.4,8.5,
33-34	Analysis of Shunt-Shunt & Shunt-Series feedback amplifier.	Shunt-Shunt and Shunt-Series feedback amplifier.	T1 Ch-8 8.6
35-37	To Understand the concept of power amplifiers and output stages	Classification of output stages, Class A and Class B output stage.	TI Ch-14 14.1, 14.2, 14.3
38-40	Overview of class AB Output stage	Class AB output stage and its biasing.	TI Ch-14 14.4,14.5
41-42	To learn the concepts power transistors	Power BJT's and MOS power transistors.	TI Ch-14 14.6,14.9

Evaluation Scheme:

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Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	27/09/2021	1-12	CB
Test 2	60 Minutes	17	18/11/2021	13- 28	CB
Test 3	60 Minutes	16	09/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	07/01/2022	1- 42	CB

** To be announced in the class

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Dr. K.KISHORE KUMAR
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS 311	**Data Communication Systems**	**3**	**0**	**3**

Instructor-in-charge: Mr.K.NAGAIAH

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

Textbook(s) T1	Data Communication and Computer Networking, B. A. Forouzan , TMH , 2006
Reference book(s)	
R1	Computer Networks, A. S. Tanenbaum, Pearson Education / Prentice Hall of India, 4th Edition, 2004.
R2	Data Communications, Computer Networks and Open Systems, Halsall Fred, Addition-Wesley, 4th Edition, 2004.
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)
1-3	To Understand network concept	OSI MODEL, TCP/IP and other networks models, Arpanet,	T1: 1.1,T1: 3.1,3.2,3.3: T:2.3
4-6	To understand the network topologies	Network Topologies Internet WAN, LAN, MAN Physical Layer: Transmission media copper,	T1:1.2.1.3 T1: 7.1,7.2,7.3
7-10	To understand the concept of ISDN and physical layer	Twisted pair wireless Switching and encoding asynchronous communications; Broad band ISDN	T1:1.2.1.3,1.4 T1: 7.1,7.2,7.3
11-13	To know the concept of ATM & detection methods	ATM Framing, error detection and correction CRC,	T1: 10.1,10.2,10.3
14-15	To understand the different flow control techniques	Elementary Protocol-stop and wait, sliding window	T1: 10.4,10.5
16-17	To know the concept protocols	DHCP, – Ethernet Data link layer in HDLC	T1:11.1.11.2
18-19	To understand MAPs	Multiple Access Protocols Link Layer Addressing – ARP	T1:12.1,12.2,12.3
20-21	To know the concept network components	Hubs, Bridges, Switches., Topology	T1:12.1,12.2,12.3
22-24	Different types of multiple access control protocols	Medium Access sub layer: ALOHAMAC addresses, Carrier sense multiple accesses.	T1:12.1,12.2,12.3

25-28	To understand IEEE 802.x concepts	IEEE 802.X Standard Ethernet wireless LANS Bridges	T1:15.1,15.2
29	To know the network service models	Forwarding and Routing, Network Service Models	T1: 18.5
30	To know IP concepts	Virtual Circuit, Mobile IP – IP	T1:18.1,18.2,18.3,18.4
31-33	To understand the different IPv4, IPv6	Protocol (IP Datagram Networks, Router – Internet IPv4 and IPv6 Link State Routing, Distance Vector Routing	T1:18.1,18.2,18.3,18.4
34-35	To understand the network layers	Transport Layer Services – Multiplexing and Demultiplexing – UDP	T1:18.1,18.2,18.3,18.4
36-37	To understand data transfer techniques	Reliable Data Transfer – Go Back-N Selective Repeat. Connection-Oriented Transport:	T1: 17.1,17.2,17.3
38	To understand TCP structure & operation	TCP – Segment Structure – RTT estimation –	T1: 24.1,24.2,24.3
39	To understand TCP structure & operation	Flow Control – Connection Management	T1: 24.1,24.2,24.3
40	To understand TCP structure & operation	Congestion Control – TCP Delay Modeling	T1: 24.1,24.2,24.3

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	28/09/2021	1-13	CB
Test 2	60 Minutes	17	20/11/2021	14- 28	CB
Test 3	60 Minutes	16	11/12/2021	29- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	12/01/2022	1- 40	CB

** To be announced in the class

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Mr. K.NAGAIAH
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur

Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS 312	**Computer Organization and Architecture**	**3**	**0**	**3**

Instructor-in-charge: Ms.NISHA THAKUR

Learning Outcomes

1. The course aims at introducing the concept of computer architecture and organization.
2. It involves design aspects and deals with the current trends in computer architecture.
3. System resources such as memory technology and I/O subsystem needed to achieve proportional increase in performance will also be discussed portion increase in performance will also be discussed.

Textbook(s) T1	Computer Organization & Architecture, Morris Mano, 3rd Ed., Pearson Education / Prentice Hall - New Delhi , 2004.
Reference book(s)R1	Structured Computer Organization, A. S. Tanenbaum:, 4th Ed., Pearson Education, / Prentice Hall New Delhi., 2004
R2	Advanced computer Architecture : Parallelism Scalability, Programmability , Kai Hwang, TMH, New Delhi , 2002

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
1	To learn the concept of Central Processor organization	Bus organized computer, Memory Address Structure,	T1: Ch 5, 147
2-3	To learn the concept of Central Processor organization	Memory data, register, program counter, Accumulator	T1: Ch 4,
4-5	To learn the concept of Central Processor organization	Addressing modes	T1: Ch 8, 278-282
6-7	To learn the concept of Central Processor organization	Instruction, register, Instruction field, Micro operations,	T1: Ch 8, 273-277
8-9	To learn the concept of Central Processor organization	Register transfer languages, Instruction field	T1: Ch 4, 111-140
10-11	To learn the concept of Central Processor organization	Decoding and execution, Instruction formats and addressing modes.	T1: Ch 5, 153-163
12-13	To learn the concept of control unit organization	Instruction sequencing, Instruction interpretation,	T1: Ch 7, 234-238
14-15	To learn the concept of control unit organization	Hardwired control, Micro programmed Control Organization	T1: Ch 7, 238-256
16	To learn the concept of control unit organization	Control memory, Address sequencing,	T1: Ch 7, 231-238
17-18	To learn the concept of control unit organization	Micro-instruction, Formats	T1: Ch 8, 273-277
19-20	To learn the concept of control	Micro-Program Sequence,	T1: Ch 7, 253

		unit organization	Microprogramming.	
21-22	To Learn the concept of Arithmetic Processor Design	Addition and subtractions algorithm	T1: Ch 10, 351-356
23-24	To Learn the concept of Arithmetic Processor Design	Multiplication algorithm	T1: Ch 10, 358-364
25-26	To Learn the concept of Arithmetic Processor Design	Division Algorithm Processor configuration	T1: Ch 10, 366-371
27-28	To Learn the concept of Arithmetic Processor Design	Design of control unit	T1: Ch 10, 366-371
29-30	To Learn the concept of Arithmetic Processor Design	Floating point arithmetic.	T1: Ch 10, 372-380
31-33	To Learn Input Output Organization	Programmed I/O., I/O addressing, I/O instruction	T1: Ch 11, 42
34-36	To Learn Input Output Organization	Synchronization, RISC, CISC	T1: Ch 8, 300-306
37-38	To Learn Concept of Memory Organization and Multiprocessor	Basic concepts and terminology, Memory hierarchy	T1: Ch 12, 463
39	To Learn Concept of Memory Organization and Multiprocessor	Semiconductor memories RAM, ROM	T1: Ch 12, 466-470
40	To Learn Concept of Memory Organization and Multiprocessor	memories and interleaving Virtual memory	T1: Ch 12, 487-490
41-42	To Learn Concept of Memory Organization and Multiprocessor	Cache memory, Associative memory	T1: Ch 12, 480-487

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	24/09/2021	1-12	CB
Test 2	60 Minutes	17	18/11/2021	13- 28	CB
Test 3	60 Minutes	16	09/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	28/01/2022	1- 42	CB

** To be announced in the class

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.

Ms.NISHA THAKUR
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS313	**Data Structures and Algorithms**	**3**	**0**	**3**

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.

Textbook(s) T1	Fundamentals of Data Structures by Ellis Horowitz & Sartaj Sahni, Computer Science press.	
Referencebook(s) R1	Data Structures using C by A. K. Sharma, Pearson Education	
R2	Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.	
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
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 linkedlists.	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
39-40	To learn various operations and traversal technique.	Kruskal and prims algorithms.	T1 CH-6 6.3, 6.4

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	23/09/2021	1-12	CB
Test 2	60 Minutes	17	17/11/2021	13- 26	CB
Test 3	60 Minutes	16	08/12/2021	27- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	06/01/2022	1- 40	CB

** To be announced in the class

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: 01/10/2021

Mr. ASHISH KUMBHARE
Instructor-In-charge

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS324	**.Net** and C# Programming	**3**	**2**	**3**

Instructor-in-charge: Mr.RAMESH KUMAR YADAV

Learning Outcomes:
The learning objectives of this course are to:
1. Gain a thorough understanding of the philosophy and architecture of Web applications using ASP.NET
2. Acquire a working knowledge of Web application development using Web Forms and Visual Studio 2008
3. Optimize an ASP.NET Web application using configuration, security, and caching
4. Access databases using ADO.NET and LINQ
5. More recent ASP .NET features
6. Implement rich client applications using ASP.NET AJAX
7. Customize Web applications through the use of HTTP handlers and modules

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

Lecture wise plan

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
1-5	To understand the basics of .NET	**Introduction to ASP.NET** From ASP to ASP.NET Web Forms Web Services ASP.NET Features	T l Ch-l 1.4,1.5, T2,Ch1.6,1.9
6-10	To learn the concepts of web form architecture	**Web Forms Architecture** Page Class Web Forms Life Cycle Web Forms Event Model	T2 Ch-2 2.1,2.4,2.7,2.9
16-20	To learn the concepts of HTTP Class	**ASP.NET and HTTP** Request/Response Programming Http Request Class HTTP Collections Http Response Class Redirection ,Http Utility Class	T1 Ch-3 3.1,3.7 T2 Ch3 5.6,3.8
21-23	To learn the concepts of web application	**Web Applications Using Visual Studio** Using Visual Web Developer, Visual Studio Forms Designer, Using Components,Shadow Copying Using the Global.asax File, Data Binding	T1 Ch-4 4.7, 4.4 T2 Ch4 4.8,4.10
24-25	To understand concept of session state	**State Management and Web Applications** Session State Application State	T1 Ch-5 5.5,5.9

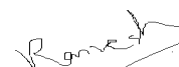|		Multithreading Issues, Cookies	
26-30	To understand concept of server controls	**Server Controls** HTML Server Controls, Web Forms Server Controls, Rich Controls,Validation Controls, User Control	T2 Ch-5 5.3,5.7
31-40	To learn the concepts of caching and its uses	**Caching in ASP.NET** What Is Caching, Page-Level Caching, Page Fragment Caching,Optimizing Your ASP.NET Application, Application Caching	T1 Ch-5,Ch6 5.7, 6.4,7.2 T2 Ch6 6.9,7.4,7.9

Evaluation Scheme: .Net (Lab)

S. No.	Name of Experiment
1	Program to display the addition, subtraction, multiplication and division of two number using console application
2	Program to display the first 10 natural numbers and their sum using console application.
3	Write a program to manage the session.
4	Program to display the addition using the windows application.
5	Write a program to convert input string from lower to upper and upper to lower case.
6	Write a program to simple calculator using windows application.
7	Write a program working with Page using ASP.Net.
8	Write a program working with forms using ASP.NET.
9	Write a program to connectivity with database.
10	Write a program to access data source through ADO.NET.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	27/09/2021	1-12	CB
Test 2	60 Minutes	17	21/11/2021	13-28	CB
Test 3	60 Minutes	16	11/12/2021	29-40	CB
Lab	Throughout the Semester	10			CB
Comprehensive Exam	3 Hours	40	22/01/2022	1-40	CB

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.

Mr.RAMESH KUMAR YADAV
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS325	**Web Technology**	**3**	**2**	**4**

Instructor in charge: Mr.NAVEEN KUMAR VAISHNAV

Learning outcome:

After successful completion of the course student will be able to:
1. Understand the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web.
2. Understand a general grounding introduction to more advanced topics such as programming and scripting.
3. Expose to the basic tools and applications used in Web publishing.

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

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
1-3	Internet Concept	Fundamental of Web, History of Web, Web development overview, Domain Name System (DNS),	T1: 1.5-1.6
4-6	Functionality of Internet	DHCP, and SMTP and other servers, Internet service provider (ISP), Client- Server Computing	T1: 1.8, 2.1
7-10	Protocols and Components of internet	Internet Protocol, TCP/IP Architecture, Web Browser and Web Server.	T1: 2.1, 2.7
11-14	HTML and DHTML:-	HTMLTag,Rules of HTML, Text Formatting and Style, List, Adding Graphics to Html Document,	T1: 4.1- 4.9
15-17	HTML Tables & Frames	Tables and Layout, Linking Documents, Frame, Forms, Project in HTML,	T1: 4.10 - 4.11
18-21	DHTML & CSS	Introduction to DHTML, CSS, Class and DIV, External Style Sheet.	T1: 5.1 - 5.8
22-25	Java Script	JavaScript(JS) in Webpage, Advantage of JavaScript, JS object model and hierarchy ,Handling event ,Operators and syntax of JS	T1: 6.1 – 6.5

26-27	JS Control statements	Switch, do while, break & continue	T1: 7.1 – 7.7
28-29	Java Script Functions	JS Function, Client side JS Vs Server side JS, Recursion	T1: 9.1 – 9.11
30-31	Document Object Model	Introduction, DOM Node & Tree, dynamic styles	T1: 12.1 – 12.6
32-34	Java Script Events	Event on load, Mouse load, More events	T1: 13.1 – 13.9
35-37	XML	Introduction to XML, XML Namespace, DTD	T1: 14.1 – 14.4
38-40	Ajax	Introduction, Traditional Web application vs Ajax, XML and DOM	T1: 15.1 – 15.6

Web Designing Practical:

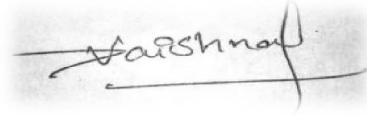| S.No	Name of the Experiment
1	HTML page to print Hello World.
2	Web page illustrating text formatting tags available in HTML. (i.e. <h1>, <b>, <u>, <i>).
3	Web page to illustrate three types of lists in HTML.
4	HTML page which displays 3 images at LEFT, RIGHT and CENTER respectively.
5	HTML Code for Table
6	CSS Colors Code
7	Student registration form using <form> tag
8	Web page using CSS Inline style.
9	Web page using CSS Internal style.
10	Web page using CSS External style.
11	Create CD Catalogue Table in XML and display it using XSL Style Sheet.
12	Write JavaScript program to perform the following function: A. To calculate Average of integer number (1 to n) B. To check whether given number is prime or not C. To calculate factorial of n D. To print current date & time

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lecture No)	Remarks
Test 1	60 Minutes	17	27/09/2021	1-14	CB
Test 2	60 Minutes	17	19/11/2021	15- 25	CB
Test 3	60 Minutes	16	10/12/2021	26-40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	10/01/2022	1- 40	CB

** To be announced in the class

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.

Mr. NAVEEN KUMAR VAISHNAV
Instructor-In-charge

Date :01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course Code	Course Title	L	P	U
CE312	Design of Concrete Structure - I	3	0	3

Instructor-in-charge: Ms. JYOTI PATEL

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

Textbook(s) T1	Limit state design of reinforced concrete – B.C. Punamia
T2	Limit state theory and design of reinforced concrete – V.L. Shah
Reference book(s) R1	Design of reinforced concrete structure – M.L. Gambhir
R2	Design aids for reinforced concrete to I.S.-456-1978

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
1	Basic of working stress method	Properties of concrete and reinforced steel,	T1
2-3	Basic of working stress method	Stress strain curves, permissible stresses, modular ratio	T1
4-5	Basic of working stress method	Numerical related to this chapter	T1
6	Basic of working stress method	Basic for design of working stress method.	T1
7-8	Basic of working stress method	Analysis the singly and doubly reinforced section by working stress methods	T1
9-10	Limit state method- rectangular beams	Introduction of limit state method, characteristic loads, partial safety factor	T2
11	Limit state method- rectangular beams	Limit state of flexure – assumptions	T2
12-13	Limit state method- rectangular beams	Stress block parameter, neutral axis	T2
14-16	Limit state method- rectangular beams	Bond and development length, shear in beams , design of lintels	T2
17-18	Limit state method- T-Beams and slabs	Properties of T-section, moment of resistance and design of singly reinforced T-Beam.	T1

19	Limit state method- T-Beams and slabs	Dead load imposed load	T1
20-21	Limit state method- T-Beams and slabs	Numerical on slabs.	T1
22-23	Limit state method- T-Beams and slabs	Design of one way slab	T1
24	Limit state method- T-Beams and slabs	Design of two way slab	T1
25	Limit state method- columns	Axially loaded short columns, minimum eccentricity	T2
26-28	Limit state method- columns	Longitudinal and transverse reinforcement , effective length of columns, safe load on columns	T2
29-32	Limit state method- columns	Uniaxial bending and combined bending	T2
33-35	Limit state method – staircases and column footings	Design of stairs – dog legged stair, open newel stair	T1
36-38	Limit state method – staircases and column footings	General principle of design of reinforced concrete footing.	T1
39-40	Limit state method – staircases and column footings	Proportions of footings. Numerical.	T1

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	16	27/09/2021	1-12	CB
Test 2	60 Minutes	17	19/11/2021	13- 27	CB
Test 3	60 Minutes	17	09/12/2021	28- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	10/01/2022	1- 40	CB

** To be announced in the class

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.

Ms. JYOTI PATEL
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur

Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course Code	Course Title	L	P	U
CE313	**Design of Steel Structure - 1**	**3**	**0**	**3**

Instructor-in-charge: Ms. JYOTI PATEL

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

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

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
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
9-10	Fasteners	Location details of fasteners, bearing type bolts.	T2
11	Fasteners	Friction grip type bolting, welds and welding.	T2
12-13	Fasteners	Advantages and disadvantages of welded connections	T2
14-16	Fasteners	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	Design strength, effective length of compression members.	T1
27-29	Compression members	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 torsion buckling.	T1
35-38	Flexural member	Design of laterally supported and unsupported beams.	T1
39-40	Flexural member	numerical	T1

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	16	23/09/2021	1-12	CB
Test 2	60 Minutes	17	17/11/2021	13- 27	CB
Test 3	60 Minutes	17	08/12/2021	28- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	06/01/2022	1- 40	CB

** To be announced in the class

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.

Ms. JYOTI PATEL
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

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

Instructor-in-charge: Ms. JYOTI PATEL

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

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

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
1	Trilateration and triangulation	Principle of Trilateration, Reduction of observation	T1
2-3	Trilateration and Triangulation	Principle and classification of triangulation system.	T1
4	Trilateration and Triangulation	Triangulation chains, strength of figures,	T1
5-6	Trilateration and Triangulation	Station marks and signals, satellite station, intersected and resected point.	T1
7-8	Trilateration and Triangulation	Field works	T1
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 triangulation 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 tachometers , range finders	T1
24	Tacheometery	EDM instruments , total station	T1
25	Photographic and aerial surveying	Photo Theodolite	T1
26-27	Photographic and aerial surveying	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
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 Quizzes conducted during the course of semester followed by a comprehensive examination.

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	16	27/09/2021	1-12	CB
Test 2	60 Minutes	17	19/11/2021	13- 27	CB
Test 3	60 Minutes	17	10/12/2021	28- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	12/01/2022	1- 40	CB

** To be announced in the class

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.

<div align="right">

Ms. JYOTI PATEL
Instructor-In-charge

</div>

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

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

Instructor-in-charge: Ms. JYOTI PATEL

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

Textbook(s) T1	Design of steel structure – N. subramanian
T2	Limit state of Design of steel structure – S.K. Duggal
Reference book (s) R1	Design of steel structure – K. S. Sai Ram
R2	Limit state of Design of steel structure – V. L. Shah

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Pg No)
1	Plate girders with solid webs	Components of a plate girder, typical section.	T1
2-3	Plate girders with solid webs	Proportioning of the section , design bending strength.	T1
4-5	Plate girders with solid webs	Design shear strength, stiffened web panels	T1
6	Plate girders with solid webs	Minimum wed thickness, bearing stiffeners, load carrying stiffeners	T1
7-8	Plate girders with solid webs	numerical	T1
9-10	Members subjected to combined forces	Combined shear & bending	T2
11	Members subjected to combined forces	Combined axial forces & bending moment	T2
12-13	Members subjected to combined forces	Section strength, overall member combinations.	T2
14-16	Members subjected to combined forces	Design of members subjected to combined forces	T2
17-18	Column bases and gantry girders	Types of column bases	T1
19	Column bases and gantry girders	Slab bases, gusset base	T1
20-21	Column bases and gantry girders	Moment resisting base plates.	T1
22-23	Column bases and gantry girders	Loads and load combinations	T1
24	Column bases and gantry girders	Typical sections, design of gantry	T1

		girders	
25-26	Eccentric and moment connections	Analysis of bolt / weld groups.	T1
27-28	Eccentric and moment connections	Connection configuration , beams to column connections	T1
30-32	Eccentric and moment connections	Beam to beam connections, web splice and its connections.	T1
33-34	Roof trusses	Types of roof trusses	T1
35-38	Roof trusses	Dead , imposed and wind load, load combination	T1
39-40	Roof trusses	Design of purlins, analysis & design of roof trusses	T1

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	16	24/09/2021	1-12	CB
Test 2	60 Minutes	17	18/11/2021	13- 27	CB
Test 3	60 Minutes	17	09/12/2021	28- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	08/01/2022	1- 40	CB

** To be announced in the class

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.

Ms. JYOTI PATEL
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course Code	Course Title	L	P	U
ME 415	**Automotive Vehicles**	**3**	**0**	**3**

Course Instructor: Mr. HEMANT KUMAR DEWANGAN

Learning Outcomes:

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

1. Understand the principle of operation and performance of internal combustion engines, along with working, analysis and design of various components of automotive vehicles.
2. Understand base tire, wheel, suspension and base steering theory.
3. Understand how to service suspension, steering components and principals of alignment.
4. Understand mechanical and hydraulic brake system theory.
5. Practice safe work habits.

Textbook(s) T1	Kirpal Singh, Automobile Engineering, - Vol. I & II, Standard Publishers Distributors, 1995.
Reference book(s)	
R1	V. Ganeshan, Internal Combustion Engines, Tata McGraw-Hill, 2nd edition, 2003
R2	K. Giri, "Automotive Mechanics", Khanna Publishers, 1996.
NPTEL	https://nptel.ac.in/courses/107/106/107106088/

Lecture-wise Plan

Lecture Nos.	Learning Objectives	Topics to be covered	Reference (chapter/sec/pg. no.)
1-4	Introduction to Automobiles	Definition of Automobile, History starting from Otto cycle	Ch-1(T1): Sec- 1,2
		Components of automobile: the basic structure, the power plant, the transmission system, the auxiliaries, the controls, the superstructure	Ch-1(T1): Sec- 3
		Chassis: classification, conventional construction, Frame: construction, advantages and disadvantages	Ch-1(T1): Sec- 4 – 9, Ch-2(T1): Sec- 1, 2, 3
5-6	Suspension system & Springs	Objectives of suspension system, functions, types of springs	Ch-7(T1): Sec-1-5
		Leaf spring, tapered leaf spring, coil spring, torsion bar, rubber spring, air spring	Ch-7(T1): Sec- 6, 11
7-9	Tyre, types of tyres, construction, working and properties	Tyres and its types and specifications: tubed and tubeless, tyre performance, functions,	Ch-9(T1): Sec- 4,5,6,11,12,13
		Tyre pressures, ageing of tyres Factors affecting tyre life and other factors: material, rotation, tools etc	Ch-9(T1): Sec- 21
10-13	Steering Systems	Steering Geometry, camber, king pin inclination, castor, camber, Toe-in toe-out	Ch-8(T1): Sec- 6

		Correct Steering angle for inside wheel and outside wheel while taking turn, turning circle radius	Ch-8(T1): Sec- 7, 8
		Numerical Problems based on correct steering angle and turning circle radius	Ch-8(T1): Sec- 7, 8, 9, 20
14-16	Parts of a simple Carburetors	Strainer, float chamber, choke, throttle, metering system, idling system, acceleration system	Ch-9(RB1): Sec- 9.4
	Concept of Carburetors	Carburetion, engine mixture requirements, calculation of air fuel ratio	Ch-9(RB1): Sec- 9.9
17- 18		Theory of band brake, blocks brake, and band and block brake. Internal expansion brake.	Ch-10(T1): Sec- 7, 8, 9
19-20	Study of Brakes	Hydraulic brakes. Hand or parking brakes.Braking of vehicle moving in a curved path.	Ch-10(T1): Sec- 12
21-23	Concept of Clutch	Characteristics, functions, principles of operation of clutch	Ch-3(T1): Sec-1-4
24-26	Operation of Clutch	Driving system and Plate clutch (uniform pressure and uniform wear).Cone clutch (uniform pressure and uniform wear)	Ch-3(T1): Sec- 5
27-29	Energy transfer in Clutch	Energy lost by plate clutch during engagement. Centrifugal clutch.	Ch-3(T1): Sec- 5.8, 6
30-32	Lubrication systems	Causes of engine friction. Function of lubrication. Mechanism of lubrication. Journal bearing lubrication.	Ch-6(T1 vol-2): Sec- 1,2,3
33-35	Types of lubrication system	Types of lubrication systems. Lubrication of engine components	Ch-6(T1 vol-2): Sec- 4
36	Emission Control	Emission sources, emission control norms	Ch-18(T1 vol-2): Sec- 1,2
37-40	I.C. Engine	Introduction to all transmission systems, diesel engine, petrol engine, 2-stroke engine, 4-stroke engine, cut section of different type of engine	Lecture Notes

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	17	23/09/2021	1-13	CB
Test 2	50 Minutes	17	17/11/2021	14- 26	CB
Test 3	50 Minutes	16	08/12/2021	27- 40	CB
Quiz 1	10 Minutes	5	26/11/2021	1-20	CB
Quiz 2	10 Minutes	5	6/12/2021	21-40	CB
Comprehensive Exam	3 Hours	40	06/01/2022	1- 40	CB

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: 01/10/2021

Mr.HEMANT KUMAR DEWANGAN
Instructor-In-charge

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No.	Course Title	L	P	U
ME 418	**Refrigeration Air-conditioning**	**3**	**2**	**4**

Course Instructor: Mr. DILIP MISHRA

Learning Outcomes:

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

1. An in-depth study of theory of refrigeration and air-conditioning and their applications.
2. The techniques of analysis and design of refrigeration and air- conditioning systems.

Textbook(s)	Arora C.P. 'Refrigeration and Air-conditioning', 2nd Ed. Tata McGraw Hill Co, 2000.
Reference book(s) R1	Manohar Prasad, 'Refrigeration and air-conditioning', Wiley Eastern Ltd, 1983
R2	Roy J. Dossat, 'Principles of Refrigeration', 4nd Ed., Pearson Education Asia, 2002.
R3	Edward G. Pita, 'Air Conditioning Principles and Systems', 4nd Ed., Pearson Education Asia, 2003.

Lecture-wise Plan:

Lect. No.	Learning Objectives	Topics to be covered	Reference (chapter/sec/pg. no.)
01	Introduction & Review	Introduction, the second law interpretation,the Carnot principle	Ch 1, Ch 2
02	Gas cycle refrigeration	Limitation of Carnot cycle, reversed Brayton cycle	Ch 1
03	Gas cycle refrigeration	Air craft refrigeration	Ch 11
04	Gas cycle refrigeration	Joule-Thomson coefficient and inversion curve, reversed Stirling cycle	Ch 11
05	Gas cycle refrigeration	Analysis of Gas cycle refrigeration	Ch 11
06	Vapor compression system	Modification in reversed Carnot cycle, Vapour compression cycle	Ch 3
07	Vapor compression system	Vapour compression system calculation	Ch 3
08	Vapor compression system	Effect of operating conditions on Vapour compression cycle	Ch 3
09	Vapor compression system	Actual Vapour compression cycle	Ch 3
10 - 11	Multi-pressure systems	Multi stage compression	Ch 5
12	Multi-pressure systems	Multi evaporative systems	Ch 5

13	Multi-pressure systems	Cascade systems, dry ice	Ch 5
14	Compressors	Principle and performance of reciprocating compressor, rotary and centrifugal compressors	Ch 6
15	Condensers	Types, Heat transfer in condensers, Wilson's plot	Ch 7
16	Evaporators	Types, Heat transfer in evaporators, augmentation of boiling heat transfer	Ch 8
17	Expansion Valves	Types of expansion devices, constant pressure and thermostatic expansion valve	Ch 9
18	Refrigerants	Designation of refrigerants, comparative study, selection of refrigerant	Ch 4
19	Refrigerants	Chemical and physical requirements, substitutes for refrigerants	Ch 4
20	Vapor absorption system	Vapor absorption system	Ch 12
21	Vapor absorption system	Single effect water - Lithium Bromide absorption chiller	Ch 12
22	Vapor absorption system	Double effect H_2O-$LiBr_2$ absorption system, electrolux refrigerator	Ch 12
23	Psychrometry of air-conditioning processes	Psychrometric properties, psychrometric chart, application of first law	Ch 14
24	Psychrometry of air-conditioning process	Basic processes in conditioning of air	Ch 15
25	Psychrometry of air-conditioning processes	Psychrometric processes in air-conditioning equipments	Ch 15
26	Psychrometry of air-conditioning processes	Summer air-conditioning	Ch 15
27	Psychrometry of air-conditioning processes	Winter air-conditioning	Ch 15
28	Load Calculations – Cooling &Heating	Design conditions, solar radiations, heat transfer through building structure	Ch 16,17,18
29 – 30	Load Calculations – Cooling & Heating	Heat gains, cooling and heating load estimate	Ch 19
31 – 32	Load Calculations – Cooling & Heating	Psychrometric calculations and selection of air-conditioning apparatus cooling and dehudification	Ch 19
33	Design of air-conditioning systems	Heat and moisture transfer in air-conditioning equipments	Ch 20
34	Design of air-conditioning systems	Design of cooling and dehumidifying coils	Ch 20
35	Design of air-conditioning systems	Spray equipments	Ch 20
36	Transmissionand distribution ofair	Friction loss and dynamic losses in ducts	Ch 21
37	Transmissionand distribution ofair	Air flow through simple duct system, air duct design	Ch 21
38	Transmission and distribution of air	Transmission and distribution of air in rooms,centrifugal and axial flow fans and fan arrangements	Ch 21,22
39	Application of Refrigeration & Air Conditioning Systems	Food processing by refrigeration and storage, transportation refrigeration	Ch 24

40	Application of Refrigeration & Air Conditioning Systems	Cooling and heating of foods, freeze drying and heat drying of foods	Ch 24

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	16	24/09/2021	1-12	CB
Test 2	60 Minutes	17	18/11/2021	13- 27	CB
Test 3	60 Minutes	17	09/12/2021	28- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	08/01/2022	1- 40	CB

** To be announced in the class

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.

Mr. DILIP MISHRA
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science & Technology
First Semester, 2021 – 2022
Course Handout

Course No.	Course Title	L	P	U
ME 424	**Non-Conventional Sources of Energy**	3	0	3

Course Instructor: Mr. DILIP MISHRA

Learning Outcomes:
After successful completion of the course student will be able to:
1. To know about important non-conventional energy resources and the technologies for harnessing these.   **2.** To analyze performances and the thermodynamic principle of working.

Text Book T1	Non-Conventional Energy Sources - G.D. Rai – Khanna Publishers
Reference Book(s) R1	Solar Energy - Fundamentals and Applications – H.P. Garg & J. Prakash,TMH ,Delhi
R2	Non-Conventional Energy Sources – Saeed, Hasan and DK Sharma, SK Kataria,Delhi
R3	Solar Energy – Principles of Thermal Collection and Storage- R Sukhatme, TMH, New Delhi
R4	Non-Conventional Energy Resources: Alternative Energy Sources And Systems- R.K. Singhal, Kataria , Delhi

Lecture wise plan:

Lect. No.	Learning Objectives	Topics to be covered	Reference (chapter/sec/pg. no.)
1-3	Introduction to variousenergy sources and their availability	Classical sources of energy, Availability of reserves, Demerits of classical energy source utilization, Energy crisis, Search for alternative sources of energy.	T 1, Ch 1
4-5	Introduction to various non-conventional energy sources	Introduction to Solar energy, Wind energy, Geo thermal energy, Tidal energy etc., Applications, Water heating, Space heating & cooling, Solar distillation, solar pumping, solar cooking, Greenhouses, Solar power plants	T 1, Ch 1
6-10	Solar Energy Source &terminologies	Solar energy, earth sun angles, resolution, solar insolation measurement, collection of solar energy, Extra-terrestrial radiation, Spectral distribution, Solar constant, Solar radiations on earth, Measurement of solar radiations, Solar radiation geometry, Flux on a plane surface, Latitude, Declination angle, Surface azimuth angle, Hour angle, Zenith angle, Solar altitude angle expression for angle between incident beam and the normal to a plane surface (no derivation), Local apparent time, Apparent motion of sun, Day length, Solar radiation data for India.	T 1, Ch 2

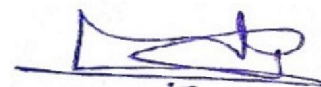|			
11-15	Solar thermal power & itsconversion	Flat plate collector, Solar concentrating collectors, Types of concentrating collectors, Thermo dynamic Limits to concentration, Cylindrical collectors, Evacuated tube collector, Focusing collector, Solar trough, Solar Pond etc.,	T 1, Ch3
16	Tracking and Power storage	Tracking CPC and solar swing, Solar thermal energy storage Introduction to Photovoltaic cell energy conversion techniques, Photovoltaic effect, Efficiency of solar cells,	T 1, Ch4
17-19	Photovoltaics system	Semiconductor materials for solar cells, Solar photovoltaic system, Standards of solar photovoltaic system, Applications of PV system, PV hybrid system	T 1, Ch 5
20-22	Collector's Performance analysis	Assumptions, Collector performance analysis, Some design parameters and calculation procedure, Applications with advantages & drawbacks of solar energy	T 1, Ch 3, Ch 4, Ch 5
23-25	Wind energy	Basic principles of wind energy conversion, wind energy estimation, site selection consideration, basic components of wind energy conversion system, classification, advantages &Disadvantages of WECS.	T 1, Ch 6
26-28	Geothermal energy	Geothermal energy, nature of geothermal fields, Geothermal sources, prime movers for geothermal energy, advantages, disadvantages of geothermal energy over other energy forms, Its application.	T 1, Ch 8
29-33	Ocean energy	Principle of ocean thermal energy conversion, Wave energy conversion machines, Power plants based on ocean energy, Problems associated with ocean thermal energy conversion systems, Thermoelectric OTEC, Developments of OTEC	T 1, Ch 9
34-36		Impact of renewable energy generation on environment, Kyoto Protocol, Cost of electricity production from different energy sources, Energy options for Indian economy.	T 1, R 1
37-38	Bio-mass	Introduction, Bio-mass conversion technologies, bio-gas generation, classification of bio-gas plant, Gasifiers, Gobar(animal-human waste) gas plant, applications.	T 1, Ch 7
39-40	Additional Alternate Energy Sources	Hydrogen energy systems, Decentralized and dispersed generation, Principle of Magneto hydrodynamics (MHD) power system, types of MHD system, advantages, and materials for MHD system	T 1, Ch 12

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	16	27/09/2021	1-12	CB
Test 2	60 Minutes	17	19/11/2021	13- 27	CB
Test 3	60 Minutes	17	09/12/2021	28- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	10/01/2022	1- 40	CB

** To be announced in the class

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.

Mr. DILIP MISHRA
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS 411	**Computer Graphics**	**3**	**2**	**4**

Instructor-in-charge: Ms. NISHA THAKUR

Learning Objective:

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

1. Understand the concepts of computer graphics through theoretical, algorithmic and advanced modeling aspects along with, applications in 3D graphics and visualization in 3D.
2. To apply the concepts and techniques to various problem domain and visualization of data-sets and processes.

Textbook(s) TI	Computer Graphics, James D. Foley, A. Van Dam, S.K. Ferrier, and J.F. Hughes, Principles and Practice, 2nd Edition in C, Addition-Wesley , 1996.
Reference book(s) R1	Mathematical Elements of Computer Graphics, Rogers B. McGraw Hill, 1989.
R2	Computer Graphics, D. Hearn and M.P. Baker, PHI, 1994.
R3	Introduction to Computer Graphics, N Krishnamurthy, 1st Edition, TMH, 2002.

Lecture-wise plan:

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./ Page Nos.of Text Book)
01—02	What, Why & Where about Graphics,	Overview of graphics systems — What, Why & Where about Graphics, Hardware & Software, Input & Output Technology, Mathematical complexity involved - Demonstration through some examples	Ch l Ch 4.4
03-05	Fast Algorithms for Drawing 2D objects Line, Circle & Ellipse.	Raster Graphics Algorithms for Drawing 2D objects: Line, Circle &Ellipse.	Ch 3.1—3.4
06-10	Manipulation of objects	Introduction to 2D & 3D Geometry, Scaling, Translation, Rotation, Shear, Reflection, Projection and Composite Transformations	Ch5.1-5.3 Ch5.5-5.7
11-13	Mapping of 2d from world to screen	Viewing & Clipping in 2D (Cohen's and Parametric Line Methods)	Ch 5.4 Ch 3.11

14-17	Mapping of 3d from world to screen	Viewing & Clipping in3D (Perspective & Parallel projection, Clipping against a Canonical View Volume, Clipping in Homogeneous Coordinates, and Mapping into aViewport	Ch 6
18-22	Drawing Smooth Curves & Surfaces	Hermit,Bezier,Continuities,B-spline Curves, Parametric BiCubic Surfaces, Quadric Surfaces	Ch 11.2.1-11.2.4 Ch 11.3- 11.4
23-27	Representation of Solid objects	Solid Modeling (Representations, Operations, Geometry, and Interface)	Ch 12
28-31	Detection of hidden portions	Visible Surface Detection (Need & Algorithms, Ray Tracing) and Hidden Line elimination	Ch 15.1-15.4
32-35	How to shade surfaces and solids	Rendering (Models, Physics, Shading Polygons & Surface, & Shadows)	Ch 16.1-16.4
36-40	How to show graphics in motion	Animation (Languages, Techniques, Control, Basic Rules & Problems)	Ch 21

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	22/09/2021	1-13	CB
Test 2	60 Minutes	17	16/11/2021	14- 28	CB
Test 3	60 Minutes	16	07/12/2021	29- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	04/01/2022	1- 40	CB

** To be announced in the class

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.

Ms.NISHA THAKUR
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS 417	**Software Engineering**	**3**	**0**	**3**

Instructor in charge: Mr. NAVEEN KUMAR VAISHNAV

Learning Outcome –

After successful completion of the course student will be able to:
1. To apply fundamental software engineering concepts, design, analysis and testing methodologies while incorporating the software engineering quality metrics to produce high quality correct software in a scheduled amount of time.
2. Students will learn object-oriented methodologies for proving programs are correct and methods of testing programs to demonstrate correctness.
3. Students will learn to use the Unified Modeling Language (UML) programming to achieve course goals.

Textbook(s) T1	Software Engineering: A Practitioner's approach, Pressman R.S, MGHISE, 6th Edition, 2005.
Reference book(s) R1	Object Oriented Technology, Tsang, THM, 2006.
R2	Larmen C, Applying UML and Patterns: An Introduction to Object Oriented analysis and Design and the Unified process, Pearson Education, 2nd Edition, 2004.
R3	PankajJalote, An Integrated approach to Software Engineering, Narosa Publishing House, 3rd Edition, 2004.
NPTEL	https://nptel.ac.in/courses/106/105/106105182/
SWAYAM	https://onlinecourses.swayam2.ac.in/cec20_cs07/preview

Lecture Wise Plan

Lecture Nos.	Learning Objective	Topics to be covered	Reference (Ch./Sec./Page Nos.of Text Book)
1-2	Key concepts, software characteristics	Introduction	Chapter1(T1)
3-4	Generic frame work activities, agility	Generic View of Process	Chapter2(T1)
5-7	Perspective models, RAD, spiralmodel	Process models	Chapter3(T1)
8-9	Philosophy & asset of guidelines	Anagile view of process	Chapter4(T1)

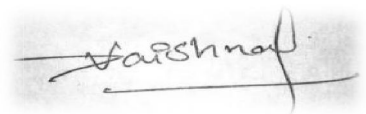|			
10-12	Practice encompasses the technical activities	Software Engineering Practice	Chapter5(T1)
13-15	It provides with a solid approach for addressing requirements challenges	Requirements Engineering	Chapter7(T1)
16-18	Diagrammatic forms, provides view of one or more model elements	Analysis Modeling	Chapter8(T1&R1)
19-21	Design is the place where software quality is established	Design Engineering	Chapter9(T1&R1)
22-25	The preliminary blue print from which software is constructed	Architectural Engineering	Chapter 10(T1&R1)
26-28	Design guidelines for avoiding errors as procedural design evolves	Component level Design	Chapter 11(T1&R1)
29-31	User scenarios will be created and screen layouts will be developed	User Interface Design	Chapter 12(T1&R1)
32-34	Different strategies for testing software.	Testing Strategies	Chapter 13 (T1)
35-37	Software Maintenance	Characteristics of Software management, types of maintenance, Software reverse Engineering	Chapter 2(R3)
38-40	Estimation	Estimation of Maintenance Cost. Emerging trends and various tools.	Chapter 4(R3)

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lecture No)	Remarks
Test 1	60 Minutes	17	27/09/2021	1-14	CB
Test 2	60 Minutes	17	19/11/2021	15- 25	CB
Test 3	60 Minutes	16	10/12/2021	26-40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	12/01/2022	1- 40	CB

** To be announced in the class

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.

Mr. NAVEEN KUMAR VAISHNAV
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS428	**Theory of Computation**	**3**	**0**	**3**

Instructor-in-charge: Mr. RAMESH KUMAR YADAV

Learning Outcomes:

The learning objectives of this course are to:

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

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

Lecture wise plan

Lecture Nos.	Learning Objective	Topics to be covered	Reference (chapter/sec./Page Nos of Text/Ref. Books)
1-5	To understand the basics of Automata	Introduction to Automata(Introduction and motivation, infinite sets, proofs, Closures, Alphabets, languages, and representations)	T1 Ch-l 1.4,1.5,1.6,1.9
6-10	To learn the concept of Finite Automata	Finite Automata (Deterministic finite automata, Non-deterministic finite automata, Closure properties and equivalences, Regularity)	T2 Ch-2 2.1,2.2,2.3,2.9
16-20	To learn the concepts of Regular-Expression & DFA	Regular Expressions and Languages,	T1 Ch-3 3.2,3.4 T2 Ch3 3.6,3.8
21-23	To learn the concepts of Regular-Languages	Properties of Regular Languages	T1 Ch-4, 4.5, 4.6 T2 Ch4, 4.8,4.10
24-25	To understand concept of CFG	Context-Free Grammars and Languages	T1 Ch-5 5.7,5.8
26-30	To understand concept of CFG	Applications of Context-Free Grammars	T2 Ch-5 5.4,5.8

31-40	To learn the concepts of PDA and its uses, NP concept	Pushdown Automata Languages of PDA Deterministic Pushdown Automata Properties of Context-Free Languages The complexity class P, The complexity class NP	T1 Ch-5,Ch6 5.9, 6.4,7.1 T2 Ch6 6.8,7.4,7.9

Evaluation Scheme:

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

Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	24/09/2021	1-12	CB
Test 2	60 Minutes	17	18/11/2021	13- 28	CB
Test 3	60 Minutes	16	09/12/2021	29- 42	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	08/01/2022	1- 42	CB

** To be announced in the class

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.

Mr.RAMESH KUMAR YADAV
Instructor-In-charge

Date: 01/10/2021

The ICFAI University, Raipur

Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CS432	Network Security	3	2	4

Instructor-in-charge: Mr. ASHISH KUMBHARE

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.The course also gives a survey of cryptographic tools and explains how they can be utilized in protocols and applications, for example how to provide secure user authentication over a public network. Students have a good understanding of how applications can communicate securely and what tools and protocols exist in order to offer different levels of security.

Textbook(s)T1	Cryptography And Network Security – Principles and Practices, William Stallings, Prentice Hall of India, Fifth Edition, 2011
Referencebook(s) R1	Cryptography and Network Security Atul Kahate, Tata McGrawHill, 2003.
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, Types of Services and Mechanisms	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
6-8	To learn various encryption standards	Block ciphers standard, Data encryption standard, Advanced encryption standard	T1 CH-3 3.1,3.2
9-11	To learn symmetric cipher encryption DES algorithm	Symmetric ciphers- triple DES concept, DES- Modes of operation	T1 CH-3 3.4,3.5
12-13	To learn public key cryptography	Confidentiality using Symmetric Encryption, Public key cryptography	T1 CH-8 8.1,8.2
14-15	To learn public key cryptography RSA Algorithm	Concept and working of RSA	T1 CH-9 9.1,9.2

16-17	To learn Key management and distribution technique	Key management Techniques, Key Distribution Techniques	T1 CH-10 10.1,10.2
18	To learn public Key Cryptosystems	Other public Key Cryptosystems – Diffie Hellmen Inroduction	T1 CH-10 10.2
19	To learn Diffie Hellmen Algorithm	Diffie Hellmen working Concept	T1 CH-10 10.2,10.3
20-21	To learn concept of Hash Function	Cryptographic Hash functions – concept, uses, Cryptographic Hash functions –SHA	T1 CH-11 11.1,11.2
22	To learn Message authentication Codes	Introduction to Message authentication Codes (MAC),	T1 CH-11 11.3
23-26	To learn different MAC algorithm	Message authentication Codes (MAC) – HMAC, Message authentication Codes (MAC) – DAA, Hash and MAC algorithms – MD5, Hash and MAC algorithms- RIPEMD	T1 CH-12 12.1,12.3,12.4
27	To learn concept of Digital Signature	Introduction to Digital signatures	T1 CH-13 13.1
28-29	To learn Digital Signature technique	Digital signatures – DSS, Digital signatures –DSA,	T1 CH-13 13.2,13.3
30-32	To learn Authentication principles	Application of X.509 Certificates. Authentication principles, Authentication applications- Kerberos V4 & V5	T1 CH-14 14.1,14.2
33-34	To learn Web security concept	Introduction to Web security, Working concept of Web security	T1 CH-17 17.1,17.2
35	To learn Web security	Web security - Secure Electronic Transaction	T1 CH-17 17.3
36-37	To learn E-Mail security	Introduction E-Mail security, Working concept of E-Mail security	T1 CH-15 15.2
38-39	To learn IP Security	Introduction to IP Security, Working concept of IP Security	T1 CH-16 16.1,16.2
40	To learn Application of IP Security	Application of IP Security, PGP (Pretty Good Privacy) Concept	T1 CH-15 15.1

Evaluation Scheme:
Student evaluation is based on the series of Tests and Quizzes conducted during the course of semester followed by a comprehensive examination.
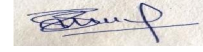
Evaluation Component	Duration	Weightage	Date	Syllabus (Lec.No.)	Remarks
Test 1	60 Minutes	17	23/09/2021	1-11	CB
Test 2	60 Minutes	17	17/11/2021	12- 26	CB
Test 3	60 Minutes	16	08/12/2021	27- 40	CB
Quizzes (2)	20 Minutes each	10	**	**	CB
Comprehensive Exam	3 Hours	40	06/01/2022	1- 40	CB

** To be announced in the class

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: 01/10/2021

Mr. ASHISH KUMBHARE
Instructor-In-charge

The ICFAI University, Raipur
Faculty of Science and Technology
First Semester, 2021 – 2022
Course Handout

Course No	Course Title	L	P	U
CE491/ CS491/ME491	**Special Project**	**0**	**0**	**3**

Instructor-in-charge: Mr. DILIP MISHRA

Scope & Objective of the course:
This is an unstructured open ended where under the overall supervision of a faculty-in-charge, batches of students will be attached to different faculty members. Each batch will work on a specific time bound which is of basic or peripheral concern of student's discipline Each Student must submit a project report as a culmination of his endeavor and investigation. Faculty-in-charge will determine the choice of the project and also whether or not the project report is to be submitted jointly by a group or individually by a student. This course will aim to evaluate the student actual ability to use the fundamentals of knowledge and to meet the new unknown situations as demonstrated by the student's interaction with the faculty member and faculty-in-charge. The faculty-in-charge may assign specific hours of formal brain storming sessions.

Learning Outcomes:
After successful completion of the course student will be able to
1. Independently acquire and handle knowledge through independent studies of relevant literature
2. Independently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies

Text Book T	No prescribed Texts. Student must do literature survey from journals of his field of research.
Reference book(s) R1	None

Evaluation Scheme:
Student evaluation is based on Literature survey, seminar series conducted, observations of the supervisor and Thesis report.

Evaluation Component	Weightage	Date	Remarks
Literature Survey and Project outline	20	**	Supervisor to submit copy to IC
Mid-term Project Report	10	**	Supervisor to submit to IC after evaluation
Mid-term Seminar	20	**	Mid-semester grading to be submitted to IC by Supervisor
End-Sem Project Report	25	**	Supervisor to submit to IC after evaluation
End-Sem Seminar	25	**	

** To be announced by the Course I/C

General Guidelines:

a) This being a three-unit course, a student is expected to work for at least 9 hours per week including the formal contact hours with the instructor.

b) Each student should meet the faculty at least once a week in addition to the formal contact hours at mutually agreed time to apprise the faculty of the progress in the project.

c) Student is supposed to maintain a diary and record the daily progress of the work done. The diary would be periodically checked by the faculty.

d) All the evaluation components are compulsory. If a student misses any component of evaluation, he is likely to get "NC".

e) The Mid-term evaluation is to be strict to avoid any laxity on the part of the student.

f) Student should make two copies of the final report in the prescribed format, one his personal copy and the other for submission to the Institute. The faculty may ask for an additional copy if so desired.

g) The final seminar is to be planned only after the submission of the project report.

h) The final seminar is open to all the student and the faculty. The faculty member should involve the local experts in the evaluation of final seminar.

i) If the progress in the project work is not satisfactory, the faculty may advise the student to withdraw from the course in time and the same may be communicated to the instructor-in- charge.

j) The student should submit the withdrawal request to the Department. The last day for withdrawal is the same as that for all other courses.

k) If more than one student is working on the same project, the distribution of work among the students is to be made clear to the students and the Instructor-in-charge. The evaluation should be based on individual performances only.

l) The details of components of evaluation should be submitted in the prescribed format only.

m) The student is expected to attend a conference on the area of project opted or present a technical paper in any of the journal.

Mr.DILIP MISHRA

Date: 01/10/2021   **Instructor-In-charge**