2.6.1: The institution has stated learning outcomes (programme and course outcome)/graduate attributes which are integrated into the assessment process and widely publicized through the website and other documents and the attainment of the same are evaluated by the institution

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)
Recognized under 2(f) and 12(B) of UGC Act 1956
NBA Accredited, Approved by AICTE and Permanently affiliated to JNTUH
Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION:

To be a technologically adaptive center for computing by grooming the students as top notch professionals.

MISSION:

DM1: To offer quality education in computing.
DM2: To provide an environment that enables overall development of all the stakeholders.
DM3: To impart training on emerging technologies.
DM4: To encourage participation of stakeholders in research and development.

PROGRAM OUTCOMES

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Computer Science and Engineering graduates will be able to:

Program Specific Outcomes	
PSO 1	To develop software projects using standard practices and suitable programming environment.
PSO 2	To identify, formulate and solve the real life problems faced in the society, industry and other areas by applying the skills of the programming languages, networks and databases learned.
PSO 3	To apply computer science knowledge in exploring and adopting latest technologies in various inter-disciplinary research activities.

I YEAR CSE SEMESTER - I (REGULATION – R20)
ACADEMIC YEAR: 2019-2020

Course Code &Name:R20MTH1101&MATHEMATICS - I
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C111.1	Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations (L4-Analyse)
C111.2	Reduce the quadratic form to canonical form using orthogonal transformations. (L3-Apply)
C111.3	Analyse the nature of sequence and series (L4-Analyse)
C111.4	Solve the applications on mean value theorems. (L3-Apply)
C111.5	Evaluate the improper integrals using Beta and Gamma functions. (L5-Evaluate)
C111.6	Find the extreme values of functions of two variables with / without constraints. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C111.1	2	3	3	1	-	-	-	-	-	-	-	2	2	2	2
C111.2	3	2	2	1	-	-	-	-	-	-	-	1	3	2	3
C111 3	1	3	3	2	-	-	-	-	-	-	-	1	2	2	1
C111.4	3	2	1	1	-	-	-	-	-	-	-	1	3	2	3
C111.5	1	2	2	3	-	-	-	-	-	-	-	2	2	2	1
C111.6	3	2	2	2	-	-	-	-	-	-	-	1	3	2	3
C111	**2.17**	**2.33**	**2.17**	**1.67**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.33**	**2.5**	**2**	**2.17**

Course Code &Name: R20ECH1101 &Chemistry
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C112.1	Illustrate the molecular orbital energy level diagram of different molecular species. (L3-Applying)
C112.2	Analyze the impurities present in the water for industrial and domestic applications.(L4-Analyzing)
C112.3	Describe and understand the operation of electrochemical cells for the production of electric energy, i.e. batteries. (L3-Applying)
C112.4	Summaries the effects of corrosion to indicate the use of alloys in various metallic structures. (L3-Applying)
C112.5	The knowledge of configurationally and conformational analysis of molecules and reaction mechanisms. (L4-Analyzing)
C112.6	The knowledge of configurationally and conformational analysis of molecules and reaction mechanisms. (L4-Analyzing)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C112.1	3	2	2	-	-	-	1	-	-	-	-	-	1	-	-
C112.2	2	2	3	-	-	-	2	-	-	-	-	-	2	2	-
C112 3	2	3	2	-	-	-	2	-	-	-	-	-	2	2	-
C112.4	2	2	2	-	-	-	2	-	-	-	-	-	1	1	-
C112.5	2	1	2	-	-	-	2	-	-	-	-	-	1	1	-
C112.6	2	2	2	-	-	-	3	-	-	-	-	-	2	2	-
C112	**2.1**	**2**	**2.1**	-	-	-	**2**	-	-	-	-	-	**1.5**	**1.3**	-

Course Code &Name: R20EEE1101 &**Basic Electrical Engineering**
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C113.1	Toanalyzeandsolveelectricalcircuits usingnetworklaws andtheorems. (L3& L4-Applying& Analyze)
C113.2	TounderstandandanalyzebasicElectricandMagneticcircuits. (L4-Analyze)
C113.3	To study and design the transformer. (L3&L6-Applying& Create)
C113.4	Summarizetheregulationand efficiencyofTransformer.(L5-Evaluating)
C113.5	TostudytheworkingprinciplesofElectricalMachinesanddesign.(L3&L6-Applying& Create)
C113.6	TointroducecomponentsofLowVoltageElectricalInstallations. (L3-Applying)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C113.1	3	2	2	2	-	1	2	-	2	1	-	2	2	2	3
C113.2	-	3	1	1	-	2	1	2	-	2	-	1	3	2	2
C113.3	2	-	2	-	1	2	2	-	1	1	2	3	2	3	2
C113.4	2	2	-	-	2	2	2	2	3	2	3	3	2	2	2
C113.5	3	3	-	2	3	1	2	1	2	2	3	2	2	3	3
C113.6	3	-	3	3	2	3	3	3	3	3	2	3	3	2	3
C113	2.1	1.6	1.3	1.3	1.3	1.8	2	1.3	1.8	1.8	1.6	2.3	2.3	2.3	2.5

Course Code &Name: R20MED1101 &**Engineering Workshop**
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C114.1	Ability todesign andmodel differentprototypes in the carpentry trade such as Crosslapjoint,Dovetailjoint.(**L3-Applying**)
C114.2	IdentifyandapplysuitabletoolsfordifferenttradesofEngineeringprocessesincludingdrilling, materialremoving,measuring, chiselinginfitting.(**L3-Applying**)
C114.3	IdentifyToolsandTechniquesUsedfor SheetMetalFabrication.(**L3-Applying**)
C114.4	ApplytheSkillsofbasicelectricalengineeringforhousewiringpractice.(**L3-Applying)**
C114.5	PracticeonmanufacturingofcomponentsusingworkshoptradesincludingBlacksmithyandFoundry.(**L3-Applying)**
C114.6	UseWeldingEquipmenttojointhestructures. (**L3-Applying)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C114.1	3	2	1	-	2		-	1	-	-	-	-	3	-	3
C114.2	3	1	-	-	-	-	-	-	-	-	-	-	3	-	3
C114.3	3	2	2	1	1	-	-	1	-	-	2	-	3	-	3
C114.4	3	1	-	1	1	-	-	2	-	-	-	-	3	-	3
C114.5	3	1	1	1	1	-	-	1	-	-	2	-	3	-	3
C114.6	3	1	-	-	1	-	-	1	-	-	-	-	3	-	3
C114	3	2	1	-	2		-	1	-	-	-	-	3	-	3

Course Code &Name: R20HAS1101 &**English**
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C115.1	Developing the language proficiency of students in English with an emphasis on vocabulary, grammar and pronunciation. (Create-L6)
C115.2	Understand the given texts and respond appropriately. (Understand- K3)
C115.3	Communicate and integrate confidently in various contexts and different cultures. (Create-K6)
C115.4	Acquire basic proficiency in English in describing, reading, listening comprehension, writing and speaking skills. (Apply-K3)
C115.5	Develop awareness in the students about the significance of silent reading, analyzing and comprehending. (Analyze-K4)
C115.6	Use English language effectively in spoken and written forms in both formal and informal situations.(Apply K3)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C115.1	2	3	3	1	-	2	-	-	-	-	-	2	2	2	2
C115.2	3	1	1	1	3	1	-	-	-	-	-	2	3	2	3
C115.3	1	3	3	2	-	1	-	-	-	-	-	2	1	2	1
C115.4	3	2	2	2	3	2	-	-	-	-	-	2	3	2	3
C115.5	3	1	2	2	3	1	-	-	-	-	-	2	3	2	3
C115.6	2	2	1	3	3	2	-	-	-	-	-	2	2	2	2
C115	**2.33**	**2**	**2**	**1.83**	**2**	**1.5**	**-**	**-**	**-**	**-**	**-**	**2**	**2.33**	**2**	**2.5**

Course Code &Name: R20ECH11L1 &**Engineering Chemistry Lab**

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C116.1	Illustrate the molecular orbital energy level diagram of different molecular species. (L3-Applying)
C116.2	Analyze the impurities present in the water for industrial and domestic applications.(L4-Analyzing)
C116.3	Describe and understand the operation of electrochemical cells for the production of electric energy, i.e. batteries. (L3-Applying)
C116.4	Summaries the effects of corrosion to indicate the use of alloys in various metallic structures. (L3-Applying)
C116.5	The knowledge of configurationally and conformational analysis of molecules and reaction mechanisms.(L4-Analyzing)
C116.6	The knowledge of configurationally and conformational analysis of molecules and reaction mechanisms.(L4-Analyzing)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C116.1	3	2	2	-	-	-	1	-	-	-	-	-	1	-	-
C116.2	2	2	3	-	-	-	2	-	-	-	-	-	2	2	-
C116.3	2	3	2	-	-	-	2	-	-	-	-	-	2	2	-
C116.4	2	2	2	-	-	-	2	-	-	-	-	-	1	1	-
C116.5	2	1	2	-	-	-	2	-	-	-	-	-	1	1	-
C116.6	2	2	2	-	-	-	3	-	-	-	-	-	2	2	-
C116	**2.1**	**2**	**2.1**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**1.5**	**1.3**	**-**

Course Code &Name: R20HAS11L2 &English Language and Communication Skills
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C117.1	Developing the language proficiency of students in English with an emphasis on vocabulary, grammar and pronunciation. (Create-L6).
C117.2	Understand the given texts and respond appropriately.(Understand-L2)
C117.3	Communicate and integrate confidently in various contexts and different cultures. (Create-L6)
C117.4	Acquire basic proficiency in English in describing, reading, listening comprehension, writing and speaking skills (Remember-L1).
C117.5	Develop awareness in the students about the significance of silent reading, analyzing and comprehending. (Analyze-L4).
C117.6	Use English language effectively in spoken and written forms in both formal and informal situations.(Apply-L3).

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C117.1	-	2	-	-	-	-	-	-	-	2	-	3	-	2	-
C117.2	-	-	-	-	-	-	-	-	2	3	2	2	-	2	-
C117.3	2	2	2	-	-	2	2	2	2	3	2	3	2	2	2
C117.4	-	2	2	2	-	2	2	2	3	3	2	3	-	2	2
C117.5	-	-	-	2	-	2	-	-	-	3	2	3	-	2	2
C117.6	-	2	-	-	-	-	-	-	-	2	-	3	-	2	-
C117	1	3	2	2	-	2	2	2	2.3	2.8	2	2.8	2	2	2

Course Code &Name: R20EEE11L3&Basic Electrical Engineering Lab
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C120.1	Get an exposure to basic electrical laws. L1- APPLYING
C120.2	Understand the response of different types of electrical circuits to different excitation.L3 UNDERSTANDING
C120.3	Understand the measurement and calculation of Resonance. L3 UNDERSTANDING
C120.4	Understand the efficiency and regulation of transformers. L3 UNDERSTANDING
C120.5	Evaluate the powers of transformers.L1APPLYING
C120.6	Understand the characteristics and efficiency of electrical machines. L3 UNDERSTANDING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C120.1	3	2	-	-	-	2	2	-	2	-	-	2	2	3	-
C120.2	3	2	-	-	-	2	2	-	2	-	-	2	2	3	-
C120.3	**2**	**3**	-	-	-	**3**	**3**	-	**2**	-	-	**3**	**3**	**3**	-
C120.4	**3**	**2**	-	-	-	**2**	**2**	-	**2**	-	-	**2**	**2**	**3**	-
C120.5	**3**	**2**	-	-	-	**2**	**2**	-	**2**	-	-	**2**	**2**	**3**	-
C120.6	2	2	-	-	-	3	3	-	3	-	-	3	3	2	-
C120	2.6	2.1	-	-	-	2.3	2.3	-	2.1	-	-	2.1	2.1	2.8	-

I YEAR CSE SEMESTER - II (REGULATION – R20)
ACADEMIC YEAR: 2019-2020

Course Code &Name:R20MTH1201&MATHEMATICS - II

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C121.1	Apply the methods to solve the first order differential equations and its applications.**(L3-Apply)**
C121.2	Analyze the methods to solve the higher order differential equations and its applications.**(L4-Analyse)**
C121.3	Evaluating multiple integrals in Cartesian and polar forms.**(L5-Evaluate)**
C121.4	Apply the multiple integrals to find the areas, volumes, center of mass and gravity for cubes and spheres.**(L3-Apply)**
C121.5	Solving vector and scalar point functions- Gradient, Divergence, Curl.**(L3-Apply)**
C121.6	Evaluate the line, surface, volume integrals and converting them from one to another.**(L5-Evaluate)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C121 .1	3	2	2	2	3	1	-	-	-	-	1	2	3	2	3
C121 .2	2	3	3	2	-	1	-	-	-	-	1	2	2	2	2
C121 .3	2	2	1	3	3	1	-	-	-	-	1	2	2	1	1
C121 .4	3	2	2	2	3	2	-	-	-	-	1	2	3	2	3
C121 .5	3	1	1	1	3	1	-	-	-	-	-	2	3	1	3
C121 .6	2	2	1	3	3	2	-	-	-	-	1	2	2	2	2
C121	**2.5**	**2**	**1.67**	**2.17**	**2.5**	**1.33**	**-**	**-**	**-**	**-**	**0.83**	**2**	**2.5**	**1.67**	**2.33**

Course Code &Name:R20EAP1201&Applied Physics
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C122.1	The concepts would be able to learn the fundamental concepts on Quantum behavior of matter in its micro state and dual nature. (L3-Applying).
C122.2	The knowledge of fundamentals of the semiconductors, semiconductor diodes and transistors.(L3-Applying).
C122.3	Analyzing the principle and working of various optoelectronic devices like solar cell, photo diode, etc. (L4-Analyzing).
C122.4	Study about characteristics of lasers and transmission of signal in optical fiber. (L4-Analyzing).
C122.5	Evaluate the polarization phenomenon in dielectrics and magnetization in magnetic materials and principles of electromagnetism. (L5 -Evaluating).
C122.6	Able to Design and characterize to study the properties of materials help to prepare new materials for engineering applications. (L6-Creating).

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C122 .1	3	1	1	1	1	-	2	-	-	-	-	1	1	2	3
C122 .2	2	2	2	1	2	-	2	-	-	-	-	2	1	2	1
C122 .3	1	3	3	3	1	-	2	-	-	-	-	2	1	2	1
C122 .4	1	3	3	3	1	-	2	-	-	-	-	2	1	1	-
C122 .5	1	1	2	1	2	-	2	-	-	-	-	1	1	1	1
C122 .6	1	2	2	2	2	-	2	-	-	-	-	1	1	3	1
C122	**1.5**	**2**	**2.1**	**1.8**	**1.5**	**-**	**2**	**-**	**-**	**-**	**-**	**1.5**	**1**	**1.8**	**1.1**

Course Code &Name:R20CSE1101&Programming for Problem Solving
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C123.1	To write algorithms and to draw flowcharts for solving problems. (k6-create)
C123.2	To convert the algorithms/flowcharts to C programs. (K3-Apply)
C123.3	To code and test a given logic in C programming language. (K4-Analyze)
C123.4	To decompose a problem into functions and to develop modular reusable code. (K4-Analyze)
C123.5	To use arrays, pointers, strings and structures to write C programs. (K3-Apply)
C123.6	Searching and Sorting problems. (k3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO 3
C123 .1	2	2	1	1	2	-	-	-	-	1	-	-	2	2	1
C123 .2	3	2	2	1	3	-	-	-	-	-	1	-	2	2	2
C123 .3	2	1	1	1	3	-	-	-	-	1	1	-	3	2	1
C123 .4	2	2	2	1	3	-	-	-	-	1	-	-	2	1	1
C123 .5	2	2	2	2	3	-	-	-	-	-	-	-	2	1	1
C123 .6	2	2	2	1	3	-	-	-	-	-	-	-	1	2	1
C123	**2.16**	**1.83**	**1.66**	**1.16**	**2.83**	**-**	**-**	**-**	**-**	**0.5**	**0.33**	**-**	**2**	**1.66**	**1.16**

Course Code &Name:R20MED1102&Engineering Graphics

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C124.1	Acquire requisite basic knowledge, techniques for the study of engineering graphics.(L4)
C124.2	Comprehend the basics of orthographic projections and deduce orthographic projections of a points, lines and planes at different orientations.(L3)
C124.3	Imagine orthographic views of various solid objects at different orientations. (L5)
C124.4	Understanding the meaning of sectioning and to anlalyse the internal details of solids.(L3)
C124.5	Develop the surfaces and Intersection of right regular solids.(L4)
C124.6	Recognize the significance of isometric and perspective views to relate 2D with 3D and to create 2D sketches by Auto CAD package.(L4)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C124 .1	3	2	3	-	3	-	-	-	-	-	-	3	3	3	2
C122 .2	3	2	3	-	3	-	-	-	-	-	-	3	3	3	2
C124 .3	3	2	3	-	3	-	-	-	-	-	-	3	3	3	2
C124 .4	3	2	3	-	3	-	-	-	-	-	-	3	3	3	2
C124 .5	3	2	3	-	3	-	-	-	-	-	-	3	3	3	2
C124 .6	3	2	3	-	3	-	-	-	-	-	-	3	3	3	2
C124	**3**	**2**	**3**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**3**	**2**

Course Code &Name:R20EAP12L1&Applied Physics Lab
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C125.1	Understand Voltage – Current characteristics semiconductor devices and opto electronic devices. (L2- Understanding)
C125.2	Estimated how the light energy converts into electrical energy by using photo diodes. (L4-Analyzing)
C125.3	The nature of the semiconducting material can be identified by evaluating hall coefficient. (L4- Analyzing)
C125.4	Learn the practical knowledge in quantum concepts by photo electric effect experiment and Characteristics of Laser diode. (L3-Applying)
C125.5	Analyze the magnetization and demagnetization of a magnetic material. (L4-Analyzing)
C125.6	Calculate the Numerical aperture of an optical fiber. (L3-Applying)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C125 .1	3	2	2	3	3	-	1	-	-	-	-	2	2	1	3
C125 .2	3	3	2	2	3	-	-	-	-	-	-	2	2	1	3
C125 .3	3	2	2	3	3	-	3	-	-	-	-	2	2	2	3
C125 .4	3	3	3	3	3	-	-	-	-	-	-	2	2	2	3
C125 .5	3	2	2	3	3	-	1	-	-	-	-	2	2	2	3
C125 .6	3	3	2	3	3	-	2	-	-	-	-	2	2	1	3
C125	**3**	**2.5**	**2.1**	**2.8**	**3**	-	**1.1**	-	-	-	-	**2**	**2**	**1.5**	**3**

Course Code &Name:R20CSE12L2&Programming for Problem Solving lab
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C126.1	Formulate algorithms/flowcharts there by translating them into programs using variables with various data types, looping and selection statements.(L6-create)
C126.2	Implement logic building techniques using control statements and arrays. (L3-apply)
C126.3	Construct modular and structure programming using functions, strings and structures.(L3-Apply)
C126.4	Analyze the iteration with recursion and implementation macros. (L4-Analyze)
C126.5	Illustration of pointers and implement memory management techniques and file handling approach. (L4-Analyze)
C126.6	Implement search and sort operations on arrays.(L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C126 .1	2	2	2	-	3	-	-	-	1	-	-	-	2	2	1
C126 .2	1	2	2	-	3	-	-	-	-	-	-	-	2	2	1
C126 .3	1	2	2	1	3	-	-	-	1	-	-	-	2	2	1
C126 .4	1	2	2	1	3	-	-	-	-	-	-	-	1	1	1
C126 .5	1	2	2	1	3	-	-	-	-	-	-	-	2	2	1
C126 .6	1	2	2	1	3	-	-	-	-	-	-	-	2	1	1
C126	**1.16**	**2**	**2**	**0.66**	**3**	**-**	**-**	**-**	**0.33**	**-**	**-**	**-**	**1.83**	**1.66**	**1**

II YEAR CSE SEMESTER-I (REGULATION –R20)
ACADEMIC YEAR: 2020-2021

Course Code &Name: R20ECE2105&AnalogElectronics
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C211 .1	Describetheconstructionoperationandcharacteristicsofelectronicdeviceslike PN Junction and Special purpose diodes. (K3-Apply)
C211 .2	Determine the application of diode as rectifier. (K3-Apply)
C211 .3	Illustrate the application of transistor as amplifier employing BJT devices. (K3-Apply)
C211 .4	Analyze the biasing circuits using BJT transistor amplifier circuits. (K4-Analyse)
C211 .5	Evaluate construction operation and characteristics of FET. (K5-Evaluate)
C211 .6	Select biasing circuits using FET amplifiers. (K4-Analyse)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C211.1	3	-	-	-	2	-	-	-	-	-	-	-	-	1	1
C211.2	3	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C211 3	3	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C211.4	-	3	3	-	-	-	-	-	-	-	-	-	1	-	-
C211.5	-	-	-	2	2	-	-	-	-	-	-	-	1	1	-
C211.6	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C211	**3**	**3**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1.25**	**1**

Course Code &Name: R20CSE2101&Data Structures
Upon completion of the course, Students will be able to:

Course Name	Course outcomes
C212 .1	Ability to select the data structures that efficiently model the information in a problem. (k3-apply)
C212 .2	Ability to assess efficiency trade-offs among different data structure implementations or combinations. (Create-k6)
C212 .3	Implement and know the application of algorithms for sorting and searching. (Create-k6)
C212 .4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees (Create-k6)
C212 .5	Ability to select the data structures that efficiently model the information in a problem. (Analyze-k4)
C212 .6	Illustrate the concept of Text pattern matching algorithm. (Analyze-k4)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C212.1	3	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C212.2	-	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C212.3	1	-	-	-	2	-	-	-	-	-	-	-	1	1	1
C212.4	1	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C212.5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C212.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C212	**1.5**	**3**	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1.5**	**1**

Course Code &Name: R20MTH2102&Computer Oriented Statistical Methods
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C213.1	Describe the probability of an event, product rule, addition rule &Baye's rule.(K3-Apply)
C213.2	Describe Random variables and Chebyshev's theorem, Discrete probability distribution. (K3-Apply)
C213.3	Calculate the area under the normal curve and applications of the normal distribution. (K3-Apply)
C213.4	Analyze the fundamental sampling distributions.(K4-Analyze)
C213.5	Test the Hypothesis of single mean, double mean, single proportion, double proportion.(K5-Evaluate)
C213.6	Evaluate Transition Probability Matrix.(K5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C213.1	3	2	-	-	2	-	-	-	-	-	-	-	-	1	-
C213.2	3	1	-	-	1	-	-	-	-	-	-	-	-	1	-
C213.3	3	1	-	-	2	-	-	-	-	-	-	-	-	1	-
C213.4	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C213.5	1	-	-	3	2	-	-	-	-	-	-	-	-	-	-
C213.6	1	-	-	3	2	-	-	-	-	-	-	-	-	-	-
C213	**2**	**1.75**	**3**	**3**	**1.8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**

Course Code &Name: R20CSE2102&Computer Organization and Architecture
Upon Completion of the course, the students will be able to:

Course Name	Course outcomes
C214.1	Describe the basics of instructions sets and their impact on processor design. (K3-Apply)
C214.2	Demonstrate an understanding of the design of the functional units of a digital computer system. (K3-Apply)
C214.3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor Including memory. (K5-Evaluate)
C214.4	Design a pipeline for consistent execution of instructions with minimum hazards. (K6-Create)
C214.5	Recognize and manipulate representations of numbers stored in digital computers.(K4-Analyze)
C214.6	Demonstrate the Characteristics of Multiprocessors.(K3-Apply)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C214.1	3	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C214.2	3	-	2	-	3	-	-	-	-	-	-	-	-	1	-
C214.3	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C214.4	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C214.5	1	3	3	1	-	-	-	-	-	-	-	-	-	1	-
C214.6	3	-	-	1	3	-	-	-	-	-	-	-	-	-	-
C214	**2.2**	**2**	**1.75**	**1.67**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**

Course Code &Name: R20CSE2103&Object Oriented Programming Using C++
Upon Completion of the course, the students will be able to:

Course Name	Course outcomes
C215 .1	Distinguish the Procedural and object oriented paradigm along with principles. (K4-Analyzing)
C215 .2	Describe dynamic memory management techniques using pointers, constructors, destructors, etc. (K3-Apply)
C215 .3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. (K3-Apply)
C215 .4	Classify Inheritance with the understanding of early and late Binding. (K4-Analyze)
C215 .5	Illustrate the process of data file manipulations using C++. (Applying-k3)
C215 .6	An ability to incorporate Exception Handling and Benefits of Exception handling in Object Oriented Programs. (Analyzing-k4)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C215.1	1	3	3	-	-	-	-	-	-	-	-	-	-	1	-
C215.2	3	1	1	-	3	-	-	-	-	-	-	-	-	1	-
C215.3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C215.4	1	3	3	-	-	-	-	-	-	-	-	-	1	1	-
C215.5	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C215.6	1	3	3	2	-	-	-	-	-	-	-	-	1	1	-
C215	**2**	**2.5**	**2.5**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**

Course Code &Name: R20ECE21L4&Analog Electronics Lab

Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C21L6.1	DeterminetheP-N-Junction diode&Zenerdiodecharacteristics. (K3-Apply).
C21L6.2	Calculate the Input and Output characteristics of BJT and FET (K3-Apply).
C21L6.3	Evaluate Half Wave and Full Wave Rectifier with and without filters (K5-Evaluate).
C21L6.4	Differentiate Measurement of h-parameters of transistor in CB, CE, CC configurations (K4-Analyze).
C21L6.5	Analyze the Frequency response of CE, CC and Common Source FET Amplifier (K4-Analyze).
C21L6.6	Measure SCR and UJT characteristics (K5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C216.1	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C216.2	3	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C216.3	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C216.4	-	3	3	-	-	-	-	-	-	-	-	-	-	-	
C216.5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C216.6	3	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C216	**3**	**2.33**	**2.33**	**2.33**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Course Code &Name: R20CSE21L1&Data Structures Lab
Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C21L7 .1	Design a program to implement the linear data structures using static and dynamic memory allocation. (k6-Create)
C21L7 .2	Design a program to implement searching, sorting techniques for the given problem.(k6-Create)
C21L7 .3	Demonstrate the fundamental algorithms of tree data structures by experimenting the programs.(k3-Apply)
C21L7 .4	Examine the traversing of a given graph by using their spec to graph traversal techniques (k3-Apply)
C21L7 .5	Design a program to implement the pattern matching algorithms for the given problem. (k6-Create)
C21L7 .6	Apply data structures in the real time applications. (k3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L7.1	2	3	3	-	3	-	-	-	-	-	-	-	1	1	1
C21L7.2	1	2	2	2	3	-	-	-	-	-	-	-	1	1	-
C21L7.3	3	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C21L7.4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C21L7.5	2	-	-	1	3	-	-	-	-	-	-	-	-	1	-
C21L7.6	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C217	**2.33**	**2.5**	**2**	**1.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**

Course Code &Name: R20CSE21L2&IT Workshop Lab
Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C21L8.1	Distinguish software's and their installation.(K4-Analyze)
C21L8.2	Design word documents by learning word processing.(Create-K6)
C21L8.3	Create presentations by using different styles.(Create-K6)
C21L8.4	Introduce different way of hooking the PC on to the internet from home and Work place and effectively usage of the internet. (Analyze-K4)
C21L8.5	Describe usage of web browsers, email, news groups and discussion forums would be covered. (K3-Apply)
C21L8.6	List of tools & modules would enable the students in crafting professional word document.(K3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L8.1	2	3	3	1	-	2	-	-	-	-	2	2	-	1	-
C21L8.2	2	-	2	-	3	-	-	-	-	-	-	-	-	-	-
C21L8.3	1	-	1	-	3	1	-	-	-	1	1	1	-	-	-
C21L8.4	1	3	3	-	1	2	-	-	-	-	-	-	-	2	-
C21L8.5	3	-	2	1	3	1	-	-	-	-	-	-	1	1	-
C21L8.6	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C21L8	**2**	**2.33**	**2**	**1**	**2.6**	**1.5**	**-**	**-**	**-**	**1**	**1.5**	**1.5**	**1**	**1.25**	**-**

Course Code &Name: R20CSE21L3&C++ Programming Lab

Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C21L9 .1	Develop applications for arrange of problems using object-oriented programming. (K6-Create)
C21L9 .2	Demonstrate the implementation of constructors, destructors and operator overloading. (K3-Apply)
C21L9 .3	Apply virtual and pure virtual function& complex program situations. (K3-Apply)
C21L9 .4	Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism. (K3-Apply)
C21L9 .5	Explain generic programming, templates, file handling. (K5-Evaluate)
C21L9 .6	Handle exceptionsin programming. (K4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L9.1	2	1	1	-	3	-	-	-	-	-	2	-	1	1	1
C21L9.2	3	-	1	1	3	1	-	-	-	-	1	-	1	1	1
C21L9.3	3	-	1	2	3	-	-	-	-	-	-	-	-	-	-
C21L9.4	3	1	-	1	3	-	-	-	-	-	1	-	-	1	-
C21L9.5	1	1	2	3	3	1	-	-	-	-	1	-	-	-	-
C21L9.6	1	3	3	2	1	-	-	-	-	-	2	1	-	1	-
C21L9	**2.17**	**1.5**	**1.6**	**1.8**	**2.67**	**1**	**-**	**-**	**-**	**-**	**1.4**	**1**	**1**	**1**	**1**

II YEAR CSE SEMESTER-II (REGULATION –R20)
ACADEMIC YEAR: 2020-2021

Course Name : **R20CSE2201**&**Discrete Mathematics**
Year of study: 2020-21

Course Name	Course outcomes
C221 .1	Explain proofs of basic discrete mathematics and predicate logic. (K5-Evaluate).
C221 .2	For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference.(K5-Evaluate)
C221 .3	For a given a mathematical Examines the problem, classify its algebraic structure.(K4-Analyze)
C221 .4	Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.(K5-Evaluate)
C221 .5	Explain use of graph theory for solving problems. (K5-Evaluate)
C221.6	Explain the algebraic structures and polymorphism. (K5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C221.1	3	1	-	3	3	1	-	-	-	-	-	1	-	2	-
C221.2	2	-	2	3	3	-	-	-	-	-	-	-	-	1	-
C221.3	2	3	3	1	1	1	-	-	-	-	-	1	-	1	-
C221.4	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
C221.5	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C221.6	1	-	-	3	3	-	-	-	-	-	-	-	-	1	-
C221	**1.67**	**1.67**	**2.5**	**2.67**	**2.6**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1.2**	**-**

CourseName: R20ECE2102& Digital Logic Design
Year of study: 2020-21

Course Name	Course outcomes
C222.1	Describe the binary number theory, binary codes and Boolean algebra.(**K3-Apply)**
C222.2	Evaluate the Boolean Function using K-maps. (K5-**Evaluate**)
C222.3	Build the given logical functions using Basic gates and Universal gates. (K6-**Create**)
C222.4	Design various combinational and sequential circuits. (K6-**Create**)
C222.5	Illustrate the functionality of flip-flops for analysis and design of various circuits. (K3-**Apply**)
C222.6	Classify the basic memories and their associated memories. (K4-**Analyse**)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C222.1	3	1	-	1	3	-	-	-	-	-	-	-	-	1	-
C222.2	1	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C222.3	1	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C222.4	1	-	1	-	3	-	-	-	-	-	-	-	-	-	-
C222.5	3	2	2	-	3	-	-	-	-	-	-	-	-	1	-
C222.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C222	**1.67**	**1.75**	**1.75**	**1.67**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**

Sub code &CourseName: R20CSE2202& Operating Systems
Year of study: 2020-21

Course Name	Course outcomes
C223.1	Design the functions, structures and history of operating systems and able to analyse the design issues associated with operating systems. (K6-Create)
C223.2	Demonstrate various process management concepts, evaluates various CPU scheduling algorithms and illustrate the process synchronization concepts with various examples. (K3-Apply)
C223.3	Describe the concepts of memory management including virtual memory, can compare various page replacement algorithms. (K3-Apply)
C223.4	Illustrate File Management, analyses different File Allocation Strategies, develop disk Scheduling Algorithms.(K3-Apply)
C223.5	Evaluate the problems related to deadlocks, classify resources sharing among the users to avoid deadlocks, design the Deadlock detection and Prevention Algorithms. (K5-Evaluate)
C223.6	Analysing system protection and Revocation of access rights.(K4-Analyse)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C223.1	1	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C223.2	3	1	1	2	3	-	-	-	-	-	-	-	-	1	-
C223.3	3	1	1	1	3	-	-	-	-	-	-	-	1	1	1
C223.4	3	2	-	-	3	-	-	-	-	-	-	-	1	1	1
C223.5	2	1	1	3	3	-	-	-	-	-	-	-	1	1	1
C223.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C223	**2.17**	**1.67**	**1.6**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**

Course Code &Name: R20CSE2203& DATABASE MANAGEMENT SYSTEMS
Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C224 .1	Explain the basic concepts and the applications of database systems. (K5-Evaluate)
C224 .2	Generate the SQL queries using the basic SQL syntaxes for the given set of problems. (K6-Create)
C224 .3	Evaluate the relational database design principles and applications of relational algebra and relational calculus. (K5-Evaluate)
C224 .4	Justify the various normalization techniques on the given relational database. (K5-Evaluate)
C224 .5	Illustrate the basic issues of transaction processing and concurrency control. (K4-Analyze)
C224 .6	Design the database storage structures and list out the access techniques. (K6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C224 .1	2	1	1	3	3	1	-	-	-	-	1	1	-	1	-
C224 .2	1	-	-	1	3	-	-	-	-	-	1	-	-	1	-
C224 .3	1	1	2	3	3	-	-	-	-	-	-	-	1	1	1
C224 .4	1	-	1	3	3	-	-	-	-	-	-	-	1	1	1
C224 .5	1	3	3	1	-	-	-	-	-	-	-	-	-	-	-
C224 .6	2	1	2	-	3	1	-	-	-	-	1	-	1	2	1
C224	**1.33**	**1.5**	**1.8**	**2.2**	**3**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**1.2**	**1**

Course Code &Name: R20CSE2204&JAVA PROGRAMMING
Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C225 .1	Explain the OOPS concepts and primary concepts of java.(K5-Evaluate)
C225 .2	Illustrate the types of inheritance, polymorphism, inner classes and packages. (K3-Apply)
C225 .3	Justify the solutions to the given problem by applying the multithreading and exception handling mechanism.(K5-Evaluate)
C225 .4	Explain various collection framework concepts and file operations. (K5-Evaluate)
C225 .5	Design java applications by applying database operations through JDBC drivers (K6-Create)
C225 .6	Analyze & Design the concept of Event Handling and Abstract Window Toolkit. (K6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C225 .1	2	1	1	3	3	1	-	-	-	-	2	1	-	2	-
C225 .2	3	-	1	1	3	1	-	-	-	-	1	-	-	1	-
C225 .3	1	1	1	3	3	-	-	-	-	-	1	-	1	1	-
C225 .4	1	1	-	3	3	-	-	-	-	-	-	-	-	-	-
C225 .5	1	-	2	1	3	-	-	-	-	-	1	-	1	1	1
C225 .6	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C225	**1.5**	**1**	**1.2**	**2.2**	**3**	**1**	**-**	**-**	**-**	**-**	**1.25**	**1**	**1**	**1.2**	**1**

Sub code &Course Name: R20CSE22L1&Operating Systems Lab
Year of study: 2019-20

Course Name	Course outcomes
C22L6.1	Examine various CPU scheduling algorithms to identify the best scheduling algorithm as per software requirement. (K3-Apply)
C22L6.2	Justify the various page replacement algorithms in memory management to assess the effective memory utilization.(K5-Evaluate)
C22L6.3	Experiment the paging and segmentation concepts for memory management.(K3-Apply)
C22L6.4	Develop the File Allocation and File Organization Techniques. (K6-Create)
C22L6.5	Generate the resource-allocation graph for dead lock detection. (K6-Create)
C21L1.6	Compose the Banker's Algorithm for implementing the dead lock avoidance concept. (K6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L6.1	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C21L6.2	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C21L6.3	3	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C21L6.4	1	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C21L6.5	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C21L6.6	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C21L6	**1.67**	**1**	**1.4**	**1.4**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**

Course Code &Name: R20CSE22L2&DATA BASE MANAGEMENT SYSTEMS LAB
Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C22L7.1	Discuss the basic requirements i.e. entities, attributes etc. for developing an enterprise database. (K6-Create)
C22L7 .2	Illustrate the relationship among the entities and attributes with the help of E-R model for the given enterprise database design. (K3-Apply)
C22L7 .3	Assess the key constraints on the given entities of an enterprise database for performing efficient manipulations on them. (K5-Evaluate)
C22L7 .4	Apply the normalization techniques among the entities for handling various anomalies. (K3-Apply)
C22L7 .5	Experiment the various DML and DDL commands for the specified enterprise database. (K3-Apply)
C22L7 .6	Build queries to perform various manipulations on the given enterprise database for generating different reports. (K6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L7.1	1	1	2	-	3	-	-	-	-	-	-	-	-	1	-
C22L7.2	3	1	1	1	1	1	-	-	-	-	1	-	1	1	1
C22L7.3	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C22L7.4	3	1	1	1	3	-	-	-	-	-	-	-	-	1	1
C22L7.5	3	1	1	1	3	-	-	-	-	-	1	-	1	1	-
C22L7.6	1	2	1	1	3	1	-	-	-	-	1	-	-	1	-
C22L7	**2**	**1.2**	**1.17**	**1.4**	**2.67**	**1**	**-**	**-**	**-**	**-**	**1.00**	**-**	**1**	**1**	**1**

Course Code &Name: R20CSE22L3&JAVA PROGRAMMING LAB
Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C22L8 .1	Illustrate the concepts of layout managers, and applets for a given problem. (K3-Apply)
C22L8 .2	Examine the Exception handling mechanism and multithreading environment by using a java programs. (K3-Apply)
C22L8.3	Justify the concept of OOPs as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading. (K5-Evaluate).
C22L8.4	Develop the database management system concepts like create insert delete update select for standalone applications. (K6-Create)
C22L8.5	Create GUI based applications through the knowledge on event handling mechanism and Applets. (K6-Create)
C22L8.6	Justify the functionality of iostream readers through a respective java program. (K5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L8 .1	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C22L8 .2	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C22L8 .3	1	1	2	3	3	-	-	-	-	-	-	-	-	1	1
C22L8 .4	1	-	1	1	3	-	-	-	-	-	-	-	1	1	1
C22L8.5	1	1	2	1	3	-	-	-	-	-	-	-	1	1	1
C22L8 .6	1	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C22L8	**1.67**	**1**	**1.6**	**1.67**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**

III YEAR CSESEMESTER-I (REGULATION –BR20)

ACADEMIC YEAR: 2022-2023

Course Code &Name: R20MBA2201&Business Economics & Financial Analysis

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C311.1	Describe the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in different market structures.(k3-Apply)
C311.2	Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.(K4-Analyze)
C311.3	Develop an understanding of Financial analysis.(K3-Apply)
C311.4	Analyse how capital budgeting decisions are carried out.(K4-Analyze)
C311.5	Describe the framework for both manual and computerized accounting process.(K3-apply)
C311.6	Know how to analyse and interpret the financial statements through ratio analysis.(K4-analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C311.1	3	-	-	-	1	3	-	-	-	2	-	2	-	1	-
C311.2	-	3	3	-	-	1	-	-	-	1	-	-	-	1	-
C311.3	3	-	-	-	1	2	-	-	-	2	-	1	-	1	-
C311.4	-	3	3	-	-	-	-	-	-	-	-	1	-	2	-
C311.5	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C311.6	-	3	3	-	-	-	-	-	-	-	-	1	-	1	-
C311	3	3	3	-	1.33	2	-	-	-	1.67	-	1.25	-	1.2	-

Course Code &Name: R20CSE2207&Software Engineering

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C312.1	Analyze characteristics, nature and role of a software and process models that are used to build professional software. (K4-analyze)
C312.2	Describe the requirements, differentiate the functional and non-functional requirements, user and system requirements with respect to preparing the SRS document and perform feasibility study. (K3-apply)
C312.3	Illustrate various system models with respect to the nature of software to be developed. (K4-analyze)
C312.4	Create software architecture and design the components, interfaces of software process by using design engineering concepts. (K6-create)
C312.5	Measure the product metrics, develop and apply software testing strategies for software applications. (K5-evaluate)

C312.6	Evaluate quality control and ensures good quality software, risk management. (K5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C312.1	1	3	3	-	2	-	-	-	-	-	-	-	-	1	-
C312.2	3	-	-	-	3	-	-	-	-	-	-	-	-	1	-
C312.3	1	3	3	-	-	-	-	-	-	-	2	1	1	2	1
C312.4	2	1	2	-	3	-	-	-	-	-	1	1	1	1	1
C312.5	1	-	-	3	1	-	-	-	-	-	-	-	-	-	-
C312.6	1	1	1	3	1	-	-	-	-	-	-	-	-	1	-
C312	1.5	2	2.25	3	2	-	-	-	-	-	1.5	1	1	1.2	1

Course Code &Name: R20CSE2205&Computer Networks

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C313.1	Describe the terminology and concepts of the OSI reference model and the TCP-IP reference model.(K3-Apply)
C313.2	Demonstrate the transmission media, design issues and determine the CRC codes.(K3-Apply)
C313.3	Classify the various protocols of physical layer and MAC layer.(K4-Analyse)
C313.4	Explain the design issues, switching and evaluate the routing algorithms of network layer.(K5-Evaluate)
C313.5	Examine the various Internetworking and Internet Transport protocols.(K3-Apply)
C313.6	Design a network based on a specified network layer protocols.(K6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C313.1	3	-	1	-	2	-	-	-	-	-	-	-	-	1	-
C313.2	3	-	1	2	2	-	-	-	-	-	-	-	-	-	-
C313.3	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C313.4	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-
C313.5	3	1	1	1	2	-	-	-	-	-	-	-	1	2	1
C313.6	2	-	2	-	3	-	-	-	-	-	-	-	1	2	1
C313	2.75	2	1.6	2	2	-	-	-	-	-	-	-	1	1.66	1

Course Code &Name: R20CSE3104&Web Technologies
Upon Completion of the course, the students will be able to:

Course Name	Course outcomes
C314.1	Describe PHP and PHP utilities for server side scripting. (K3-Apply)
C314.2	Implement the XML programme using PARSING METHODS. (K3-Apply)
C314.3	Justify Server side programming with Java SERVLET'S and JSP. (K5-Evaluate)
C314.4	Examine the database connectivity in JSP with an Example.(K4-Analyze)
C314.5	Discuss about java script with declaration of variables and functions.(K3-Apply))
C314.6	Developing a Library Management System using PHP, XML, Servlets, JSP and JavaScript's. (K6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C314.1	3	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C314.2	3	1	1	-	1	-	-	-	-	-	-	-	-	-	-
C314.3	1	1	1	3	2	-	-	-	-	-	-	-	1	2	1
C314.4	1	3	3	1	1	-	-	-	-	-	-	-	1	-	1
C314.5	3	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C314.6	2	1	1	1	3	-	-	-	-	-	-	-	2	2	1
C314	2.17	1.5	1.5	1.67	1.67	-	-	-	-	-	-	-	1.33	1.67	1

Course Code &Name: R20CSE3113&Principles of Programming Languages
Upon Completion of the course, the students will be able to:

Course Name	Course outcomes
C315.1	Describe the syntax-related concepts including context-free grammars, parse trees, recursive-descent parsing, and interpretation. (K3-Apply))
C315.2	Illustrate the semantic issues associated with implementations, including variable binding, scoping rules, Expression and Assignment statement and control structures.(K3-Apply)
C315.3	Justify the language abstraction constructs of functions, parameter passing and co-routines.(K5-Evaluate)
C315.4	Classify the Abstract Data Types, concurrency and Exception handling in various programming languages.(K4-Analyse)
C315.5	Describe the implementation of Functional programming languages and scripting languages.(K3-Apply)
C315.6	Describe the implementation model of logic programming language.(K3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C315.1	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C315.2	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C315.3	1	1	1	3	1	-	-	-	-	-	-	-	-	-	-
C315.4	-	3	3	1	-	-	-	-	-	-	-	-	-	1	-
C315.5	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C315.6	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C315	2.6	2	2	2	1.4	-	-	-	-	-	-	-	-	1	-

Course Code &Name: R20CSE31L1&Software Engineering Lab
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C31L7.1	Describe the role of software& Understand the need of requirements engineering process. (K3-Apply).
C31L7.2	Determine the problems occurred due to various software crises.(K4-Analyze)
C31L7.3	Compare the process of requirements development and requirements management.(K4-Analyze)
C31L7.4	Determine the importance of requirements classification. Determine the principle of design stating high cohesion and low coupling. (K3-Apply).
C31L7.5	Describe the difference between verification and validation process. Understand the importance of performance testing.(K3-Apply)
C31L7.6	Determine the procedure of regression testing. Determine the concepts of software metrics used before software deployment.(K4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C317.1	3	-	3	-	3	-	-	-	-	-	-	-	-	-	-
C317.2	1	3	3	2	1	-	-	-	-	-	-	-	-	1	-
C317.3	1	3	3	1	-	-	-	-	-	-	-	-	-	-	-
C317.4	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C317.5	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C317.6	1	3	1	1	1	-	-	-	-	-	-	-	-	1	1
C317	2	2.2	2.16	1.25	2.2	-	-	-	-	-	-	-	-	1	1

Course Code &Name: R20CSE31L2&Web Technologies Lab
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C31L8.1	Design the web applications using PHP. (K6-Create)
C31L8.2	Create XML documents and XML Schema. (K6-Create)
C31L8.3	Develop interactive web applications using HTML forms and servlets. (K6-Create)
C31L8.4	Develop JSP applications implementing Session management and Data base Connectivity. (K6-Create)
C31L8.5	Create dynamic web pages using JavaScript. (K6-Create)
C31L8.6	Demonstrate the role of languages like HTML, CSS, XML, JavaScript, PHP, SERVLETS, JSP and protocols in the workings of the web and web applications. (K3-Applying)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C318.1	1	1	2	-	3	-	-	-	-	-	-	-	-	-	-
C318.2	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C318.3	1	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C318.4	1	1	1	2	3	-	-	-	-	-	-	-	-	1	1
C318.5	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C318.6	3	2	1	2	3	-	-	-	-	-	2	-	1	1	1
C318	1.33	1.25	1.33	1.5	3	-	-	-	-	-	2	-	1	1	1

Course Code &Name: R20HAS31L1 &Advanced Communication Skills Lab
Upon the completion of the course, Students will be able to:

Course Name	Course outcomes
C31L9.1	Development of sound vocabulary and its proper use contextually.(Apply-k3)
C31L9.2	Flair in writing and felicity in written expression.(Evaluate-k5)
C31L9.3	Enhanced job prospects.(K6-Create)
C31L9.4	Analyze Effective speaking abilities.(K4-Analyze)
C31L9.5	Describe computer assisted multimedia instructions enabling individualizedand independent language learning(K3-Apply)
C31L9.6	Sensitize to the nuances of English speech sounds, word accent, intonation and rhythm.(K3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C319.1	3	-	1	-	3	1	-	-	-	2	-	2	-	-	-
C319.2	3	-	1	-	3	1	-	-	-	1	-	1	-	-	-
C319.3	1	1	1	1	3	-	-	-	-	1	-	-	-	-	-
C319.4	1	3	3	1	1	2	-	-	-	2	-	1	-	-	-
C319.5	3	1	1	1	3	-	-	-	-	1	-	-	-	-	-
C319.5	3	1	1	-	3	1	-	-	-	1	-	1	-	-	-
C319	2.33	1.5	1.33	1	2.66	1.25	-	-	-	1.33	-	1.25	-	-	-

III YEAR CSESEMESTER-II (REGULATION –BR20)
ACADEMIC YEAR: 2022-2023

Course Code &Name: R20CSE3201&Machine Learning
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C321.1	Develop an appreciation for what is involved in learning models from data.(K3-Apply)
C321.2	Explain a wide variety of learning algorithm. (K5-Evaluate)
C321.3	Describe how to evaluate models generated from data.(K3-Apply)
C321.4	Apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.(K3-Apply)
C321.5	Recognize the characteristics of machine learning that make it useful to real-world problems.(K4-Analyze)
C321.6	Construct various instant based learning and learning set of rules. (K6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C321.1	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C321.2	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C321.3	3	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C321.4	3	1	2	1	3	-	-	-	-	-	-	-	-	2	1
C321.5	1	3	3	1	1	-	-	-	-	-	-	-	-	1	-
C321.6	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C321	2	1.67	1.5	1.5	2.67	-	-	-	-	-	-	-	-	1.25	1

Course Code &Name: R20CSE3202&Compiler Design
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C322.1	Explain the basics of compilers and construct the lexical analyzer. (K5-Evaluate)
C322.2	Differentiate the types of top down parsers along with their limitations. (K4-Analyze)
C322.3	Differentiate the types of bottom up parsers and able to construct them. (K4-Analyze)
C322.4	Explain the role of semantic analyzer and organization of symbol table for block structured and non-block structured languages. (K5-Evaluate)
C322.5	Demonstrate the various code optimization techniques. (K3-Apply)
C322.6	Describe the object code generation algorithms, machine dependent optimization techniques and design the machine code. (K3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C322.1	2	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C322.2	1	3	3	2	1	-	-	-	-	-	-	-	-	-	-
C322.3	1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
C322.4	1	1	1	3	3	-	-	-	-	-	-	-	-	-	-
C322.5	3	-	2	1	3	-	-	-	-	-	-	-	-	1	-
C322.6	3	1	2	1	3	-	-	-	-	-	-	-	1	1	1
C322	1.83	2	2	1.83	2.33	-	-	-	-	-	-	-	1	1	1

Course Code &Name: R20CSE3203&Design and Analysis of Algorithms

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C323.1	Justify the performance of algorithms through performance analysis, probabilistic analysis and amortized analysis. (K5-Evaluate)
C323.2	Examines the general method of divide and conquer approach on various searching sorting and general applications. (K3-Apply)
C323.3	Illustrate the various graph and tree traversal techniques. (K4-Analysis)
C323.4	Justify the algorithm design method of greedy and dynamic programming approach on various applications. (K5-Evaluate)
C323.5	Analyse the backtracking, branch and bound algorithm design methods on various applications. (K4-Analyse)
C323.6	Differentiate the NP-Hard and NP Complete problems. (K4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C323.1	2	2	1	3	3	-	-	-	-	-	-	-	-	1	-
C323.2	3	1	1	1	3	-	-	-	-	-	-	-	-	1	1
C323.3	1	3	3	-	1	-	-	-	-	-	-	-	-	-	-
C323.4	1	-	2	3	3	-	-	-	-	-	-	-	-	1	-
C323.5	2	3	3	2	1	-	-	-	-	-	-	-	1	1	1
C323.6	1	3	3	2	1	-	-	-	-	-	-	-	-	1	-
C323	1.66	2.4	2.16	2.2	2	-	-	-	-	-	-	-	1	1	1

Course Code &Name: R20CSE3233 & Mobile Application Development
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C324.1	Evaluate and select appropriate solutions to the mobile computing platform.
C324.2	Evaluate J2SE, J2ME.
C324.3	Design a simple mobile phone game.
C324.4	Develop the user interface
C324.5	Develop the user interface and authenticate with a web server.
C324.6	Effective learning of HTTP protocols and Commands.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C324.1	3	2	3	1	3	2	-	-	2	3	-	3	3	2	3
C324.2	3	2	2	2	3	1	-	-	1	3	-	3	3	2	3
C324.3	3	2	3	1	3	2	-	-	2	3	-	3	3	2	3
C324.4	3	2	2	2	3	1	-	-	1	3	-	3	3	2	3
C324.5	3	3	3	3	3	2	-	-	3	3	2	3	3	2	3
C324.6	3	3	3	3	3	2	-	-	3	3	2	3	3	2	3
C324	**3**	**2**	**3**	**2**	**3**	**2**	**-**	**-**	**2**	**3**	**1**	**3**	**3**	**2**	**3**

Course Code &Name: R20CSE32L1&Machine Learning Lab
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C325L1.1	Explain the implementation procedures for the machine learning algorithms.(K5-Evaluate)
C325L1.2	Design java/python programs for various learning algorithms. (K6-Create)
C325L1.3	Apply appropriate data sets to the machine learning algorithms.(K3-Apply)
C325L1.4	Identify and apply machine learning algorithms to solve real world algorithm.(K3-Apply)
C325L1.5	Create effectively machine learning toolboxes.(K6-Create)
C325L1.6	Analyse Machine Learning algorithms to solve real world problems.(K4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C325L1.1	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-
C325L1.2	1	-	2	1	3	-	-	-	-	-	-	-	-	-	-
C325L1.3	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C325L1.4	3	1	1	2	3	-	-	-	-	-	-	-	1	2	1
C325L1.5	1	-	2	-	3	-	-	-	-	-	-	-	-	1	-
C325L1.6	2	3	3	2	-	-	-	-	-	-	-	-	-	1	-
C325L1	1.83	1.66	1.66	1.8	3	-	-	-	-	-	-	-	1	1.25	1

Course Code &Name: R20CSE32L2&Compiler Design Lab
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C326L2.1	Examine the role of lexical analyzer on the given input data.(K3-Apply)
C326L2.2	Construct Recursive Descent Parser for the given grammar.(K6-Create)
C326L2.3	Experiment the functionality of non-recursive descent parserLL(1) by parsing the given input string.(K3-Apply)
C326L2.4	Build the intermediate code from the given source code by using various intermediate code generation techniques.(K6-Create)
C326L2.5	Generate the machine code from the given abstract syntax tree of the source code.(K6-Create)
C326L2.6	Justify the functionality of lexical analyser using LEX, FLEX or JFLEX tool. (K5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C326L2.1	3	1	-	1	3	-	-	-	-	-	-	-	-	1	-
C326L2.2	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C326L2.3	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C326L2.4	1	-	2	2	3	-	-	-	-	-	-	-	-	1	1
C326L2.5	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C326L2.6	1	2	1	3	3	-	-	-	-	-	-	-	-	1	-
C326L2	1.66	1.33	1.25	1.75	3	-	-	-	-	-	-	-	-	1	1

Course Code &Name: R20CSE32L3 & Mobile Application Development Lab

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C327L3.1	Ability to install J2ME toolkit.
C327L3.2	Ability to develop the user interface and authenticate with a Web Server.
C327L3.3	Ability to design Web application using J2ME.
C327L3.4	Evaluate Client-Server Application with UDP-based client-server application.
C327L3.5	Ability to create the Authentication with a Web Server

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C327L3.1	3	2	2	2	3	-	-	-	2	3	-	3	3	2	3
C327L3.2	3	-	2	3	3	-	-	-	1	3	-	3	3	2	3
C327L3.3	3	2	3	1	3	-	-	-	2	3	-	3	3	2	3
C327L3.4	3	3	3	2	3	-	-	-	1	3	-	3	3	2	3
C327L3.5	3	3	3	3	3	-	-	-	3	3	2	3	3	2	3
C327L3	3.0	2.0	2.6	2.2	3.0	-	-	-	1.8	3.0	0.4	3.0	3.0	2.0	3.0

Course Code &Name: R20INF3275& Information Technology Essentials

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C328.1	Design and deploy web-sites.(K6-Create)
C328.2	Design and deploy simple web-applications.(K6-Create)
C328.3	Create simple database applications.(K6-Create)
C328.4	Develop an information system.(K3-Apply)
C328.5	Describe the basics of networking.(K3-Apply)
C328.6	Describe the basics of networking and mobile communications. (K3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C328.1	2	1	2	1	3	-	-	-	-	-	-	-	-	-	-
C328.2	2	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C328.3	1	-	1	2	3	-	-	-	-	-	-	-	-	1	-
C328.4	3	-	-	1	3	-	-	-	-	-	-	-	-	1	-
C328.5	3	-	1	2	3	-	-	-	-	-	-	-	-	1	-
C328.5	3	2	2	2	3	-	-	-	-	-	-	-	-	2	-
C328	2.33	1.33	1.6	1.5	3	-	-	-	-	-	-	-	-	1.2	-

IV YEAR CSESEMESTER-I (REGULATION –BR-20)

Year of study: 2022 - 23

Sub Code &CourseName: R20CSE4101& Cryptography and Network Security

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C411.1	Describe network security services and mechanisms.(K3-Apply)
C411.2	Identify Symmetrical and asymmetrical cryptography.(K3-Apply)
C411.3	Explain Data integrity, authentication, and digital signatures.(K5-Evaluate)
C411.4	Explain Various network security applications, IPsec, Firewalls, IDS, web security, Email security and malicious software etc.(K5-Evaluate)
C411.5	To evaluate Encryption and decryption of messages using block ciphers. Sign and verify messages using well known signature generation and verification algorithms. (K5-Evaluate)
C411.6	To Describe and analyze existing authentication protocols for two party communications and Analyze key agreement algorithms to identify their weaknesses.(K3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C411.1	3	1	2	-	3	2	-	-	-	-	2	-	1	1	1
C411.2	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C411.3	2	2	1	3	3	-	-	-	-	-	-	-	1	1	1
C411.4	2	2	2	3	3	-	-	-	-	-	-	-	1	2	1
C411.5	2	1	2	3	3	-	-	-	-	-	-	-	1	3	1
C411.6	3	1	1	2	3	-	-	-	-	-	-	-	1	1	1
C411	2.5	1.33	1.5	2.75	3	2	-	-	-	-	2	-	1	1.6	1

Sub Code &CourseName: R20CSE4102& Data Mining

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C412.1	Identify the fundamental concepts, benefits and problem areas associated with data warehousing. (K3-Apply)
C412.2	Evaluate the different models of OLAP and data preprocessing. (K5-Evaluate)
C412.3	Remember the concept, structure and major issues of data mining. (K3-Apply)
C412.4	Analyze and compare various data mining techniques based on different parameters.(K4-Analyze)
C412.5	Applying Association and classification knowledge to different data sets. (K3-Applying)
C412.6	Create the clusters for different data set. (K6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C412.1	3	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C412.2	1	2	2	3	3	-	-	-	-	-	-	-	-	1	-
C412.3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C412.4	2	3	3	2	1	-	-	-	-	-	-	-	-	1	-
C412.5	3	1	1	2	3	-	-	-	-	-	-	-	1	2	1
C412.6	1	1	2	1	3	-	-	-	-	-	-	-	-	1	1
C412	2.16	1.75	1.8	1.8	2.66	-	-	-	-	-	-	-	1	1.25	1

Sub Code &CourseName: R20CSE4143 &Cloud Computing

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C413.1	Demonstrate knowledge of latest technologies and how to create virtual machines in a single physical device.(K6-Create)
C413.2	Create virtual machines by using hypervisor software. (K6-Create)
C413.3	Define migration techniques and virtual machines can be migrated from one host to Demonstrate knowledge of latest technologies and how to create virtual machines in a single another host.(K5-Evaluate)
C413.4	Understand the Cloud Services like IAAS, PAAS, SAAS and Distributed Data Storage in Cloud.(K3-Apply)
C413.5	Implements Monitoring and Management and Applications and SLA Management and Understand the AWS console create the S3 registration and creating buckets in the S3 Cloud.(K6-Create)
C413.6	Master systems evaluate different hardware components related with Distributed Cloud and best Practices in Architecting Cloud Applications in the AWS Cloud.(K5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C413.1	1	1	2	-	3	-	-	-	-	-	-	-	-	-	-
C413.2	2	-	1	1	3	-	-	-	-	-	-	-	1	2	1
C413.3	2	2	2	3	2	-	-	-	-	-	-	-	1	2	1
C413.4	3	1	1	2	3	-	-	-	-	-	-	-	-	1	-
C413.5	1	-	1	-	3	-	-	-	-	-	-	-	-	-	-
C413.6	2	1	1	3	3	-	-	-	-	-	-	-	-	1	-
C413	1.83	1.25	1.33	2.25	2.83	-	-	-	-	-	-	-	1	1.5	1

Course Code &Name:R20CSE4152& Internet of Things
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C414.1	Analyze various protocols for IoT.(K4-Analyze)
C414.2	Develop web services to access/control IoT devices.(K3-Apply)
C414.3	Design a portable IoT using Rasperry Pi.(K6-Create)
C414.4	Deploy an IoT application and connect to the cloud.(K3-Apply)
C414.5	Analyze applications of IoT in real time scenario.(K4-Analyze)
C414.6	Explain various industry oriented and real life applications.(K5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C414.1	1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
C414.2	3	-	1	2	3	-	-	-	-	-	-	-	-	1	-
C414.3	1	1	2	1	3	-	-	-	-	-	-	-	-	-	-
C414.4	3	-	-	1	3	-	-	-	-	-	-	-	1	1	1
C414.5	2	3	3	1	1	-	-	-	-	-	-	-	-	1	-
C414.6	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-
C414	1.83	2.33	2	1.5	2.33	-	-	-	-	-	-	-	1	1	1

Course Code &Name:R20CSE41L1& Cryptography and Network Security Lab
Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C415L1.1	Identify the information system requirements for a client and server.(K3-Apply)
C415L1.2	Execute cryptographic algorithms, authentication and security issues.(K5-Evaluate)
C415L1.3	Develop algorithms and methods for web security with IPV4 and IPV6.(K3-Apply)
C415L1.4	Explain the security and legal issues towards information security.(K5-Evaluate)
C415L1.5	Construct the fundamentals of secret and public cryptography.(K6-Create)
C415L1.6	Develop and implement a java interface for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms. (K3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C415L1.1	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C415L1.2	1	2	2	3	3	-	-	-	-	-	-	-	1	2	1
C415L1.3	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C415L1.4	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-
C415L1.5	2	1	2	2	3	-	-	-	-	-	-	-	1	1	1
C415L1.6	3	2	1	2	3	-	-	-	-	-	-	-	1	2	1
C415	2.16	1.4	1.5	2	3	-	-	-	-	-	-	-	1	1.4	1

Course Code &Name:R20INF4185& E-Commerce

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C416.1	Explain the E-commerce strategies and value chains.(K5-Evaluate)
C416.2	Describe the E-commerce services.(K3-Apply)
C416.3	Explain E-commerce infrastructure, its applications and supply chain management.(K5-Evaluate)
C416.4	Identify the availability of latest technology and applications of E-payment mechanism.(K3-Apply)
C416.5	Apply E-commerce in business-to-business application.(K3-Apply)
C416.6	Describe the major types of E-commerce.(K3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C416.1	1	-	-	-	3	-	-	-	-	-	-	-	-	-
C416.2	3	1	1	1	3	1	-	-	-	-	-	-	-	1
C416.3	1	-	1	3	3	-	-	-	-	-	-	-	-	1
C416.4	3	1	2	2	3	1	-	-	-	-	-	-	1	2
C416.5	3	2	2	2	3	2	-	-	-	-	-	-	1	1
C416.6	3	-	2	2	3	1	-	-	-	-	-	-	-	-
C416	2.33	1.33	1.6	2	3	1.25	-	-	-	-	-	-	1	1.25

IV YEAR CSESEMESTER-II (REGULATION –R20)

Year of study: 2022 - 23

Sub Code &CourseName: R20HAS4201&Organizational Behaviour

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C421.1	Evolution of Management and contribution of management thinkers.
C421.2	The relevance of environment scanning, planning and to take decisions.
C421.3	Organizing and controlling.
C421.4	Individual and group behavior.
C421.5	Leadership and motivation.
C421.6	Basic knowledge on organization culture, climate, its significance and impact in an organization.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C421.1	1	2	1	2	-	1	-	-	1	1	3	1	1	2	-
C421.2	1	1	2	1	1	1	3	1	1	1	1	-	-	1	-
C421.3	-	1	1	1	-	1	1	-	1	1	-	-	-	-	-
C421.4	-	1	1	1	-	-	-	-	3	1	-	-	-	1	-
C421.5	1	1	-	1	-	-	-	-	2	-	-	-	-	-	-
C421.6	1	-	1	1	2	1	1	-	-	-	1	1	-	1	-
C421	1	1.2	1.2	1.17	1.5	1	1.67	1	1.6	1	1.67	1	1	1.25	-

Sub Code &CourseName: R20CSE4261&Distributed Systems

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C422.1	Understand theoretical and practical aspects of distributed database systems.
C422.2	Study and identify various issues related to the development of distributed database system.
C422.3	To understand various Query Optimization Algorithms.
C422.4	Understand Transaction Management & Compare various approaches to concurrency control in Distributed database.
C422.5	Understand various algorithms and techniques for deadlock in Distributed database.
C422.6	Understand the design aspects of object-oriented database system and related development.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C422.1	1	1	2	-	-	1	-	-	-	-	-	-	1	2	1
C422.2	-	2	1	1	-	-	-	-	-	-	-	-	-	1	1
C422.3	1	-	1	2	1	-	-	1	-	1	1	1	-	1	-
C422.4	1	1	1	1	2	-	1	1	-	1	2	-	1	1	--
C422.5	1	2	1	2	1	1	-	-	-	1	1	-	-	1	-
C422.6	1	1	3	2	1	1	-	-	-	-	1	-	1	2	1
C422	1	1.4	1.5	1.6	1.25	1	1	1	-	1	1.25	1	1	1.33	1

Sub Code &CourseName: R20INF4295&Information Security Fundamentals

Upon the completion of the course, students will be able to:

Course Name	Course outcomes
C423.1	Understand the information security and various Attacks, Analyze the effectiveness of passwords in access control.
C423.2	Understand the basic concepts of Cryptography, encryption and decryption techniques.
C423.3	Understand the various network security applications, IPSec, Web Security, Email Security and Kerberos, X.509 etc.
C423.4	Apply firewall principles, honey pots, IDS, IPS, authentication, mechanisms.
C423.5	Analyze diverse viewpoints to ethical dilemmas in the information technology field and recommend appropriate actions.
C423.6	Understand the role of third-party agents in the provision of authentication services.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C423.1	1	-	1	-	1	-	-	-	-	-	-	-	-	1	-
C423.2	2	1	2	2	1	-	1	-	-	-	-	-	1	2	1
C423.3	1	3	3	2	2	-	-	-	-	1	2	1	1	2	2
C423.4	1	1	1	1	-	-	-	-	-	-	-	-	1	1	1
C423.5	-	1	1	1	3	1	1	-	-	1	-	-	-	-	-
C423.6	1	1	1	1	2	2	1	-	1	2	1	1	-	1	1
C423	1.2	1.4	1.5	1.4	1.8	1.5	1	-	1	1.33	1.5	1	1	1.4	1.25

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Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

DEPARTMENT OF INFORMATION TECHNOLOGY

VISION:

To be a recognized knowledge center in the field of Information Technology with self - motivated, employable engineers to society.

MISSION:

DM_1 To offer high quality student centric education in Information Technology.

DM_2 To provide a conducive environment towards innovation and skills.

DM_3 To involve in activities that provide social and professional solutions.

DM_4 To impart training on emerging technologies namely cloud computing and IOT with involvementof stake holders.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Higher Studies: Graduates with an ability to apply knowledge of Basic sciences andprogramming skills in their career and higher education.

PEO 2: Lifelong Learning: Graduates with an ability to adopt new technologies for ever changing IT industry needs through Self-Study, Critical thinking and Problem solving skills.

PEO 3: Professional skills: Graduates will be ready to work in projects related to complex problems involving multi-disciplinary projects with effective analytical skills.

PEO 4: Engineering Citizenship: Graduates with an ability to communicate well and exhibitsocial, technical and ethical responsibility in process or product.

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	**Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, andan engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological Change.
Program Specific Outcomes	
PSO 1	**Software Development:** To apply the knowledge of Software Engineering, Data Communication, Web Technology and Operating Systems for building IOT and Cloud Computing applications.
PSO 2	**Industrial Skills Ability:** Design, develop and test software systems for world-wide network of computers to provide solutions to real world problems.
PSO 3	**Project implementation:** Analyze and recommend the appropriate IT Infrastructure required for the implementation of a project.

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DEPARTMENT OF INFORMATION TECHNOLOGY

R20 (II/III/IV-I&II) COURSE OUTCOMES

II Year I- Semester

COURSE NAME: ANALOG ELECTRONICS

COURSE CODE: (R20ECE2105)

At the end of the course student will be able to:

Course Outcomes	Statements
C211.1	Describe the construction, operation and characteristics of electronic devices like P-N- Junction and special Purpose diodes **(Understand).**
C211.2	Determine the application of diode as a rectifier **(Apply)**
C211.3	Illustrate the application of transistors as amplifier employing BJT devices **(Apply)**
C211.4	Analyze the Biasing circuits using BJT Transistor Amplifier Circuit **(Analyze)**
C211.5	Evaluate construction, operation and characteristics of FET **(Evaluate)**
C211.6	Classify the Biasing circuits using FET Amplifiers **(Analyze)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C211.1	3	-	-	-	2	-	-	-	-	-	-	-	-	1	1
C211.2	3	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C211 3	3	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C211.4	-	3	3	-	-	-	-	-	-	-	-	-	1	-	-
C211.5	-	-	-	2	2	-	-	-	-	-	-	-	1	1	-
C211.6	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C211	3	3	3	2	2	-	-	-	-	-	-	-	1	1.25	1

COURSE NAME: DATA STRUCTURES

COURSE CODE: (R20CSE2101)

At the end of the course student will be able to:

Course Outcomes	Statements
C212.1	Ability to Select the data structures that efficiently model the information in a problem. **(Understand)**
C212.2	Ability to assess efficiency trade-offs among different data structure Implementations or combinations**. (Create)**
C212.3	Implement and know the application of algorithms for sorting and searching. **(Create)**
C212.4	Design programs using a variety of data structures, including hash tables, binary andgeneral tree structures, search trees, tries, heaps, graphs, and AVL-trees **(Create)**
C212.5	Ability to select the data structures that efficiently model the information in a problem **(Analyze)**
C212.6	Illustrate the concept of Text pattern matching algorithm **(Analyze)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C212.1	3	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C212.2	-	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C212.3	1	-	-	-	2	-	-	-	-	-	-	-	1	1	1
C212.4	1	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C212.5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C212.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C212	1.5	3	3	-	2	-	-	-	-	-	-	-	1	1.5	1

COURSE NAME: PROBABILITY AND STATISTICAL METHODS

COURSE CODE: (R20MTH2103)

At the end of the course student will be able to:

Course Outcomes	Statements
C213.1	Describe the probability of an event, product rule, addition rule & boye's Rule **(Understand)**
C213.2	Explain Random variables and chebyshev's theorem , Discrete probability distribution**(Understand)**
C213.3	Calculate the areas under the normal curve & applications of the normal distribution**(Apply)**
C213.4	Analyze the fundamental sampling distributions **(Analyze)**
C213.5	Test the Hypothesis of single mean, double mean, single proportion, double Proportion **(Evaluate)**
C213.6	Evaluate Transition Probability matrix **(Evaluate)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C213.1	3	2	-	-	2	-	-	-	-	-	-	-	-	1	-
C213.2	3	1	-	-	1	-	-	-	-	-	-	-	-	1	-
C213.3	3	1	-	-	2	-	-	-	-	-	-	-	-	1	-
C213.4	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C213.5	1	-	-	3	2	-	-	-	-	-	-	-	-	-	-
C213.6	1	-	-	3	2	-	-	-	-	-	-	-	-	-	-
C213	2	1.75	3	3	1.8	-	-	-	-	-	-	-	-	1	-

COURSE NAME: COMPUTER ORGANIZATION AND ARCHITECTURE
COURSE CODE: (R20CSE2102)

At the end of the course student will be able to:

Course Outcomes	Statements
C214.1	Understand the basics of instructions sets and their impact on processor design**(Understand)**
C214.2	Demonstrate an understanding of the design of the functional units of a digital computer system. **(Understand)**
C214.3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory**(Evaluate)**
C214.4	Design a pipeline for consistent execution of instructions with minimum hazards**(Create)**
C214.5	Recognize and manipulate representations of numbers stored in digital computers.**(Analyze)**
C214.6	Demonstrate the Characteristics of Multiprocessors.**(Apply)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C214.1	3	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C214.2	3	-	2	-	3	-	-	-	-	-	-	-	-	1	-
C214.3	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C214.4	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C214.5	1	3	3	1	-	-	-	-	-	-	-	-	-	1	-
C214.6	3	-	-	1	3	-	-	-	-	-	-	-	-	-	-
C214	2.2	2	1.75	1.67	2.6	-	-	-	-	-	-	-	-	1	-

COURSE NAME: OBJECT ORIENTED PROGRAMMING USING C++
COURSE NAME: (R20CSE2103)

At the end of the course student will be able to:

Course Outcomes	Statements
C215.1	Distinguish the procedural and object oriented paradigm along with principles**(Analyze)**
C215.2	Apply dynamic memory management techniques using pointers, constructors, destructors, etc **(Understand)**
C215.3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism**.(Understand)**
C215.4	Classify inheritance with the understanding of early and late binding **(Understand)**
C215.5	Illustrate the process of data file manipulations using C++ **(Apply)**
C215.6	An ability to incorporate Exception handling in Object Oriented programs**(Analyze)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C215.1	1	3	3	-	-	-	-	-	-	-	-	-	-	1	-
C215.2	3	1	1	-	3	-	-	-	-	-	-	-	-	1	-
C215.3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C215.4	1	3	3	-	-	-	-	-	-	-	-	-	1	1	-
C215.5	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C215.6	1	3	3	2	-	-	-	-	-	-	-	-	1	1	-
C215	2	2.5	2.5	2	3	-	-	-	-	-	-	-	1	1	-

COURSE NAME: ANALOG ELECTRONICS LAB

COURSE NAME: (R20ECE21L4)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L1.1	Determine the P-N-Junction diode & Zener diode characteristics**.(Evaluate)**
C21L1.2	Calculate the Input and Output characteristics of BJT and FET. **(Evaluate)**
C21L1.3	Evaluate Half Wave and Full Wave Rectifier with and without filters. **(Evaluate)**
C21L1.4	Differentiate Measurement of h-parameters of transistor in CB, CE, CC configurations**.(Analyze)**
C21L1.5	Analyze the Frequency response of CE, CC and Common Source FET Amplifier **.(Analyze)**
C21L1.6	Measure SCR and UJT characteristics..**(Evaluate)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L1.1	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C21L1.2	3	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C21L1.3	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C21L1.4	-	3	3	-	-	-	-	-	-	-	-	-	-	-	
C21L1.5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C21L1.6	3	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C21L1	3	2.33	2.33	2.33	3	-	-	-	-	-	-	-	-	-	-

COURSE NAME: DATA STRUCTURES LAB

COURSE NAME: (R20CSE21L1)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L2.1	Design a program to implement the linear data structures using static and dynamic memory allocation. **(Create)**
C21L2.2	Design a program to implement searching ,sorting techniques for the given problem **(Create)**
C21L2.3	Demonstrate the fundamental algorithms of tree data structures by experimenting the programs.**(Apply)**
C21L2.4	Examine the traversing of a given graph by using the respect to graph traversal techniques **(Apply)**
C21L2.5	Design a program to implement the pattern matching algorithms for the given problem.**(Create)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L2.1	2	3	3	-	3	-	-	-	-	-	-	-	1	1	1
C21L2.2	1	2	2	2	3	-	-	-	-	-	-	-	1	1	-
C21L2.3	3	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C21L2.4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C21L2.5	2	-	-	1	3	-	-	-	-	-	-	-	-	1	-
C21L2	2.33	2.5	2	1.5	2.5	-	-	-	-	-	-	-	1	1	1

COURSE NAME: IT WORKSHOP LAB

COURSE NAME: (R20CSE21L2)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L3.1	Distinguish software's and their installation. **(Analyze)**
C21L3.2	Design word documents by learning word processing.**(Create)**
C21L3.3	Create presentations by using different styles.**(Create)**
C21L3.4	Introduce different way of hooking the PC on to the internet from home and workplace and effectively usage of the internet **(Analyze)**
C21L3.5	Define usage of web browsers, email, news groups and discussion forums would be covered. **(Remember)**
C21L3.6	List of tools & modules would enable the students in crafting professional word document**.(Remember)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L3.1	2	3	3	1	-	2	-	-	-	-	2	2	-	1	-
C21L3.2	2	-	2	-	3	-	-	-	-	-	-	-	-	-	-
C21L3.3	1	-	1	-	3	1	-	-	-	1	1	1	-	-	-
C21L3.4	1	3	3	-	1	2	-	-	-	-	-	-	-	2	-
C21L3.5	3	-	2	1	3	1	-	-	-	-	-	-	1	1	-
C21L3.6	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C21L3	2	2.33	2	1	2.6	1.5	-	-	-	1	1.5	1.5	1	1.25	-

COURSE NAME : C++ PROGRAMMING LAB

COURSE CODE : (R20CSE21L3)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L4.1	Develop applications for a range of problems using object-oriented programming **(Create)**
C21L4.2	Demonstrate the implementation of constructors, destructors and operator overloading. **(Apply)**
C21L4.3	Apply virtual and pure virtual function & complex program situations **(Apply)**
C21L4.4	Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism. **(Apply)**
C21L4.5	Explain generic programming, templates, file handling. **(Understand)**
C21L4.6	Handle exceptions in programming **(Analyze)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L4.1	2	1	1	-	3	-	-	-	-	-	2	-	1	1	1
C21L4.2	3	-	1	1	3	1	-	-	-	-	1	-	1	1	1
C21L4.3	3	-	1	2	3	-	-	-	-	-	-	-	-	-	-
C21L4.4	3	1	-	1	3	-	-	-	-	-	1	-	-	1	-
C21L4.5	1	1	2	3	3	1	-	-	-	-	1	-	-	-	-
C21L4.6	1	3	3	2	1	-	-	-	-	-	2	1	-	1	-
C21L4	2.17	1.5	1.6	1.8	2.67	1	-	-	-	-	1.4	1	1	1	1

COURSE NAME : GENDER SENSITIZATION LAB

COURSE CODE : (R20MAC2100)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L5.1	Develop a better understanding of important issues related to gender in contemporary India.**(Apply)**
C21L5.2	Sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.**(Remember)**
C21L5.3	Attain a finer grasp of how gender discrimination works in our society and how to counter it.**(Remember)**
C21L5.4	explain insight into the gendered division of labor and its relation to politics and economics.**(Understand)**
C21L5.5	Men and women students and professionals will be better equipped to work and live together as equals.**(Understand)**
C21L5.6	develop a sense of appreciation of women in all walks of life.**(Apply)**

II Year II-Semester

COURSE NAME: DISCRETE MATHEMATICS
COURSE CODE: (R20CSE2201)

At the end of the course student will be able to:

Course Outcomes	Statements
C221.1	Ability to understand and construct precise mathematical proofs.**(Understand)**
C221.2	Ability to use logic and set theory to formulate precise statements.**(Understand)**
C221.3	Ability to analyze and solve counting problems on finite and discrete structures **(Analyze)**
C221.4	Ability to describe and manipulate sequences.**(Understand)**
C221.5	Ability to apply graph theory in solving computing problems.**(Apply)**
C221.6	Ability to apply Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees problems.**(Apply)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C221.1	3	1	-	3	3	1	-	-	-	-	-	1	-	2	-
C221.2	2	-	2	3	3	-	-	-	-	-	-	-	-	1	-
C221.3	2	3	3	1	1	1	-	-	-	-	-	1	-	1	-
C221.4	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
C221.5	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C221.6	1	-	-	3	3	-	-	-	-	-	-	-	-	1	-
C221	1.67	1.67	2.5	2.67	2.6	1	-	-	-	-	-	1	-	1.2	-

COURSE NAME: DIGITAL LOGIC DESIGN
COURSE CODE: (R20ECE2102)

At the end of the course student will be able to:

Course Outcomes	Statements
C222.1	Describe the binary number theory, binary codes and Boolean algebra. **(Apply)**
C222.2	Evaluate the Boolean Function using K-maps. **(Evaluate)**
C222.3	Build the given logical functions using Basic gates and Universal gates. **(Create)**
C222.4	Design various combinational and sequential circuits. **(Create)**
C222.5	Illustrate the functionality of flip-flops for analysis and design of various circuits. **(Apply)**
C222.6	Classify the basic memories and their associated memories. **(Analyze)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C222.1	3	1	-	1	3	-	-	-	-	-	-	-	-	1	-
C222.2	1	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C222.3	1	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C222.4	1	-	1	-	3	-	-	-	-	-	-	-	-	-	-
C222.5	3	2	2	-	3	-	-	-	-	-	-	-	-	1	-
C222.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C222	1.67	1.75	1.75	1.67	3	-	-	-	-	-	-	-	-	1	-

COURSE NAME: OPERATING SYSTEMS

COURSE CODE: (R20CSE2202)

At the end of the course student will be able to:

Course Outcomes	Statements
C223.1	Define the functions, structures and history of operating systems and able to analyze the design issues associated with operating systems. **(Remember)**
C223.2	Demonstrate various process management concepts, evaluates various CPU scheduling algorithms and illustrate the process synchronization concepts with various examples. **(Apply)**
C223.3	Evaluate the problems related to deadlocks, classify resources sharing among the users to avoid deadlocks, design the Deadlock detection and Prevention Algorithms. **(Evaluate)**
C223.4	Describe the concepts of memory management including virtual memory, can compare various page replacement algorithms (**Understand)**
C223.5	Illustrate File Management, analyses different File Allocation Strategies, develop disk Scheduling Algorithms. **(Understand)**
C223.6	Using system protection and Revocation of access rights**.(Analyze)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C223.1	1	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C223.2	3	1	1	2	3	-	-	-	-	-	-	-	-	1	-
C223.3	3	1	1	1	3	-	-	-	-	-	-	-	1	1	1
C223.4	3	2	-	-	3	-	-	-	-	-	-	-	1	1	1
C223.5	2	1	1	3	3	-	-	-	-	-	-	-	1	1	1
C223.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C223	2.17	1.67	1.6	2	3	-	-	-	-	-	-	-	1	1	1

COURSE NAME: DATABASE MANAGEMENT SYSTEMS COURSE CODE: (R20CSE2203)

At the end of the course student will be able to:

Course Outcomes	Statements
C224.1	Gain knowledge of fundamentals of DBMS, Database design and normal forms
C224.2	Master the basics of SQL for retrieval and management of data
C224.3	Be acquainted with the basics of transaction processing of concurrency control
C224.4	Familiarity with database storage structures and access techniques

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C224 .1	2	1	1	3	3	1	-	-	-	-	1	1	-	1	-
C224 .2	1	-	-	1	3	-	-	-	-	-	1	-	-	1	-
C224 .3	1	1	2	3	3	-	-	-	-	-	-	-	1	1	1
C224 .4	1	-	1	3	3	-	-	-	-	-	-	-	1	1	1
C224	1.33	1.5	1.8	2.2	3	1	-	-	-	-	1	1	1	1.2	1

COURSE NAME: JAVA PROGRAMMING

COURSE CODE: (R20CSE2204)

At the end of the course student will be able to:

Course Outcomes	Statements
C225.1	Describe the OOPS concepts and primary concepts of java**.(Understand)**
C225.2	Illustrate the types of inheritance, polymorphism, inner classes and packages**(Apply)**
C225.3	Justify the solutions to the given problem by applying the multithreading and exception handling mechanism**(Analyze)**
C225.4	Describe various collection framework concepts and file operations **(Understand)**
C225.5	Design java applications by applying database operations through JDBC drivers **(Analyze)**
C225.6	Analyze & Design the concept of Event Handling and Abstract Window Toolkit**.(Create)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C225 .1	2	1	1	3	3	1	-	-	-	-	2	1	-	2	-
C225 .2	3	-	1	1	3	1	-	-	-	-	1	-	-	1	-
C225 .3	1	1	1	3	3	-	-	-	-	-	1	-	1	1	-
C225 .4	1	1	-	3	3	-	-	-	-	-	-	-	-	-	-
C225 .5	1	-	2	1	3	-	-	-	-	-	1	-	1	1	1
C225 .6	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C225	1.5	1	1.2	2.2	3	1	-	-	-	-	1.25	1	1	1.2	1

COURSE NAME: OPERATING SYSTEMS LAB

COURSE CODE: (R20CSE22L1)

At the end of the course student will be able to:

Course Outcomes	Statements
C22L1.1	Examine various CPU scheduling algorithms to identify the best scheduling algorithm as per software requirement. (**Apply**)
C22L1.2	Justify the various page replacement algorithms in memory management to assess the effective memory utilization.(**Evaluate**)
C22L1.3	Experiment the paging and segmentation concepts for memory management.(**Apply**)
C22L1.4	Develop the File Allocation and File Organization Techniques. (**Create**)
C22L1.5	Generate the resource-allocation graph for dead lock detection. (**Create**)
C22L1.6	Compose the Banker's Algorithm for implementing the dead lock avoidance concept. (**Create**)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L1.1	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C22L1.2	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C22L1.3	3	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C22L1.4	1	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C22L1.5	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C22L1.6	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C22L1	1.67	1	1.4	1.4	3	-	-	-	-	-	-	-	-	1	-

COURSE NAME: DATABASE MANAGEMENT SYSTEMS LAB COURSE CODE: (R20CSE22L21)

At the end of the course student will be able to:

Course Outcomes	Statements
C22L2.1	Explain the basic requirements i.e. entities, attributes etc. for developing an enterprise database.**(Understand)**
C22L2.2	Illustrate the relationship among the entities and attributes with the help of E-R model for the given enterprise database design. **(Apply)**
C22L2.3	Assess the key constraints on the given entities of an enterprise database for performing efficient manipulations on them.**(Evaluate)**
C22L2.4	Apply the normalization techniques among the entities for handling various anomalies. **(Apply)**
C22L2.5	Experiment the various DML and DDL commands for the specified enterprise database. **(Apply)**
C22L2.6	Build queries to perform various manipulations on the given enterprise database for generating different reports**.(Create)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L2.1	1	1	2	-	3	-	-	-	-	-	-	-	-	1	-
C22L2.2	3	1	1	1	1	1	-	-	-	-	1	-	1	1	1
C22L2.3	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C22L2.4	3	1	1	1	3	-	-	-	-	-	-	-	-	1	1
C22L2.5	3	1	1	1	3	-	-	-	-	-	1	-	1	1	-
C22L2.6	1	2	1	1	3	1	-	-	-	-	1	-	-	1	-
C22L2	2	1.2	1.17	1.4	2.67	1	-	-	-	-	1.00	-	1	1	1

COURSE NAME: JAVA PROGRAMMING LAB

COURSE CODE: (R20CSE22L3)

At the end of the course student will be able to:

Course Outcomes	Statements
C22L3.1	Recall the basic concepts of java programming (**Remember**).
C22L3.2	Translate the given user requirement into the program format using java compiler and eclipse platform (**Understand**).
C22L3.3	Implement multithreading with n threads for multiprocessing and handle exception using exception handling techniques (**Apply**).
C22L3.4	Analyze the concepts for storage of data using files and connecting to database using JDBC (**Analyze**).
C22L3.5	Evaluating techniques for developing of forms using GUI programming and different layouts (**Evaluate**).
C22L3.6	Construct an application that prints meta-data of a given table (**Create**).

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L3.1	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C22L3.2	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C22L3.3	1	1	2	3	3	-	-	-	-	-	-	-	-	1	1
C22L3.4	1	-	1	1	3	-	-	-	-	-	-	-	1	1	1
C22L3.5	1	1	2	1	3	-	-	-	-	-	-	-	1	1	1
C22L3.6	1	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C22L3	1.67	1	1.6	1.67	3	-	-	-	-	-	-	-	1	1	1

III Year I-Semester

COURSE NAME: BUSINESS ECONOMICS & FINANCIAL ANALYSIS
COURSE CODE: (R20MBA2201)

At the end of the course student will be able to:

Course Outcomes	Statements
C311.1	Understand the market dynamics namely, demand and supply, demand forecasting elasticity of demand and supply, pricing methods and pricing in different market Structures.**(Understand)**
C311.2	Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.**(Remember)**
C311.3	Develop an understanding of markets and new economic environment**(Analyze)**
C311.4	Analyze how capital budgeting decisions are carried out.**(Create)**
C311.5	Understanding the framework for both manual and computerized accounting process. **(Understand)**
C311.6	Know how to analyze and interpret the financial statements through ratio analysis.**(Analyze)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C311.1	3	-	-	-	1	3	-	-	-	2	-	2	-	1	-
C311.2	-	3	3	-	-	1	-	-	-	1	-	-	-	1	-
C311.3	3	-	-	-	1	2	-	-	-	2	-	1	-	1	-
C311.4	-	3	3	-	-	-	-	-	-	-	-	1	-	2	-
C311.5	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C311.6	-	3	3	-	-	-	-	-	-	-	-	1	-	1	-
C311	3	3	3	-	1.33	2	-	-	-	1.67	-	1.25	-	1.2	-

COURSE NAME: SOFTWARE ENGINEERING

COURSE CODE: (R20CSE2207)

At the end of the course student will be able to:

Course Outcomes	Statements
C312.1	Analyze the knowledge of Software Engineering principles of large scale software systems,and the process models that are used to build them**. (Analyze)**
C312.2	Differentiate the functional and non-functional requirements, user and system requirements with respect to preparing the SRS document and perform feasibility study, validation of the gathered requirements**. (Understand)**
C312.3	Illustrate various system models with respect to the nature of software to be developed. **(Analyzing, Apply)**
C312.4	Design a software architecture for the specified application or problem **(Create)**
C312.5	Develop and apply testing strategies for software applications **(Create)**
C312.6	Evaluate Quality control and how to ensure good quality software **(Evaluate)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C312.1	1	3	3	-	2	-	-	-	-	-	-	-	-	1	-
C312.2	3	-	-	-	3	-	-	-	-	-	-	-	-	1	-
C312.3	1	3	3	-	-	-	-	-	-	-	2	1	1	2	1
C312.4	2	1	2	-	3	-	-	-	-	-	1	1	1	1	1
C312.5	1	-	-	3	1	-	-	-	-	-	-	-	-	-	-
C312.6	1	1	1	3	1	-	-	-	-	-	-	-	-	1	-
C312	1.5	2	2.25	3	2	-	-	-	-	-	1.5	1	1	1.2	1

COURSE NAME: DATA COMMUNICATIONS AND COMPUTER NETWORKS
COURSE CODE: (R20INF3101)

At the end of the course student will be able to:

Course Outcomes	Statements
C313.1	Describe the seven layers of OSI Protocol hierarchy**(Remember)**
C313.2	Differentiate wireless communication satellite and cellular radio satellite**(Analyze)**
C313.3	Define cradles telephone , basic telephone procedures and standard telephone set **(Remember)**
C313.4	Understand the terminology and concepts of the OSI reference model and the TCP-IP referencemodel.**(Understand)**
C313.5	Describe various networking concepts.**(Understand)**
C313.6	Illustrate various Internet Transport Protocols.**(Understand)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C313.1	3	-	1	-	2	-	-	-	-	-	-	-	-	1	-
C313.2	3	-	1	2	2	-	-	-	-	-	-	-	-	-	-
C313.3	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C313.4	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-
C313.5	3	1	1	1	2	-	-	-	-	-	-	-	1	2	1
C313.6	2	-	2	-	3	-	-	-	-	-	-	-	1	2	1
C313	2.75	2	1.6	2	2	-	-	-	-	-	-	-	1	1.66	1

COURSE NAME: WEB TECHNOLOGIES
COURSE CODE: (R20CSE3104)

At the end of the course student will be able to:

Course Outcomes	Statements
C314.1	Describe PHP and PHP utilities for server side scripting. **(Understand)**
C314.2	Implement the XML program using PARSING METHODS. **(Create)**
C314.3	Justify Server side programming with Java SERVLET'S and JSP. **(Evaluate)**
C314.4	Develop the JSP page and connecting to Data Base. **(Create)**
C314.5	Discuss about java script with declaration of variables and functions. **(Create)**
C314.6	Develop a college web site using PHP. **(Create)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C314.1	3	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C314.2	3	1	1	-	1	-	-	-	-	-	-	-	-	-	-
C314.3	1	1	1	3	2	-	-	-	-	-	-	-	1	2	1
C314.4	1	3	3	1	1	-	-	-	-	-	-	-	1	-	1
C314.5	3	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C314.6	2	1	1	1	3	-	-	-	-	-	-	-	2	2	1
C314	2.17	1.5	1.5	1.67	1.67	-	-	-	-	-	-	-	1.33	1.67	1

COURSE NAME: PRINCIPLES OF PROGRAMMING LANGUAGES
COURSE NAME: (R20CSE3113)

At the end of the course student will be able to:

Course Outcomes	Statements
C315.1	Define the syntax-related concepts including context-free grammars, parse trees, recursive-descentparsing, and interpretation**(Remember)**
C315.2	Illustrate the semantic issues associated with implementations, including variable binding, scoping rules,Expression and Assignment statement and control structures.**(Apply)**
C315.3	Justify the language abstraction constructs of functions, parameter passing and co-routines.**(Evaluate)**
C315.4	Classify the Abstract Data Types, concurrency and Exception handling in various programminglanguages**.(Analyze)**
C315.5	Describe the implementation of Functional programming languages and scripting languages**.(Understand)**
C315.6	Describe the implementation model of logic programming language**.(Understand)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C315.1	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C315.2	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C315.3	1	1	1	3	1	-	-	-	-	-	-	-	-	-	-
C315.4	-	3	3	1	-	-	-	-	-	-	-	-	-	1	-
C315.5	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C315.6	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C315	2.6	2	2	2	1.4	-	-	-	-	-	-	-	-	1	-

COURSE NAME: ARFICIAL INTELLIGENCE
COURSE NAME: (R20CSE3122)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C316.1	Formulate an efficient problem space for a problem expressed in ENGLISH.**(Create)**
C316.2	Select a search algorithm for a problem and characterize its time and space complexities. **(Apply)**
C316.3	Build skill for representing knowledge using the appropriate technique.**(Apply)**
C316.4	Apply A1 techniques to solve problems of Game Paying, Expert Systems, Machine Learning and Natural Language Processing.**(Apply)**
C316.5	Define machine learning paradigms.**(Learning)**
C316.6	Show the knowledge of case grammars semantic web.**(Remember)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C316.1	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C316.2	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C316.3	1	1	1	3	1	-	-	-	-	-	-	-	-	-	-
C316.4	-	3	3	1	-	-	-	-	-	-	-	-	-	1	-
C316.5	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C316.6	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C316	2.6	2	2	2	1.4	-	-	-	-	-	-	-	-	1	-

SOFTWARE ENGINEERING LAB
COURSE CODE: (R20CSE31L1)

At the end of the course student will be able to:

Course Outcomes	Statements
C31L1.1	Understand the software engineering methodologies involved in the phases for projectdevelopment**.(Understand)**
C31L2.2	Explain OOAD concepts and various UML diagrams. **(Analyze)**
C31L3.3	Compare and contrast various testing techniques **(Analyze)**
C31L4.4	Select an appropriate design pattern **(Apply)**
C31L5.5	Illustrate about domain models and conceptual classes **(Apply)**
C31L6.6	Construct projects using UML diagrams **(Apply)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C31L1.1	3	-	3	-	3	-	-	-	-	-	-	-	-	-	-
C31L1.2	1	3	3	2	1	-	-	-	-	-	-	-	-	1	-
C31L1.3	1	3	3	1	-	-	-	-	-	-	-	-	-	-	-
C31L1.4	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C31L1.5	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C31L1.6	1	3	1	1	1	-	-	-	-	-	-	-	-	1	1
C31L1	2	2.2	2.16	1.25	2.2	-	-	-	-	-	-	-	-	1	1

COURSE NAME: WEB TECHNOLOGIES LAB
COURSE CODE: (R20CSE31L2)

Upon the completion of the course, students will be able to:

Course Outcomes	Statements
C31L2.1	Design the web applications using PHP. **(Create)**
C31L2.2	Create XML documents and XML Schema. **(Create)**
C31L2.3	Develop interactive web applications using HTML forms and servlets. **(Create)**
C31L2.4	Develop JSP applications implementing Session management and Data base Connectivity. **(Create)**
C31L2.5	Create dynamic web pages using JavaScript. **(Create)**
C31L2.6	Demonstrate the role of languages like HTML, CSS, XML, JavaScript, PHP, SERVLETS, JSP and protocols in the workings of the web and web applications**. (Apply)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C31L2.1	1	1	2	-	3	-	-	-	-	-	-	-	-	-	-
C31L2.2	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C31L2.3	1	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C31L2.4	1	1	1	2	3	-	-	-	-	-	-	-	-	1	1
C31L2.5	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C31L2.6	3	2	1	2	3	-	-	-	-	-	2	-	1	1	1
C31L2	1.33	1.25	1.33	1.5	3	-	-	-	-	-	2	-	1	1	1

COURSE NAME: ADVANCED ENGLISH COMMUNICATION LAB
COURSE CODE: R20HAS31L1

At the end of the course student will be able to:

Course Outcomes	Statements
C31L3.1	Development of sound vocabulary and its proper use contextually.**(Apply)**
C31L3.2	Flair in writing and felicity in written expression.**(Evaluate)**
C31L3.3	Enhanced job prospects.**(Create)**
C31L3.4	Analyze Effective speaking abilities.**(Analyze)**
C31L3.5	Describe computer assisted multimedia instructions enabling individualized and independent language learning**(Apply)**
C31L3.6	Sensitize to the nuances of English speech sounds, word accent, intonation and rhythm.**(Apply)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C31L3.1	3	-	1	-	3	1	-	-	-	2	-	2	-	-	-
C31L3.2	3	-	1	-	3	1	-	-	-	1	-	1	-	-	-
C31L3.3	1	1	1	1	3	-	-	-	-	1	-	-	-	-	-
C31L3.4	1	3	3	1	1	2	-	-	-	2	-	1	-	-	-
C31L3.5	3	1	1	1	3	-	-	-	-	1	-	-	-	-	-
C31L3.6	3	1	1	-	3	1	-	-	-	1	-	1	-	-	-
C31L3	2.33	1.5	1.33	1	2.66	1.25	-	-	-	1.33	-	1.25	-	-	-

III YEAR II- SEMESTER

COURSE NAME: MACHINE LEARNING
COURSE CODE: (R20CSE3201)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C321.1	Identify the characteristics of datasets and compare the trivial data and big data for various applications **(Understand)**
C321.2	Classify machine learning techniques and computing environment that are suitable for the applications under consideration. **(Analyze)**
C321.3	Solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues. **(Apply)**
C321.4	Develop scaling up machine learning techniques and associated computing techniques and technologies for various applications. **(Create)**
C321.5	Implement various ways of selecting suitable model parameters for different machine learning techniques. **(Apply)**
C321.6	Integrate machine learning libraries, and mathematical and statistical tools with modern technologies like Hadoop distributed file system and Map Reduce programming model. **(Apply)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C321.1	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C321.2	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C321.3	3	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C321.4	3	1	2	1	3	-	-	-	-	-	-	-	-	2	1
C321.5	1	3	3	1	1	-	-	-	-	-	-	-	-	1	-
C321.6	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C321	2	1.67	1.5	1.5	2.67	-	-	-	-	-	-	-	-	1.25	1

COURSE NAME: PRINCIPLES OF COMPILER CONSTRUCTION
COURSE CODE: (R20INF3201)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C322.1	Classify the finite state machines and the languages accepted by them**.(Analyze)**
C322.2	Demonstrate the working of Top-Down and Bottom-Up Parsers.(**Apply)**
C322.3	Describe the Semantics, Hierarchy and Type-Checking of the Grammars and Languages. **(Understand).**
C322.4	Access the importance of Code Optimization on the given code at various levels of the compilation**.(Evaluate)**
C322.5	Justify the output generated by the Code-generator phase of the compiler with the help of object code forms and code generation algorithms**.(Evaluate)**
C322.6	Generate the LL(K) & LR(K) parsers for parsing the given set of input data**.(Create)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C322.1	2	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C322.2	1	3	3	2	1	-	-	-	-	-	-	-	-	-	-
C322.3	1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
C322.4	1	1	1	3	3	-	-	-	-	-	-	-	-	-	-
C322.5	3	-	2	1	3	-	-	-	-	-	-	-	-	1	-
C322.6	3	1	2	1	3	-	-	-	-	-	-	-	1	1	1
C322	1.83	2	2	1.83	2.33	-	-	-	-	-	-	-	1	1	1

COURSE NAME: ALGORITHM DESIGN AND ANALYSIS
COURSE CODE: (R20INF3202)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C323.1	Analyzing the algorithms and improve the efficiency of algorithms**(Analyze)**
C323.2	Different Designing methods for development of algorithms to realistic problems**(Apply)**
C323.3	Describe and estimate the performance of algorithms**(understand)**
C323.4	Evaluate the problems by using Greedy method and Dynamic Programming approach on various applications**(Evaluate)**
C323.5	Evaluate the problems by using Backtracking ,Branch and bound on various applications**(Evaluate)**
C323.6	Evaluate the problems of Deterministic and Non deterministic Polynomial**(Evaluate)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C323.1	2	3	2	2	-	-	-	-	-	-	1	1	2	1	1
C323.2	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C323.3	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C323.4	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C323.5	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C323.6	2	2	1	1	-	-	-	-	-	-	1	1	-	-	-
C323	2.0	2.16	1.5	1.5	-	-	-	-	-		1.0	1.0	2	1	1

COURSE NAME: SOFTWARE TESTING METHODOLOGIES COURSE CODE: (R20CSE3231)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C324.1	Describe the basic concept of software testing and its essentials and to identify the various bugs and correcting them after knowing the consequences of the bug. **(Understand)**
C324.2	Define programs control flow as a structural model is the corner stone of testing and performing functional testing using control flow and transaction flow graphs **(Remember)**
C324.3	Determine test domain or an application of software environment.
C324.4	Explain the functional and system testing methods **(Understand)**
C324.5	Evaluate functional testing using control flow and transaction flow graphs. **(Evaluate)**
C324.6	Develop and apply testing strategies for software applications **(Create).**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C324.1	1	1	2	3	3	-	-	-	-	-	-	-	1	2	1
C324.2	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C324.3	2	3	3	2	2	-	-	-	-	-	-	-	1	1	1
C324.4	1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
C324.5	1	1	1	3	3	-	-	-	-	-	-	-	-	1	-
C324.6	1	-	1	-	3	-	-	-	-	-	-	-	-	1	1
C324	1.5	2.	2	2.25	2.5	-	-	-	-	-	-	-	1	1.25	1

COURSE NAME: INFORMATION TECHNOLOGY ESSENTIALS COURSE CODE: (R20INF3275)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C325.1	Design and deploy web-sites. **(Create)**
C325.2	Design and deploy simple web-applications. **(Create)**
C325.3	Create simple database applications. **(Create)**
C325.4	Develop an information system. **(Apply)**
C325.5	Describe the basics of networking. **(Apply)**
C325.6	Describe the basics of networking and mobile communications. **(Apply)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C325.1	2	1	2	1	3	-	-	-	-	-	-	-	-	-	-
C325.2	2	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C325.3	1	-	1	2	3	-	-	-	-	-	-	-	-	1	-
C325.4	3	-	-	1	3	-	-	-	-	-	-	-	-	1	-
C325.5	3	-	1	2	3	-	-	-	-	-	-	-	-	1	-
C325.5	3	2	2	2	3	-	-	-	-	-	-	-	-	2	-
C325	**2.33**	**1.33**	**1.6**	**1.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.2**	**-**

COURSE NAME: MACHINE LEARNING LAB
COURSE CODE: (R20CSE32L1)

At the end of the course student will be able to

Course Outcomes	Statements
C32L1.1	Explain the implementation procedures for the machine learning algorithms. **(Evaluate)**
C32L1.2	Design java/python programs for various learning algorithms. **(Create)**
C32L1.3	Apply appropriate data sets to the machine learning algorithms**.(Apply)**
C32L1.4	Identify and apply machine learning algorithms to solve real world algorithm. **(Apply)**
C32L1.5	Create effectively machine learning toolboxes. **(Create)**
C32L1.6	Analyze Machine Learning algorithms to solve real world problems**. (Analyze)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C32L1.1	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-
C32L1.2	1	-	2	1	3	-	-	-	-	-	-	-	-	-	-
C32L1.3	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C32L1.4	3	1	1	2	3	-	-	-	-	-	-	-	1	2	1
C32L1.5	1	-	2	-	3	-	-	-	-	-	-	-	-	1	-
C32L1.6	2	3	3	2	-	-	-	-	-	-	-	-	-	1	-
C32L1	1.83	1.66	1.66	1.8	3	-	-	-	-	-	-	-	1	1.25	1

COURSE NAME: COMPILER CONSTRUCTION LAB
COURSE CODE: (R20INF32L1)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C32L2.1	Examine the role of lexical analyzer on the given input data. **(Apply)**
C32L2.2	Construct Recursive Descent Parser for the given grammar. **(Create)**
C32L2.3	Experiment the functionality of non-recursive descent parser LL(1) by parsing the given input string. **(Apply)**
C32L2.4	Build the intermediate code from the given source code by using various intermediate code generation techniques. **(Create)**
C32L2.5	Generate the machine code from the given abstract syntax tree of the source code. **(Create)**
C32L2.6	Justify the functionality of lexical analyser using LEX, FLEX or JFLEX tool. **(Evaluate)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C32L2.1	3	1	-	1	3	-	-	-	-	-	-	-	-	1	-
C32L2.2	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C32L2.3	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C32L2.4	1	-	2	2	3	-	-	-	-	-	-	-	-	1	1
C32L2.5	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C32L2.6	1	2	1	3	3	-	-	-	-	-	-	-	-	1	-
C32L2	1.66	1.33	1.25	1.75	3	-	-	-	-	-	-	-	-	1	1

COURSE NAME: SOFTWARE TESTING METHODOLOGIES LAB
COUSE CODE: (R20CSE32L3)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C32L3.1	Describe the myths and facts of software testing. **(Apply)**
C32L3.2	Analyze and design test cases using black box testing techniques which include decision tables domain testing and transition testing**. (Analyze)**
C32L3.3	Analyze and design test cases for a white box testing techniques which includes path testing, data flow graphs and matrix representation for a given problem. **(Analyze)**
C32L3.4	Execute how to run test script wizard and execute how to do performance testing using testing tools including win runner and J meter respectively. **(Evaluate)**
C32L3.5	Demonstrate the importance of testing and its role in need of software development. **(Apply)**
C32L3.6	Explain the need and usage of software tools required for manual and automated testing. (**Evaluate)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C32L3.1	3	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C32L3.2	2	3	2	1	1	-	-	-	-	-	-	-	-	2	1
C32L3.3	2	3	3	2	2	-	-	-	-	-			-	2	-
C32L3.4	1	1	1	3	3	-	-	-	-	-	-	-	-	1	1
C32L3.5	3	-	2	1	3	-	-	-	-	-	-	-	1	1	1
C32L3.6	2	2	1	3	3	-	-	-	-	-	-	-	1	1	1
C32L3	2.16	2.25	1.66	1.83	2.5	-	-	-	-	-	-	-	1	1.4	1

IV YEAR I- SEMESTER

COURSE NAME: INFORMATION SECURITY
COURSE CODE: (R20INF4101)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C411.1	Explain security concepts, Ethics in Network Security. Identify and classify various Attacks and explainthe same.**(Understand, Remember)**
C411.2	Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to variousattacks. **(Evaluate)**
C411.3	Explain the role of third-party agents in the provision of authentication services. **Understand)**
C411.4	Comprehend and apply authentication, email security, web security services and mechanisms. **(Apply)**
C411.5	Distinguish and explain different protocol like SSL, TLS and their applications. **(Create)**
C411.6	Discuss the effectiveness of passwords in access control. Explain firewall principles**.(Analyze Understand)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C411.1	2	2	-	-	-	-	-	-	-	-	-	-	3	3	3
C411.2	2	2	3	-	-	-	-	-	-	-	-	-	3	3	3
C411.3	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
C411.4	2	2	2	2	-	-	-	-	-	-	-	-	3	3	3
C411.5	2	2	3	2	-	-	-	-	-	-	-	-	3	3	3
C411.6	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
C411	**2**	**2**	**2.8**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	3	3	3

COURSE NAME: DATA MINING
COURSE CODE: (R20CSE4102)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C412.1	Design a data mart or data warehouse for any organizations.**(create)**
C412.2	Solve the Raw input data and preprocess it to provide suitable input for range of data mining Algorithm **(create).**
C412.3	Apply association Rules and Classification Models.**(Apply)**
C412.4	Identify the similar objects using clustering techniques**(Apply)**
C412.5	Explore the recent trend in data mining such as web mining , special- temporal mining**(Understand)**
C412.6	Identify the business applications of Data mining **(Apply)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C412.1	3	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C412.2	1	2	2	3	3	-	-	-	-	-	-	-	-	1	-
C412.3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C412.4	2	3	3	2	1	-	-	-	-	-	-	-	-	1	-
C412.5	3	1	1	2	3	-	-	-	-	-	-	-	1	2	1
C412.6	1	1	2	1	3	-	-	-	-	-	-	-	-	1	1
C412	2.16	1.75	1.8	1.8	2.66	-	-	-	-	-	-	-	1	1.25	1

COURSE NAME: CLOUD COMPUTING
COURSE CODE: (R20CSE4143)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C413.1	Implement knowledge of latest Technologies and how to create virtual machines in a single physicaldevice(**Apply**)
C413.2	Develop virtual machines by using hypervisor software.(**Create**)
C413.3	Execute migration techniques and virtual machines can be migrated from one host to another host (**Evaluate**)
C413.4	Describe the Cloud Services like IAAS, PAAS, SAAS and Distributed DataStorage in Cloud (**Understand**)
C413.5	Demonstrate Monitoring and Management and Applications and SLA Management and Understand the AWS console create the S3 registration and creating buckets in theS3 Cloud(**Apply**)
C413.6	Master system Support different hardware components related with Distributed Cloud and best Practices in Architecting Cloud Applications in the AWS Cloud (**Evaluate**)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C413.1	1	1	2	-	3	-	-	-	-	-	-	-	-	-	-
C413.2	2	-	1	1	3	-	-	-	-	-	-	-	1	2	1
C413.3	2	2	2	3	2	-	-	-	-	-	-	-	1	2	1
C413.4	3	1	1	2	3	-	-	-	-	-	-	-	-	1	-
C413.5	1	-	1	-	3	-	-	-	-	-	-	-	-	-	-
C413.6	2	1	1	3	3	-	-	-	-	-	-	-	-	1	-
C413	1.83	1.25	1.33	2.25	2.83	-	-	-	-	-	-	-	1	1.5	1

COURSE NAME:INTERNET OF THINGS
COURSE CODE: (R20CSE4152)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C414.1	Analyze various protocols for IoT. **(Analyze)**
C414.2	Develop web services to access/ control IoT devices. **(Create)**
C414.3	Design a portable IoT Using Raspberry Pi. **(Create)**
C414.4	Develop an IoT application and connect to the cloud. **(Create)**
C414.5	Analyze applications of IoT in Real time Scenario. **(Analyze)**
C414.6	Able to understand the application areas of IoT. **(Understand)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C414.1	1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
C414.2	3	-	1	2	3	-	-	-	-	-	-	-	-	1	-
C414.3	1	1	2	1	3	-	-	-	-	-	-	-	-	-	-
C414.4	3	-	-	1	3	-	-	-	-	-	-	-	1	1	1
C414.5	2	3	3	1	1	-	-	-	-	-	-	-	-	1	-
C414.6	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-
C414	1.83	2.33	2	1.5	2.33	-	-	-	-	-	-	-	1	1	1

COURSE NAME: E–COMMERCE
COURSE CODE: (R20INF4185)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C415.1	Understand The E-Commerce Strategies And Value Chains. **(Understand)**
C415.2	Understand The E-Commerce. **(Understand)**
C415.3	Understand E- Commerce Infrastructure, Its Applications And Supply Chain Management. **(Understand)**
C415.4	Know The Availability Of Latest Technology. **(Analyze)**
C415.5	Apply E-Commerce In Business–To-Business Application. **(Apply)**

COURSE NAME: INFORMATION SECURITY LAB
COURSE CODE: (R20INF41L1)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C41L.1	Explain security concepts, Ethics in Network Security. Identify and classify various Attacks and explain the same. **(Understand)**
C41L.2	Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to various attacks**.(Evaluate)**
C41L.3	Explain the role of third-party agents in the provision of authentication services**.(Understand)**
C41L.4	Comprehend and apply authentication, email security, web securityservices and mechanisms**.(Apply)**
C41L.5	Distinguish and explain different protocol like SSL, TLS and their applications**.(Create)**
C41L.6	Discuss the effectiveness of passwords in access control.Explain firewall principles**.(Analyze**)

CO	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
C41L. 1	3	2	-	-	-	-	-	-	-	-	-	-	3	3	3
C41L. 2	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C41L. 3	2	3	3	3	-	-	-	-	-	-	-	-	3	3	3
C41L. 4	2	3	2	2	-	-	-	-	-	-	-	-	3	3	3
C41L. 5	2	3	3	2	-	-	-	-	-	-	-	-	3	3	3
C41L. 6	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
	2.3 3	**2.6 7**	**2. 8**	**2. 5**	-	-	-	-	-	-	-	-	3	3	3

IV YEAR II- SEMESTER

COURSE NAME: ORGANIZATIONAL BEHAVIOUR
COURSE CODE: (R20HAS4201)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C421.1	Explain the Organizational behavioral challenges in the Canadian work environment. **(Understand)**.
C421.2	Illustrate the impact of perception, personality and emotions **(Understand)**
C421.3	Articulate the impact of values. Attitudes and the influence of diversity **(Understand)**
C421.4	Describe the major motivational theories that affect the workplace **(Remember)**
C421.5	Describe the difference between work groups and work teams and the models of team development **(Create)**
C421.6	Summarize the communication channels and their barriers.**(Understand)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C421.1	1	2	1	2	-	1	-	-	1	1	3	1	1	2	-
C421.2	1	1	2	1	1	1	3	1	1	1	1	-	-	1	-
C421.3	-	1	1	1	-	1	1	-	1	1	-	-	-	-	-
C421.4	-	1	1	1	-	-	-	-	3	1	-	-	-	1	-
C421.5	1	1	-	1	-	-	-	-	2	-	-	-	-	-	-
C421.6	1	-	1	1	2	1	1	-	-	-	1	1	-	1	-
C421	1	1.2	1.2	1.17	1.5	1	1.67	1	1.6	1	1.67	1	1	1.25	-

COURSE NAME: HUMAN COMPUTER INTERACTION COURSE
COURSE CODE (R20CSE4263)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C412.1	Apply HCI and principles to interaction design. (**Apply)**
C422.2	Design certain tools for blind or PH people. **(Create)**
C422.3	Design effective HCI for individuals and persons with disabilities. **(Create)**
C422.4	Assess the importance of User Feedback. **(Evaluate)**
C422.5	Explain the HCI implications for designing Multimedia / E-commerce / E-Learning Websites. **(Understand)**
C422.6	Develop Meaningful User-interface**.(Apply)**

COURSE NAME: INFORMATION SECURITY FUNDAMENTALS
COURSE CODE: (R20INF4295)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C423.1	Explain security concepts, Ethics in Network Security. Identify and classify various Attacks and explainthe same.**(Understand, Remember)**
C423.2	Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to variousattacks. **(Evaluate)**
C423.3	Explain the role of third-party agents in the provision of authentication services. **(Understand)**
C423.4	Discuss the effectiveness of passwords in access control. Explain Firewall principles. **(Analyze, Understand)**
C423.5	Describe the Professional and Ethical Issues of Information Security. **(Understand)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C423.1	1	-	1	-	1	-	-	-	-	-	-	-	-	1	-
C423.2	2	1	2	2	1	-	1	-	-	-	-	-	1	2	1
C423.3	1	3	3	2	2	-	-	-	-	1	2	1	1	2	2
C423.4	1	1	1	1	-	-	-	-	-	-	-	-	1	1	1
C423.5	-	1	1	1	3	1	1	-	-	1	-	-	-	-	-
C423.6	1	1	1	1	2	2	1	-	1	2	1	1	-	1	1
C423	1.2	1.4	1.5	1.4	1.8	1.5	1	-	1	1.33	1.5	1	1	1.4	1.25

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)
Recognized under 2(f) and 12(B) of UGC Act 1956
NBA Accredited, Approved by AICTE and Permanently affiliated to JNTUH
Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

INSTITUTION VISION

To be a premier Institution in Engineering & Technology and Management with competency, values and social consciousness.

INSTITUTION MISSION

IM1 Provide high quality academic programs, training activities and research facilities.

IM2 Promote Continuous Industry-Institute Interaction for Employability, Entrepreneurship, Leadership and Research aptitude among stakeholders.

IM3 Contribute to the Economical and technological development of the region, state and nation.

DEPARTMENT VISION

To be a recognized knowledge center in the field of Information Technology with self -motivated, employable engineers to society.

DEPARTMENT MISSION

The Department has following Missions:

DM1 To offer high quality student centric education in Information Technology.

DM2 To provide a conducive environment towards innovation and skills.

DM3 To involve in activities that provide social and professional solutions.

DM4 To impart training on emerging technologies namely cloud computing and IOT with involvementof stake holders.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Higher Studies: Graduates with an ability to apply knowledge of Basic sciences andprogramming skills in their career and higher education.

PEO 2: Lifelong Learning: Graduates with an ability to adopt new technologies for ever changingIT industry needs through Self-Study, Critical thinking and Problem solving skills.

PEO 3: Professional skills: Graduates will be ready to work in projects related to complex problems involving multi-disciplinary projects with effective analytical skills.

PEO 4: Engineering Citizenship: Graduates with an ability to communicate well and exhibit social, technical and ethical responsibility in process or product.

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	**Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, andan engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological Change.
Program Specific Outcomes	
PSO 1	**Software Development:** To apply the knowledge of Software Engineering, Data Communication, Web Technology and Operating Systems for building IOT and Cloud Computing applications.
PSO 2	**Industrial Skills Ability:** Design, develop and test software systems for world-wide network of computers to provide solutions to real world problems.
PSO 3	**Project implementation:** Analyze and recommend the appropriate IT Infrastructure required for the implementation of a project.

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Choice Based Credit System (CBCS)

REGULATIONS – BR20

B. Tech. - COMPUTER SCIENCE & INFORMATION TECHNOLOGY

I YEAR I SEMESTER **COURSE STRUCTURE**

S. No.	Course Code	Course Title	L	T	P	Credits
1	R20MTH1101	Mathematics – I (Linear Algebra and Calculus)	3	1	0	4
2	R20ECH1101	Chemistry	3	1	0	4
3	R20EEE1101	Basic Electrical Engineering	3	0	0	3
4	R20MED1101	Engineering Workshop	1	0	3	2.5
5	R20HAS1101	English	2	0	0	2
6	R20ECH11L1	Engineering Chemistry Lab	0	0	3	1.5
7	R20HAS11L2	English Language and Communication Skills lab	0	0	2	1
8	R20EEE12L3	Basic Electrical Engineering Lab	0	0	2	1
9	R20HAS1102	Environmental Science	3	0	0	0
10	R20IPG1101	Induction Programme for Three Weeks	0	0	0	0
		Total Credits	**15**	**2**	**10**	**19**

I YEAR II SEMESTER **COURSE STRUCTURE**

S. No.	Course Code	Course Title	L	T	P	Credits
1	R20MTH1201	Mathematics – II (Advanced Calculus)	3	1	0	4
2	R20EAP1201	Applied Physics	3	1	0	4
3	R20CSE1101	Programming for Problem Solving	3	1	0	4
4	R20MED1102	Engineering Graphics	1	1	4	3
5	R20EAP12L1	Applied Physics Lab	0	0	3	1.5
6	R20CSE12L2	Programming for Problem Solving Lab	0	0	3	1.5
7	R20ITK1101	Essence of Indian Traditional Knowledge	3	0	0	0
		Total Credits	**13**	**3**	**10**	**18**

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REGULATIONS – BR20

B. Tech. - COMPUTER SCIENCE & INFORMATION TECHNOLOGY

II YEAR I SEMESTER **COURSE STRUCTURE**

S. No.	Course Code	Course Title	L	T	P	Credits
1	R20ECE2105	Analog Electronics	3	0	0	3
2	R20CSE2101	Data Structures	3	0	0	3
3	R20MTH2103	Probability & Statistical Methods	4	0	0	4
4	R20CSE2102	Computer Organization & Architecture	3	0	0	3
5	R20CSE2103	Object Oriented Programming using C++	3	0	0	3
6	R20ECE21L4	Analog Electronics Lab	0	0	2	1
7	R20CSE21L1	Data Structures Lab	0	0	3	1.5
8	R20CSE21L2	IT Workshop Lab	0	0	3	1.5
9	R20CSE21L3	C++ Programming Lab	0	0	2	1
10	R20MAC2100	Gender Sensitization Lab **(**An Activity-based Course)	0	0	2	0
		Total Credits	**15**	**1**	**12**	**21**

II YEAR II SEMESTER **COURSE STRUCTURE**

S. No.	Course Code	Course Title	L	T	P	Credits
1	R20CSE2201	Discrete Mathematics	3	0	0	3
2	R20ECE2102	Digital Logic Design	3	0	0	3
3	R20CSE2202	Operating Systems	3	0	0	3
4	R20CSE2203	Database Management Systems	3	1	0	4
5	R20CSE2204	Java Programming	3	1	0	4
6	R20CSE22L1	Operating Systems Lab	0	0	3	1.5
7	R20CSE22L2	Database Management Systems Lab	0	0	3	1.5
8	R20CSE22L3	Java Programming Lab	0	0	2	1
9	R20MAC2200	Intellectual Property Rights	3	0	0	0
		Total Credits	**18**	**2**	**8**	**21**

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REGULATIONS – BR20

B. Tech. - COMPUTER SCIENCE & INFORMATION TECHNOLOGY

III YEAR I SEMESTER **COURSE STRUCTURE**

S. No.	Course Code	Course Title	L	T	P	Credits
1	R20CSE2207	Software Engineering	3	0	0	3
2	R20CSE3201	Machine Learning	3	1	0	4
3	R20INF3101	Data Communication & Computer Networks	3	0	0	3
4	R20CSE3104	Web Technologies	3	0	0	3
5	**Professional Elective-I**		3	0	0	3
	R20CSE3111	Advanced Computer Architecture				
	R20CSE2206	Formal Languages & Automata Theory				
	R20CSE3113	Principles of Programming Languages				
	R20MAC3100	MOOCs-I				
6	**Professional Elective –II**		3	0	0	3
	R20CSE3121	Advanced Operating Systems				
	R20CSE3122	Artificial Intelligence				
	R20INF3122	Computer Graphics				
7	R20CSE31L1	Software Engineering Lab	0	0	3	1.5
8	R20CSI31L1	Communication Networks & Web Technologies Lab	0	0	3	1.5
9	R20CSE32L1	Machine Learning Lab	0	0	3	1.5
		Total Credits	**18**	**1**	**8**	**23.5**

III YEAR II SEMESTER **COURSE STRUCTURE**

S.No.	Course Code	Course Title	L	T	P	Credits
1	R20MBA2201	Business Economics & Financial Analysis	3	0	0	3
2	R20INF3201	Principles of Compiler Construction	3	1	0	4
3	R20INF3202	Algorithm Design and Analysis	3	1	0	4
5	**Professional Elective –III**		3	0	0	3
	R20CSE3231	Software Testing Methodologies				
	R20CSE3232	Scripting Languages				
	R20CSE3233	Mobile Application Development				
	R20MAC3200	MOOCs-II				
6		Open Elective-I	3	0	0	3
7	R20HAS31L1	Advanced Communication Skills Lab	0	0	2	1
8	R20INF32L1	Compiler Construction Lab	0	0	3	1.5
9	Professional Elective-III Lab		0	0	2	1
10	R20COI1101	Constitution of India	**3**	**0**	**0**	**0**
		Total Credits	**18**	**2**	**8**	**20.5**

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Choice Based Credit System (CBCS)

REGULATIONS – BR20

B. Tech. - COMPUTER SCIENCE & INFORMATION TECHNOLOGY

IV YEAR I SEMESTER **COURSE STRUCTURE**

S. No.	Course Code	Course Title	L	T	P	Credits
1	R20INF4101	Information Security	3	0	0	3
2	R20CSE4102	Data Mining	2	0	0	2
3	**Professional Elective –IV**		3	0	0	3
	R20INF4142	Pattern Recognition				
	R20CSE4143	Cloud Computing				
	R20INF4141	Adhoc Sensor Networks				
	R20MAC4100	MOOCs-III				
4	**Professional Elective –V**		3	0	0	3
	R20CSE4152	Internet of Things				
	R20CSE3123	Distributed Databases				
	R20CSE4153	Software Process & Project Management				
5	**Open Elective-II**		3	0	0	3
6	R20INF41L1	Information Security Lab	0	0	2	1
7	R20CSI41P1	Technical Seminar	0	0	2	1
8	R20CSI41P2	Comprehensive Viva-voce	0	0	6	3
9	R20CSI41P3	Industrial Oriented Mini Project/ Summer Internship	0	0	0	2
		Total Credits	**14**	**0**	**10**	**21**

IV YEAR II SEMESTER **COURSE STRUCTURE**

S. No.	Course Code	Course Title	L	T	P	Credits
1	R20HAS4201	Organizational Behaviour	3	0	0	3
2	**Professional Elective –VI**		3	0	0	3
	R20CSE4261	Distributed Systems				
	R20CSE4262	Cyber Forensics				
	R20CSE4263	Human Computer Interaction				
	R20MAC4200	MOOCs-IV				
3	**Open Elective-III**		3	0	0	3
4	R20INF42P1	Project Work	0	0	14	7
		Total Credits	9	0	14	16

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)
Recognized under 2(f) and 12(B) of UGC Act 1956
NBA Accredited, Approved by AICTE and Permanently affiliated to JNTUH
Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

R20 (II/III/IV-I&II) COURSE OUTCOMES

II Year I- Semester

COURSE NAME: ANALOG ELECTRONICS

COURSE CODE: (R20ECE2105)

At the end of the course student will be able to:

Course Outcomes	Statements
C211.1	Describe the construction, operation and characteristics of electronic devices like P-N-Junction and special Purpose diodes (L2-Understand).
C211.2	Determine the application of diode as a rectifier (L3-Apply)
C211.3	Illustrate the application of transistors as amplifier employing BJT devices (L3-Apply)
C211.4	Analyze the Biasing circuits using BJT Transistor Amplifier Circuit (L4-Analyze)
C211.5	Evaluate construction, operation and characteristics of FET(L5-Evaluate)
C211.6	Select Biasing circuits using FET Amplifiers (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C211.1	3	-	-	-	2	-	-	-	-	-	-	-	-	1	1
C211.2	3	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C211 3	3	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C211.4	-	3	3	-	-	-	-	-	-	-	-	-	1	-	-
C211.5	-	-	-	2	2	-	-	-	-	-	-	-	1	1	-
C211.6	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C211	3	3	3	2	2	-	-	-	-	-	-	-	1	1.25	1

COURSE NAME: DATASTRUCTURES

COURSE CODE: (R20CSE2101)

At the end of the course student will be able to:

Course Outcomes	Statements
C212.1	Ability to select the data structures that efficiently model the information in a problem.(L2-Understand)
C212.2	Ability to assess efficiency trade-offs among different data structure implementations or combinations(L6-Create)
C212.3	Implement and know the application of algorithms for sorting and searching(L6-Create)
C212.4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees(L6-Create)
C212.5	Ability to select the data structures that efficiently model the information in a problem(L4-Analyze)
C212.6	Illustrate the concept of Text pattern matching algorithm(L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C212.1	3	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C212.2	-	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C212.3	1	-	-	-	2	-	-	-	-	-	-	-	1	1	1
C212.4	1	-	-	-	2	-	-	-	-	-	-	-	1	2	1
C212.5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C212.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C212	1.5	3	3	-	2	-	-	-	-	-	-	-	1	1.5	1

COURSE NAME: PROBABILITY AND STATISTICAL METHODS

COURSE CODE: (R20MTH2103)

At the end of the course student will be able to:

Course Outcomes	Statements
C213.1	Describe the probability of an event, product rule, addition rule & boye's rule (L2-Understand)
C213.2	Explain Random variables and Chebyshev's theorem, Discrete probability distribution (L2-Understand)
C213.3	Calculate the areas under the normal curve & application soft he normal distribution(L3-Apply)
C213.4	Analyze the fundamental sampling distributions (L4-Analyze)
C213.5	Test the Hypothesis of single mean, double mean, single proportion, double proportion (L5-Evaluate)
C213.6	Evaluate Transition Probability matrix (L5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C213.1	3	2	-	-	2	-	-	-	-	-	-	-	-	1	-
C213.2	3	1	-	-	1	-	-	-	-	-	-	-	-	1	-
C213.3	3	1	-	-	2	-	-	-	-	-	-	-	-	1	-
C213.4	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C213.5	1	-	-	3	2	-	-	-	-	-	-	-	-	-	-
C213.6	1	-	-	3	2	-	-	-	-	-	-	-	-	-	-
C213	2	1.75	3	3	1.8	-	-	-	-	-	-	-	-	1	-

COURSE NAME: COMPUTER ORGANIZATION AND ARCHITECTURE
COURSE CODE: (R20CSE2102)

At the end of the course student will be able to:

Course Outcomes	Statements
C214.1	Describe the basics of instructions sets and their impact on processor design. (L3-Apply)
C214.2	Demonstrate an understanding of the design of the functional units of a digital Computer system. (L3-Apply)
C214.3	Evaluate cost performance and design trade-offs in designing and constructing a computerprocessor including memory. (L5-Evaluate)
C214.4	Design a pipeline for consistent execution of instructions with minimum hazards. (L6-Create)
C214.5	Recognize and manipulate representations of numbers stored in digital Computers. (L4-Analyze)
C214.6	Demonstrate the Characteristics of Multiprocessors. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C214.1	3	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C214.2	3	-	2	-	3	-	-	-	-	-	-	-	-	1	-
C214.3	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C214.4	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C214.5	1	3	3	1	-	-	-	-	-	-	-	-	-	1	-
C214.6	3	-	-	1	3	-	-	-	-	-	-	-	-	-	-
C214	2.2	2	1.75	1.67	2.6	-	-	-	-	-	-	-	-	1	-

COURSE NAME: OBJECT ORIENTED PROGRAMMING USING C++

COURSE CODE: (R20CSE2103)

At the end of the course student will be able to:

Course Outcomes	Statements
C215.1	Distinguish the procedural and object-oriented paradigm along with principles(L4-Analyze)
C215.2	Understand dynamic memory management techniques using pointers, constructors, destructors, etc. (L2-Understand)
C215.3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. (L2-Understand)
C215.4	Classify inheritance with the understanding of early and late binding. (L2-Understand)
C215.5	Illustrate the process of data file manipulations using C++ (L3-Apply)
C215.6	An ability to incorporate Exception handling in Object Oriented programs. (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C215.1	1	3	3	-	-	-	-	-	-	-	-	-	-	1	-
C215.2	3	1	1	-	3	-	-	-	-	-	-	-	-	1	-
C215.3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C215.4	1	3	3	-	-	-	-	-	-	-	-	-	1	1	-
C215.5	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C215.6	1	3	3	2	-	-	-	-	-	-	-	-	1	1	-
C215	2	2.5	2.5	2	3	-	-	-	-	-	-	-	1	1	-

COURSE NAME: ANALOG ELECTRONICS LAB

COURSE CODE: (R20ECE21L4)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L1.1	Determine the P-N-Junction diode & Zener diode characteristics. (L5-Evaluate)
C21L1.2	Calculate the Input and Output characteristics of BJT and FET. (L5-Evaluate)
C21L1.3	Evaluate Half Wave and Full Wave Rectifier with and without filters. (L5-Evaluate)
C21L1.4	Differentiate Measurement of h-parameters of transistor in CB, CE, CC configurations. (L4-Analyze)
C21L1.5	Analyze the Frequency response of CE, CC and Common Source FET Amplifier. (L4-Analyze
C21L1.6	Measure SCR and UJT characteristics. (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L1.1	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C21L1.2	3	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C21L1.3	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C21L1.4	-	3	3	-	-	-	-	-	-	-	-	-	-	-	
C21L1.5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C21L1.6	3	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C21L1	3	2.33	2.33	2.33	3	-	-	-	-	-	-	-	-	-	-

COURSE NAME: DATA STRUCTURES LAB

COURSE CODE: (R20CSE21L1)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L2.1	Design a program to implement the linear data structures using static and dynamic memory allocation. (L6-Create)
C21L2.2	Design a program to implement searching, sorting techniques for the given problem. (L6-Create)
C21L2.3	Demonstrate the fundamental algorithms of tree data structures by experimenting the programs. (L3-Apply)
C21L2.4	Examine the traversing of a given graph by using the respect to graph traversal Techniques (L3-Apply)
C21L2.5	Design a program to implement the pattern matching algorithms for the given problem. (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L2.1	2	3	3	-	3	-	-	-	-	-	-	-	1	1	1
C21L2.2	1	2	2	2	3	-	-	-	-	-	-	-	1	1	-
C21L2.3	3	-	1	-	2	-	-	-	-	-	-	-	-	-	-
C21L2.4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C21L2.5	2	-	-	1	3	-	-	-	-	-	-	-	-	1	-
C21L2	2.33	2.5	2	1.5	2.5	-	-	-	-	-	-	-	1	1	1

COURSE NAME: IT WORKSHOP LAB

COURSE CODE: (R20CSE21L2)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L3.1	Distinguish software's and their installation. (L4-Analyze)
C21L3.2	Design word documents by learning word processing. (L6-Create)
C21L3.3	Create presentations by using different styles. (L6-Create))
C21L3.4	Introduce different way of hooking the PC on to the internet from home and workplace and effectively usage of the internet(L4-Analyze)
C21L3.5	Define usage of web browsers, email, news groups and discussion forums would be covered(L1-Remember)
C21L3.6	List of tools & modules would enable the students in crafting professional word document. (L1-Remember)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L3.1	2	3	3	1	-	2	-	-	-	-	2	2	-	1	-
C21L3.2	2	-	2	-	3	-	-	-	-	-	-	-	-	-	-
C21L3.3	1	-	1	-	3	1	-	-	-	1	1	1	-	-	-
C21L3.4	1	3	3	-	1	2	-	-	-	-	-	-	-	2	-
C21L3.5	3	-	2	1	3	1	-	-	-	-	-	-	1	1	-
C21L3.6	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C21L3	2	2.33	2	1	2.6	1.5	-	-	-	1	1.5	1.5	1	1.25	-

COURSE NAME: C++ PROGRAMMING LAB

COURSE CODE: (R20CSE21L3)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L4.1	develop applications for a range of problems using object-oriented programming (L6-Create)
C21L4.2	Demonstrate the implementation of constructors, destructors and operator overloading.(L3-Apply)
C21L4.3	Apply virtual and pure virtual function & complex program situations(L3-Apply)
C21L4.4	Apply fundamental algorithmic problems including type casting, inheritance, andpolymorphism. (L3-Apply)
C21L4.5	Explain generic programming, templates, file handling. (L2-Understand)
C21L4.6	Handle exceptions in programming (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L4.1	2	1	1	-	3	-	-	-	-	-	2	-	1	1	1
C21L4.2	3	-	1	1	3	1	-	-	-	-	1	-	1	1	1
C21L4.3	3	-	1	2	3	-	-	-	-	-	-	-	-	-	-
C21L4.4	3	1	-	1	3	-	-	-	-	-	1	-	-	1	-
C21L4.5	1	1	2	3	3	1	-	-	-	-	1	-	-	-	-
C21L4.6	1	3	3	2	1	-	-	-	-	-	2	1	-	1	-
C21L4	2.17	1.5	1.6	1.8	2.67	1	-	-	-	-	1.4	1	1	1	1

COURSE NAME: GENDER SENSITIZATION LAB

COURSE CODE: (R20MAC2100)

At the end of the course student will be able to:

Course Outcomes	Statements
C21L5.1	Develop a better understanding of important issues related to gender in contemporary India. (L3-Apply)
C21L5.2	Sensitized to basic dimensions of the biological, sociological, psychological and legal aspectsof gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film. (L1-Remember)
C21L5.3	Attain a finer grasp of how gender discrimination works in our society and how to counterit. (L1-Remember)
C21L5.4	explain insight into the gendered division of labor and its relation to politics and economics. (L2-Understand)
C21L5.5	Men and women students and professionals will be better equipped to work and live together as equals. (L2-Understand)
C21L5.6	develop a sense of appreciation of women in all walks of life. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C221.1	3	1	-	3	3	1	-	-	-	-	-	1	-	2	-
C221.2	2	-	2	3	3	-	-	-	-	-	-	-	-	1	-
C221.3	2	3	3	1	1	1	-	-	-	-	-	1	-	1	-
C221.4	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
C221.5	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C221.6	1	-	-	3	3	-	-	-	-	-	-	-	-	1	-
C221	1.67	1.67	2.5	2.67	2.6	1	-	-	-	-	-	1	-	1.2	-

II Year II-Semester

COURSE NAME: DISCRETE MATHEMATICS

COURSE CODE: (R20CSE2201)

At the end of the course student will be able to:

Course Outcomes	Statements
C221.1	Ability to understand and construct precise mathematical proofs. (L5-Evaluate)
C221.2	Ability to use logic and set theory to formulate precise statements. (L5-Evaluate)
C221.3	Ability to analyze and solve counting problems on finite and discrete structures. (L4-Analyze)
C221.4	Ability to describe and manipulate sequences. (L5-Evaluate)
C221.5	Ability to apply graph theory in solving computing problems. (L5-Evaluate)
C221.6	Ability to apply Trees, Applications of Trees, Tree Traversal, Spanning Trees, MinimumSpanning Trees problems. (L5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C221.1	3	1	-	3	3	1	-	-	-	-	-	1	-	2	-
C221.2	2	-	2	3	3	-	-	-	-	-	-	-	-	1	-
C221.3	2	3	3	1	1	1	-	-	-	-	-	1	-	1	-
C221.4	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
C221.5	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C221.6	1	-	-	3	3	-	-	-	-	-	-	-	-	1	-
C221	1.67	1.67	2.5	2.67	2.6	1	-	-	-	-	-	1	-	1.2	-

COURSE NAME: DIGITAL LOGIC DESIGN

COURSE CODE: (R20ECE2102)

At the end of the course student will be able to:

Course Outcomes	Statements
C222.1	Interpret the various number systems & code converters, error detecting and correcting, BCD, Gray Code, EX-3. (L5-Evaluate)
C222.2	Describe the operation of logic gates and Apply Boolean Algebra on K-map. (L2-Understand)
C222.3	Design / Analysis of Combinational Circuits. (L6-Create)
C222.4	Diagram illustrates the operation &timing constrains for Latches & Flip-Flops and Registersand Counters. (L2-Understand)
C222.5	Design & analyze sequential circuits. (L6-Create)
C222.6	Use HDL & appropriate EDA tools for digital logic design & simulation. (L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C222.1	3	1	-	1	3	-	-	-	-	-	-	-	-	1	-
C222.2	1	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C222.3	1	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C222.4	1	-	1	-	3	-	-	-	-	-	-	-	-	-	-
C222.5	3	2	2	-	3	-	-	-	-	-	-	-	-	1	-
C222.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C222	1.67	1.75	1.75	1.67	3	-	-	-	-	-	-	-	-	1	-

COURSE NAME: OPERATING SYSTEMS

COURSE CODE: (R20CSE2202)

At the end of the course student will be able to:

Course Outcomes	Statements
C223.1	Will be able to control access to a computer and the files that may be shared. (L6-Create)
C223.2	Demonstrate the knowledge of the components of computer and their respective roles incomputing. (L3-Apply)
C223.3	Ability to recognize and resolve user problems with standard operating environments. (L3-Apply)
C223.4	Gain practical knowledge of how programming languages, operating systems, andarchitectures interact and how to use each effectively. (L3-Apply)
C223.5	Illustrate File Management, analyses different File Allocation Strategies, develop diskScheduling Algorithms. (L5-Evaluate)
C223.6	Using system protection and Revocation of access rights. (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C223.1	1	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C223.2	3	1	1	2	3	-	-	-	-	-	-	-	-	1	-
C223.3	3	1	1	1	3	-	-	-	-	-	-	-	1	1	1
C223.4	3	2	-	-	3	-	-	-	-	-	-	-	1	1	1
C223.5	2	1	1	3	3	-	-	-	-	-	-	-	1	1	1
C223.6	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C223	2.17	1.67	1.6	2	3	-	-	-	-	-	-	-	1	1	1

COURSE NAME: DATABASE MANAGEMENT SYSTEMS

COURSE CODE: (R20CSE2203)

At the end of the course student will be able to:

Course Outcomes	Statements
C224.1	Explain the basic concepts and the applications of database systems. (L5-Evaluate)
C224.2	Generate the SQL queries using the basic SQL syntaxes for the given set ofProblems. (L6-Create)
C224.3	Evaluate the relational database design principles and applications of relational algebra and relational calculus. (L5-Evaluate)
C224.4	Justify the various normalization techniques on the given relational database. (L5-Evaluate)
C224.5	Illustrate the basic issues of transaction processing and concurrency control. (L4-Analyze)
C224.6	Design the database storage structures and list out the access techniques. (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C224 .1	2	1	1	3	3	1	-	-	-	-	1	1	-	1	-
C224 .2	1	-	-	1	3	-	-	-	-	-	1	-	-	1	-
C224 .3	1	1	2	3	3	-	-	-	-	-	-	-	1	1	1
C224 .4	1	-	1	3	3	-	-	-	-	-	-	-	1	1	1
C224 .5	1	3	3	1	-	-	-	-	-	-	-	-	-	-	-
C224 .6	2	1	2	-	3	1	-	-	-	-	1	-	1	2	1
C224	1.33	1.5	1.8	2.2	3	1	-	-	-	-	1	1	1	1.2	1

COURSE NAME: JAVA PROGRAMMING

COURSE CODE: (R20CSE2204)

At the end of the course student will be able to:

Course Outcomes	Statements
C225.1	Explain the OOPS concepts and primary concepts of java. (L5-Evaluate)
C225.2	Illustrate the types of inheritance, polymorphism, inner classes and packages. (L3-Apply)
C225.3	Justify the solutions to the given problem by applying the multithreading and Exception Handling Mechanism. (L5-Evaluate)
C225.4	Explain various collection framework concepts and file operations. (L5-Evaluate).
C225.5	Design java applications by applying database operations through JDBC drivers. (L6-Create)
C225.6	Analyze & Design the concept of Event Handling and Abstract Window Toolkit. (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C225 .1	2	1	1	3	3	1	-	-	-	-	2	1	-	2	-
C225 .2	3	-	1	1	3	1	-	-	-	-	1	-	-	1	-
C225 .3	1	1	1	3	3	-	-	-	-	-	1	-	1	1	-
C225 .4	1	1	-	3	3	-	-	-	-	-	-	-	-	-	-
C225 .5	1	-	2	1	3	-	-	-	-	-	1	-	1	1	1
C225 .6	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C225	1.5	1	1.2	2.2	3	1	-	-	-	-	1.25	1	1	1.2	1

COURSE NAME: OPERATING SYSTEMS LAB

COURSE CODE: (R20CSE22L1)

At the end of the course student will be able to:

Course Outcomes	Statements
C22L1.1	Examine various CPU scheduling algorithms to identify the best scheduling algorithm as per software requirement. (L3- Apply)
C22L1.2	Justify the various page replacement algorithms in memory management to assess the effective memory utilization. (L5-Evaluate)
C22L1.3	Experiment the paging and segmentation concepts for memory management. (L3-Apply)
C22L1.4	Develop the File Allocation and File Organization Techniques. (L6-Create)
C22L1.5	Generate the resource-allocation graph for dead lock detection. (L6-Create)
C22L1.6	Compose the Banker's Algorithm for implementing the dead lock avoidance concept. (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L1.1	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C22L1.2	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C22L1.3	3	1	1	1	3	-	-	-	-	-	-	-	-	-	-
C22L1.4	1	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C22L1.5	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C22L1.6	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C22L1	1.67	1	1.4	1.4	3	-	-	-	-	-	-	-	-	1	-

COURSE NAME: DATABASE MANAGEMENT SYSTEMS LAB

COURSE CODE: (R20CSE22L2)

At the end of the course student will be able to:

Course Outcomes	Statements
C22L2.1	Explain the basic requirements i.e. entities, attributes etc. for developing an enterprise database. (L2-Understand)
C22L2.2	Illustrate the relationship among the entities and attributes with the help of E-R model for the given enterprise database design. (L3-Apply)
C22L2.3	Assess the key constraints on the given entities of an enterprise database for performing efficient manipulations on them. (L5-Evaluate)
C22L2.4	Apply the normalization techniques among the entities for handling various anomalies. (L3-Apply)
C22L2.5	Experiment the various DML and DDL commands for the specified enterprise database. (L3-Apply)
C22L2.6	Build queries to perform various manipulations on the given enterprise database for generating different reports. (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L2.1	1	1	2	-	3	-	-	-	-	-	-	-	-	1	-
C22L2.2	3	1	1	1	1	1	-	-	-	-	1	-	1	1	1
C22L2.3	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C22L2.4	3	1	1	1	3	-	-	-	-	-	-	-	-	1	1
C22L2.5	3	1	1	1	3	-	-	-	-	-	1	-	1	1	-
C22L2.6	1	2	1	1	3	1	-	-	-	-	1	-	-	1	-
C22L2	2	1.2	1.17	1.4	2.67	1	-	-	-	-	1.0	-	1	1	1

COURSE NAME: JAVA PROGRAMMING LAB

COURSE CODE: (R20CSE22L3)

At the end of the course student will be able to:

Course Outcomes	Statements
C22L3.1	Recall the basic concepts of java programming (L1-Remember).
C22L3.2	Translate the given user requirement into the program format using java compiler and eclipse platform (L2-Understand).
C22L3.3	Implement multithreading with n threads for multiprocessing and handle exception using exception handling techniques (L3-Apply).
C22L3.4	Analyze the concepts for storage of data using files and connecting to database using JDBC (L4-Analyze).
C22L3.5	Evaluating techniques for developing of forms using GUI programming and different layouts (L5-Evaluate).
C22L3.6	Construct an application that prints meta-data of a given table (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L3.1	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C22L3.2	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C22L3.3	1	1	2	3	3	-	-	-	-	-	-	-	-	1	1
C22L3.4	1	-	1	1	3	-	-	-	-	-	-	-	1	1	1
C22L3.5	1	1	2	1	3	-	-	-	-	-	-	-	1	1	1
C22L3.6	1	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C22L3	1.67	1	1.6	1.67	3	-	-	-	-	-	-	-	1	1	1

COURSE NAME: INTELLECTUAL PROPERTY RIGHTS
COURSE CODE: (R20MAC2200)

At the end of the course student will be able to:

Course Outcomes	Statements
C226.1	Define intellectual property rights(L1-Remember)
C226.2	Describe the functions of trade marks(L2-Understand)
C226.3	Apply law of copyrights(L3-Apply)
C226.4	Develop procedural knowledge to legal systems (L3-Apply)
C226.5	Solve the problem relating to intellectual property rights(L6-Create)
C226.6	Compare and contrast the different terms of intellectual property protection in terms of the key differences and similarities(L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C226.1	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C226.2	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C226.3	1	1	2	3	3	-	-	-	-	-	-	-	-	1	1
C226.4	1	-	1	1	3	-	-	-	-	-	-	-	1	1	1
C226.5	1	1	2	1	3	-	-	-	-	-	-	-	1	1	1
C226.6	1	-	-	3	3	-	-	-	-	-	-	-	-	-	-
C226	1.67	1	1.6	1.67	3	-	-	-	-	-	-	-	1	1	1

III Year I-Semester

COURSE NAME: SOFTWARE ENGINEERING

COURSE CODE: (R20CSE2207)

At the end of the course student will be able to:

Course Outcomes	Statements
C311.1	Analyze the knowledge of Software Engineering principles of large scale software systems,and the process models that are used to build them. (L4-Analyze)
C311.2	Differentiate the functional and non-functional requirements, user and system requirements with respect to preparing the SRS document and perform feasibility study, validation of the gathered requirements. (L2-Understand)
C311.3	Illustrate various system models with respect to the nature of software to be developed. (L4-Analyze, L3-Apply)
C311.4	Design a software architecture for the specified application or problem (L6-Create)
C311.5	Develop and apply testing strategies for software applications (L6-Create)
C311.6	Evaluate Quality control and how to ensure good quality software (L5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C311.1	1	3	3	-	2	-	-	-	-	-	-	-	-	1	-
C311.2	3	-	-	-	3	-	-	-	-	-	-	-	-	1	-
C311.3	1	3	3	-	-	-	-	-	-	-	2	1	1	2	1
C311.4	2	1	2	-	3	-	-	-	-	-	1	1	1	1	1
C311.5	1	-	-	3	1	-	-	-	-	-	-	-	-	-	-
C311.6	1	1	1	3	1	-	-	-	-	-	-	-	-	1	-
C311	1.5	2	2.25	3	2	-	-	-	-	-	1.5	1	1	1.2	1

COURSE NAME: MACHINE LEARNING

COURSE CODE: (R20CSE3201)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C312.1	Identify the characteristics of datasets and compare the trivial data and big data forvarious applications (L2-Understand)
C312.2	Classify machine learning techniques and computing environment that are suitable for the applications under consideration. (L4-Analyze)
C312.3	Solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues. (L3-Apply)
C312.4	Develop scaling up machine learning techniques and associated computing techniques and technologies for various applications. (L6-Create)
C312.5	Implement various ways of selecting suitable model parameters for different machine learning techniques. (L3-Apply)
C312.6	Integrate machine learning libraries, and mathematical and statistical tools with modern technologies like Hadoop distributed file system and Map Reduce programming model. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C312.1	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C312.2	1	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C312.3	3	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C312.4	3	1	2	1	3	-	-	-	-	-	-	-	-	2	1
C312.5	1	3	3	1	1	-	-	-	-	-	-	-	-	1	-
C312.6	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C312	2	1.67	1.5	1.5	2.67	-	-	-	-	-	-	-	-	1.25	1

COURSE NAME: DATA COMMUNICATION AND COMPUTER NETWORKS
COURSE CODE: (R20INF3101)

At the end of the course student will be able to:

Course Outcomes	Statements
C313.1	Describe the seven layers of OSI Protocol hierarchy(L1-Remember)
C313.2	Differentiate wireless communication satellite and cellular radio satellite(L3-Analyze)
C313.3	Define cradles telephone, basic telephone procedures and standard telephone set (L1-Remember)
C313.4	Explain the terminology and concepts of the OSI reference model and the TCP-IP reference model. (L2-Understand)
C313.5	Describe various networking concepts. (L2-Understand)
C313.6	Illustrate various Internet Transport Protocols. (L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C313.1	3	-	1	-	2	-	-	-	-	-	-	-	-	1	-
C313.2	3	-	1	2	2	-	-	-	-	-	-	-	-	-	-
C313.3	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
C313.4	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-
C313.5	3	1	1	1	2	-	-	-	-	-	-	-	1	2	1
C313.6	2	-	2	-	3	-	-	-	-	-	-	-	1	2	1
C313	2.75	2	1.6	2	2	-	-	-	-	-	-	-	1	1.66	1

COURSE NAME: WEB TECHNOLOGIES

COURSE CODE: (R20CSE3104)

At the end of the course student will be able to:

Course Outcomes	Statements
C314.1	Describe PHP and PHP utilities for server-side scripting. (L2-Understand)
C314.2	Implement the XML program using PARSING METHODS. (L6-Create)
C314.3	Justify Server-side programming with Java SERVLET'S and JSP. (L5-Evaluate)
C314.4	Develop the JSP page and connecting to Data Base. (L6-Create)
C314.5	Discuss about java script with declaration of variables and functions. (L6-Create)
C314.6	Develop a college web site using PHP. (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C314.1	3	-	-	-	2	-	-	-	-	-	-	-	-	1	-
C314.2	3	1	1	-	1	-	-	-	-	-	-	-	-	-	-
C314.3	1	1	1	3	2	-	-	-	-	-	-	-	1	2	1
C314.4	1	3	3	1	1	-	-	-	-	-	-	-	1	-	1
C314.5	3	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C314.6	2	1	1	1	3	-	-	-	-	-	-	-	2	2	1
C314	2.17	1.5	1.5	1.67	1.67	-	-	-	-	-	-	-	1.33	1.67	1

COURSE NAME: PRINCIPLES OF PROGRAMMING LANGUAGES

COURSE NAME: (R20CSE3113)

At the end of the course student will be able to:

Course Outcomes	Statements
C315.1	Define the syntax-related concepts including context-free grammars, parse trees, recursive-descent parsing, and interpretation(L1-Remember)
C315.2	Illustrate the semantic issues associated with implementations, including variable binding, scoping rules, Expression and Assignment statement and control structures. (L3-Apply)
C315.3	Justify the language abstraction constructs of functions, parameter passing and co-routines. (L5-Evaluate)
C315.4	Classify the Abstract Data Types, concurrency and Exception handling in various programming languages. (L4-Analyze)
C315.5	Describe the implementation of Functional programming languages and scripting languages. (L2-Understand)
C315.6	Describe the implementation model of logic programming language. (L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C315.1	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C315.2	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C315.3	1	1	1	3	1	-	-	-	-	-	-	-	-	-	-
C315.4	-	3	3	1	-	-	-	-	-	-	-	-	-	1	-
C315.5	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C315.6	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C315	2.6	2	2	2	1.4	-	-	-	-	-	-	-	-	1	-

COURSE NAME: ARFICIAL INTELLIGENCE
COURSE NAME: (R20CSE3122)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C316.1	Formulate an efficient problem space for a problem expressed in ENGLISH. (L6-Create)
C316.2	Select a search algorithm for a problem and characterize its time and space complexities. (L3-Apply)
C316.3	Build skill for representing knowledge using the appropriate technique. (L3-Apply)
C316.4	Apply A1 techniques to solve problems of Game Paying, Expert Systems, Machine Learning and Natural Language Processing. (L3-Apply)
C316.5	Define machine learning paradigms. (L2-Understand)
C316.6	Show the knowledge of case grammars semantic web. (L1-Remember)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C316.1	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C316.2	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C316.3	1	1	1	3	1	-	-	-	-	-	-	-	-	-	-
C316.4	-	3	3	1	-	-	-	-	-	-	-	-	-	1	-
C316.5	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C316.6	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-
C316	2.6	2	2	2	1.4	-	-	-	-	-	-	-	-	1	-

COURSE NAME: SOFTWARE ENGINEERING LAB

COURSE CODE: (R20CSE31L1)

At the end of the course student will be able to:

Course Outcomes	Statements
C31L1.1	Describe the role of software & Understand the need of requirements engineering process. (L3-Apply).
C31L1.2	Determine the problems occurred due to various software crises. (L4-Analyze)
C31L1.3	Compare the process of requirements development and requirements management. (L4-Analyze)
C31L1.4	Determine the importance of requirements classification. Determine the principle of design stating high cohesion and low coupling. (L3-Apply).
C31L1.5	Describe the difference between verification and validation process. Understand the importance of performance testing. (L3-Apply)
C31L1.6	Determine the procedure of regression testing. Determine the concepts of software metrics used before software deployment. (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C31L1.1	3	-	3	-	3	-	-	-	-	-	-	-	-	-	-
C31L1.2	1	3	3	2	1	-	-	-	-	-	-	-	-	1	-
C31L1.3	1	3	3	1	-	-	-	-	-	-	-	-	-	-	-
C31L1.4	3	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C31L1.5	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C31L1.6	1	3	1	1	1	-	-	-	-	-	-	-	-	1	1
C31L1	2	2.2	2.16	1.25	2.2	-	-	-	-	-	-	-	-	1	1

COURSE NAME: COMMUNICATION NETWORKS &WEB TECHNOLOGIES LAB
COURSE CODE: (R20CSI31L1)

At the end of the course student will be able to:

Course Outcomes	Statements
C31L2.1	Design the web applications using PHP. (L6-Create)
C31L2.2	Create XML documents and XML Schema(L6-Create)
C31L2.3	Develop interactive web applications using HTML forms and servlets. (L6-Create)
C31L2.4	Develop JSP applications implementing Session management and Data Base Connectivity. (L6-Create)
C31L2.5	Create dynamic web pages using JavaScript. (L6-Create)
C31L2.6	Demonstrate the role of languages like HTML, CSS, XML, JavaScript, PHP, SERVLETS, JSP and protocols in the workings of the web and web applications. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C31L2.1	1	1	2	-	3	-	-	-	-	-	-	-	-	-	-
C31L2.2	1	-	1	-	3	-	-	-	-	-	-	-	-	1	-
C31L2.3	1	1	2	1	3	-	-	-	-	-	-	-	-	1	-
C31L2.4	1	1	1	2	3	-	-	-	-	-	-	-	-	1	1
C31L2.5	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C31L2.6	3	2	1	2	3	-	-	-	-	-	2	-	1	1	1
C31L2	1.33	1.25	1.33	1.5	3	-	-	-	-	-	2	-	1	1	1

COURSE NAME: MACHINE LEARNING LAB
COURSE CODE: (R20CSE32L1)

At the end of the course student will be able to

Course Outcomes	Statements
C31L3.1	Explain the implementation procedures for the machine learning algorithms. (L5-Evaluate)
C31L3.2	Design java/python programs for various learning algorithms. (L6-Create)
C31L3.3	Apply appropriate data sets to the machine learning algorithms. (L3-Apply)
C31L3.4	Identify and apply machine learning algorithms to solve real world algorithm. (L3-Apply)
C31L3.5	Create effectively machine learning toolboxes. (L6-Create)
C31L3.6	Analyze Machine Learning algorithms to solve real world problems. (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C31L3.1	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-
C31L3.2	1	-	2	1	3	-	-	-	-	-	-	-	-	-	-
C31L3.3	3	1	1	1	3	-	-	-	-	-	-	-	-	1	-
C31L3.4	3	1	1	2	3	-	-	-	-	-	-	-	1	2	1
C31L3.5	1	-	2	-	3	-	-	-	-	-	-	-	-	1	-
C31L3.6	2	3	3	2	-	-	-	-	-	-	-	-	-	1	-
C31L3	1.83	1.66	1.66	1.8	3	-	-	-	-	-	-	-	1	1.25	1

III YEAR II- SEMESTER

COURSE NAME: BUSINESS ECONOMICS & FINANCIAL ANALYSIS

COURSE CODE: (R20MBA2201)

At the end of the course student will be able to:

Course Outcomes	Statements
C321.1	Understand the market dynamics namely, demand and supply, demand forecasting Elasticity of demand and supply, pricing methods and pricing in different market Structures.(L2-Understand)
C321.2	Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis. (L1-Remember)
C321.3	Develop an understanding of markets and new economic environment. (L4-Analyze)
C321.4	Analyze how capital budgeting decisions are carried out. (L6-Create)
C321.5	Understanding the framework for both manual and computerized accounting process. (L2-Understand)
C321.6	Know how to analyze and interpret the financial statements through ratio analysis. (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C321.1	3	-	-	-	1	3	-	-	-	2	-	2	-	1	-
C321.2	-	3	3	-	-	1	-	-	-	1	-	-	-	1	-
C321.3	3	-	-	-	1	2	-	-	-	2	-	1	-	1	-
C321.4	-	3	3	-	-	-	-	-	-	-	-	1	-	2	-
C321.5	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
C321.6	-	3	3	-	-	-	-	-	-	-	-	1	-	1	-
C321	3	3	3	-	1.33	2	-	-	-	1.67	-	1.25	-	1.2	-

COURSE NAME: PRINCIPLES OF COMPILER CONSTRUCTION

COURSE CODE: (R20INF3201)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C322.1	Classify the finite state machines and the languages accepted by them. (L4-Analyze)
C322.2	Demonstrate the working of Top-Down and Bottom-Up Parsers. (L3-Apply)
C322.3	Describe the Semantics, Hierarchy and Type-Checking of the Grammars and Languages. (L2-Understand)
C322.4	Access the importance of Code Optimization on the given code at various levels of the compilation. (L5-Evaluate)
C322.5	Justify the output generated by the Code-generator phase of the compiler with the help ofobject code forms and code generation algorithms. (L5-Evaluate)
C322.6	Generate the LL(K) & LR(K) parsers for parsing the given set of input data. (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C322.1	2	-	1	3	3	-	-	-	-	-	-	-	-	1	-
C322.2	1	3	3	2	1	-	-	-	-	-	-	-	-	-	-
C322.3	1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
C322.4	1	1	1	3	3	-	-	-	-	-	-	-	-	-	-
C322.5	3	-	2	1	3	-	-	-	-	-	-	-	-	1	-
C322.6	3	1	2	1	3	-	-	-	-	-	-	-	1	1	1
C322	1.83	2	2	1.83	2.33	-	-	-	-	-	-	-	1	1	1

COURSE NAME: ALGORITHM DESIGN AND ANALYSIS
COURSE CODE: (R20INF3202)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C323.1	Analyzing the algorithms and improve the efficiency of algorithms. (L4-Analyze)
C323.2	Different Designing methods for development of algorithms to realistic problems(L3-Apply)
C323.3	Describe and estimate the performance of algorithms. (L2-Understand)
C323.4	Evaluate the problems by using Greedy method and Dynamic Programming approach onvarious applications(L5-Evaluate)
C323.5	Evaluate the problems by using Backtracking, Branch and bound on various applications(L5-Evaluate)
C323.6	Evaluate the problems of Deterministic and Non-Deterministic Polynomial**(**L5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C323.1	2	3	2	2	-	-	-	-	-	-	1	1	2	1	1
C323.2	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C323.3	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C323.4	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C323.5	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C323.6	2	2	1	1	-	-	-	-	-	-	1	1	-	-	-
C323	2.0	2.16	1.5	1.5	-	-	-	-	-		1.0	1.0	2	1	1

COURSE NAME: SOFTWARE TESTING METHODOLOGIES
COURSE CODE: (R20CSE3231)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C324.1	Describe the basic concept of software testing and its essentials and to identify the various bugs and correcting them after knowing the consequences of the bug. (L2-Understand)
C324.2	Define programs control flow as a structural model is the corner stone of testing and performing functional testing using control flow and transaction flowgraphs (L1-Remember)
C324.3	Determine test domain or an application of software environment.
C324.4	Explain the functional and system testing methods. (L2-Understand)
C324.5	Evaluate functional testing using control flow and transaction flow graphs. (L5-Evaluate)
C324.6	Develop and apply testing strategies for software applications. (L6-Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C324.1	1	1	2	3	3	-	-	-	-	-	-	-	1	2	1
C324.2	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C324.3	2	3	3	2	2	-	-	-	-	-	-	-	1	1	1
C324.4	1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
C324.5	1	1	1	3	3	-	-	-	-	-	-	-	-	1	-
C324.6	1	-	1	-	3	-	-	-	-	-	-	-	-	1	1
C324	1.5	2.	2	2.25	2.5	-	-	-	-	-	-	-	1	1.25	1

COURSE NAME: ADVANCED COMMUNICATION SKILLS LAB
COURSE CODE: (R20HAS31L1)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C32L1.1	Development of sound vocabulary and its proper use contextually. (L3-Apply)
C32L1.2	Flair in writing and felicity in written expression. (L5-Evaluate)
C32L1.3	Enhanced job prospects. (L6-Create)
C32L1.4	Analyze Effective speaking abilities. (L4-Analyze)
C32L1.5	Describe computer assisted multimedia instructions enabling individualized and independent language learning(L3-Apply)
C32L1.6	Sensitize to the nuances of English speech sounds, word accent, intonation and rhythm. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C32L1.1	3	-	1	-	3	1	-	-	-	2	-	2	-	-	-
C32L1.2	3	-	1	-	3	1	-	-	-	1	-	1	-	-	-
C32L1.3	1	1	1	1	3	-	-	-	-	1	-	-	-	-	-
C32L1.4	1	3	3	1	1	2	-	-	-	2	-	1	-	-	-
C32L1.5	3	1	1	1	3	-	-	-	-	1	-	-	-	-	-
C32L1.6	3	1	1	-	3	1	-	-	-	1	-	1	-	-	-
C32L1	2.33	1.5	1.33	1	2.66	1.25	-	-	-	1.33	-	1.25	-	-	-

COURSE NAME: COMPILER CONSTRUCTION LAB
COURSE CODE: (R20INF32L1)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C32L2.1	Examine the role of lexical analyzer on the given input data. (L3-Apply)
C32L2.2	Construct Recursive Descent Parser for the given grammar. (L6-Create)
C32L2.3	Experiment the functionality of non-recursive descent parser LL (1) by parsing the giveninput string. (L3-Apply)
C32L2.4	Build the intermediate code from the given source code by using various intermediatecode generation techniques. (L6-Create)
C32L2.5	Generate the machine code from the given abstract syntax tree of the source code. (L6-Create)
C32L2.6	Justify the functionality of lexical analyzer using LEX, FLEX or JFLEX tool. (L5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C32L2.1	3	1	-	1	3	-	-	-	-	-	-	-	-	1	-
C32L2.2	1	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C32L2.3	3	1	1	-	3	-	-	-	-	-	-	-	-	-	-
C32L2.4	1	-	2	2	3	-	-	-	-	-	-	-	-	1	1
C32L2.5	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C32L2.6	1	2	1	3	3	-	-	-	-	-	-	-	-	1	-
C32L2	1.66	1.33	1.25	1.75	3	-	-	-	-	-	-	-	-	1	1

COURSE NAME: SOFTWARE TESTING METHODOLOGIES LAB
COUSE CODE: (R20CSE32L3)

At the end of the course student will be able to**:**

Course Outcomes	**Statements**
C32L3.1	Describe the myths and facts of software testing. (L3-Apply)
C32L3.2	Analyze and design test cases using black box testing techniques which include decisiontables domain testing and transition testing. (L4-Analyze)
C32L3.3	Analyze and design test cases for a white box testing technique which includes path testing, data flow graphs and matrix representation for a given problem. (L4-Analyze)
C32L3.4	Execute how to run test script wizard and execute how to do performance testing usingtesting tools including win runner and J meter respectively. (L5-Evaluate)
C32L3.5	Demonstrate the importance of testing and its role in need of software development. (L3-Apply)
C32L3.6	Explain the need and usage of software tools required for manual and automated testing.(L5-Evaluate)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**	**PSO3**
C32L3.1	3	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C32L3.2	2	3	2	1	1	-	-	-	-	-	-	-	-	2	1
C32L3.3	2	3	3	2	2	-	-	-	-	-			-	2	-
C32L3.4	1	1	1	3	3	-	-	-	-	-	-	-	-	1	1
C32L3.5	3	-	2	1	3	-	-	-	-	-	-	-	1	1	1
C32L3.6	2	2	1	3	3	-	-	-	-	-	-	-	1	1	1
C32L3	2.16	2.25	1.66	1.83	2.5	-	-	-	-	-	-	-	1	1.4	1

IV YEAR I- Semester

COURSE NAME: INFORMATION SECURITY
COURSE CODE: (R20INF4101)

At the end of the course student will be able to:

Course Outcomes	Statements
C411.1	Explain security concepts, Ethics in Network Security. Identify and classify various Attacksand explain the same. (L2-Understand, L1-Remember)
C411.2	Compare and contrast symmetric and asymmetric encryption systems and them vulnerability to various attacks. (L5-Evaluate)
C411.3	Explain the role of third-party agents in the provision of authentication services. (L2-Understand)
C411.4	Comprehend and apply authentication, email security, web security services and mechanisms.(L3-Apply)
C411.5	Distinguish and explain different protocol like SSL, TLS and their applications. (L6-Create)
C411.6	Discuss the effectiveness of passwords in access control. Explain firewall principles. (L4-Analyze, L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C411.1	2	2	-	-	-	-	-	-	-	-	-	-	3	3	3
C411.2	2	2	3	-	-	-	-	-	-	-	-	-	3	3	3
C411.3	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
C411.4	2	2	2	2	-	-	-	-	-	-	-	-	3	3	3
C411.5	2	2	3	2	-	-	-	-	-	-	-	-	3	3	3
C411.6	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
C411	2	2	2.8	2.5	-	-	-	-	-	-	-	-	3	3	3

COURSE NAME: DATA MINING
COURSE CODE: (R20CSE4102)

At the end of the course student will be able to:

Course Outcomes	Statements
C412.1	Design a data mart or data warehouse for any organizations. (L6-Create)
C412.2	Solve the Raw input data and preprocess it to provide suitable input for range of data mining Algorithm. (L6-Create)
C412.3	Apply association Rules and Classification Models.(L3-Apply)
C412.4	Identify the similar objects using clustering techniques(L3-Apply)
C412.5	Explore the recent trend in data mining such as web mining , special- temporal mining(L2-Understand)
C412.6	Identify the business applications of Data mining (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C412.1	3	-	1	1	3	-	-	-	-	-	-	-	-	-	-
C412.2	1	2	2	3	3	-	-	-	-	-	-	-	-	1	-
C412.3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C412.4	2	3	3	2	1	-	-	-	-	-	-	-	-	1	-
C412.5	3	1	1	2	3	-	-	-	-	-	-	-	1	2	1
C412.6	1	1	2	1	3	-	-	-	-	-	-	-	-	1	1
C412	2.16	1.75	1.8	1.8	2.66	-	-	-	-	-	-	-	1	1.25	1

COURSE NAME: CLOUD COMPUTING
COURSE CODE: (R20CSE4143)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C413.1	Implement knowledge of latest Technologies and how to create virtual machines in a single physical device(L3-Apply)
C413.2	Develop virtual machines by using hypervisor software. (L6-Create)
C413.3	Execute migration techniques and virtual machines can be migrated from one host to anotherhost (L5-Evaluate)
C413.4	Describe the Cloud Services like IAAS, PAAS, SAAS and Distributed Data Storage in Cloud (L2-Understand)
C413.5	Demonstrate Monitoring and Management and Applications and SLA Management and Understand the AWS console create the S3 registration and creating buckets in theS3 Cloud(L3-Apply)
C413.6	Master system Support different hardware components related with Distributed Cloud and best Practices in Architecting Cloud Applications in the AWS Cloud (L5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C413.1	1	1	2	-	3	-	-	-	-	-	-	-	-	-	-
C413.2	2	-	1	1	3	-	-	-	-	-	-	-	1	2	1
C413.3	2	2	2	3	2	-	-	-	-	-	-	-	1	2	1
C413.4	3	1	1	2	3	-	-	-	-	-	-	-	-	1	-
C413.5	1	-	1	-	3	-	-	-	-	-	-	-	-	-	-
C413.6	2	1	1	3	3	-	-	-	-	-	-	-	-	1	-
C413	1.83	1.25	1.33	2.25	2.83	-	-	-	-	-	-	-	1	1.5	1

COURSE NAME: INTERNET OF THINGS
COURSE CODE: (R20CSE4152)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C414.1	Analyze various protocols for IoT. (L4-Analyze)
C414.2	Develop web services to access/ control IoT devices. (L3-Apply)
C414.3	Design a portable IoT Using Raspberry Pi. (L6-Create)
C414.4	Develop an IoT application and connect to the cloud. (L3-Apply)
C414.5	Analyze applications of IoT in Real Time Scenario. (L4-Analyze)
C414.6	Explain various industry oriented and real-life applications. (L5-Evaluate)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C414.1	1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
C414.2	3	-	1	2	3	-	-	-	-	-	-	-	-	1	-
C414.3	1	1	2	1	3	-	-	-	-	-	-	-	-	-	-
C414.4	3	-	-	1	3	-	-	-	-	-	-	-	1	1	1
C414.5	2	3	3	1	1	-	-	-	-	-	-	-	-	1	-
C414.6	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-
C414	1.83	2.33	2	1.5	2.33	-	-	-	-	-	-	-	1	1	1

COURSE NAME: E – COMMERCE
COURSE CODE: (R20INF4185)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C415.1	Explain the E-commerce strategies and value chains. (L5-Evaluate)
C415.2	Describe the E-commerce services. (L3-Apply)
C415.3	Explain E-commerce infrastructure, its applications and supply chain Management. (L5-Evaluate)
C415.4	Identify the availability of latest technology and applications of E-payment Mechanism. (L3-Apply)
C415.5	Apply E-commerce in business-to-business application. (L3-Apply)
C415.6	Describe the major types of E-commerce. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C415.1	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-
C415.2	3	1	1	1	3	1	-	-	-	-	-	-	-	-	1
C415.3	1	-	1	3	3	-	-	-	-	-	-	-	-	-	1
C415.4	3	1	2	2	3	1	-	-	-	-	-	-	-	1	2
C415.5	3	2	2	2	3	2	-	-	-	-	-	-	-	1	1
C415.6	3	-	2	2	3	1	-	-	-	-	-	-	-	-	-
C415	2.33	1.33	1.6	2	3	1.25	-	-	-	-	-	-	-	1	1.25

COURSE NAME: INFORMATION SECURITY LAB
COURSE CODE: (R20INF41L1)

At the end of the course student will be able to**:**

Course Outcomes	Statements
C41L1.1	Explain security concepts, Ethics in Network Security. Identify and classify various Attacks and explain the same(L2-Understand)
C41L1.2	Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to various attacks. (L5-Evaluate)
C41L1.3	Explain the role of third-party agents in the provision of authentication services. (L2-Understand)
C41L1.4	Comprehend and apply authentication, email security, web security services and mechanisms. (L3-Apply)
C41L1.5	Distinguish and explain different protocol like SSL, TLS and their applications. (L6-Create)
C41L1.6	Discuss the effectiveness of passwords in access control. Explain Firewall principles. (L4-Analyze)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C41L1.1	2	2	-	-	-	-	-	-	-	-	-	-	3	3	3
C41L1.2	2	2	3	-	-	-	-	-	-	-	-	-	3	3	3
C41L1.3	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
C41L1.4	2	2	2	2	-	-	-	-	-	-	-	-	3	3	3
C41L1.5	2	2	3	2	-	-	-	-	-	-	-	-	3	3	3
C41L1.6	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
C41L1	2	2	2.8	2.5	-	-	-	-	-	-	-	-	3	3	3

IV YEAR II- Semester

COURSE NAME: ORGANIZATIONAL BEHAVIOUR
COURSE CODE: (R20HAS4201)

At the end of the course student will be able to:

Course Outcomes	Statements
C421.1	Evolution of Management and contribution of management thinkers. (L2-Understand)
C421.2	The relevance of Environmental Scanning, planning and to take decisions. (L2-Understand)
C421.3	Organizing and Controlling. (L2-Understand)
C421.4	Individual and group Behavior. (L1-Remember)
C421.5	Leadership and Motivation. (L6-Create)
C421.6	Basic knowledge on organization culture, climate, its significance and impact in anOrganization. (L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C421.1	1	2	1	2	-	1	-	-	1	1	3	1	1	2	-
C421.2	1	1	2	1	1	1	3	1	1	1	1	-	-	1	-
C421.3	-	1	1	1	-	1	1	-	1	1	-	-	-	-	-
C421.4	-	1	1	1	-	-	-	-	3	1	-	-	-	1	-
C421.5	1	1	-	1	-	-	-	-	2	-	-	-	-	-	-
C421.6	1	-	1	1	2	1	1	-	-	-	1	1	-	1	-
C421	1	1.2	1.2	1.17	1.5	1	1.67	1	1.6	1	1.67	1	1	1.25	-

COURSE NAME: HUMAN COMPUTER INTERACTION
COURSE CODE: (R20CSE4263)

At the end of the course student will be able to:

Course Outcomes	Statements
C422.1	Apply HCI and principles to interaction design. (L3-Apply)
C422.2	Design certain tools for blind or PH people. (L6-Create)
C422.3	Design effective HCI for individuals and persons with disabilities. (L6-Create)
C422.4	Assess the importance of User Feedback. (L5-Evaluate)
C422.5	Explain the HCI implications for designing Multimedia / E-commerce / E-Learning Websites.(L2-Understand)
C422.6	Develop Meaningful User-interface. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C422.1	1	2	1	2	-	1	-	-	1	1	3	1	1	2	-
C422.2	1	1	2	1	1	1	3	1	2	1	1	-	-	1	-
C422.3	-	1	1	1	-	1	1	-	1	1	-	-	-	-	-
C422.4	-	1	1	1	-	-	-	-	3	1	-	-	-	1	-
C422.5	1	1	-	1	-	-	-	-	2	-	-	-	-	-	-
C422.6	1	-	1	1	2	1	1	-	-	-	1	1	-	1	-
C422	1	1.2	1.2	1.17	1.5	1	1.67	1	1.8	1	1.67	1	1	1.25	-

COURSE NAME: INFORMATION SECURITY FUNDAMENTALS
COURSE CODE: (R20INF4295)

At the end of the course student will be able to:

Course Outcomes	Statements
C423.1	Understand the information security and various Attacks, Analyze the effectiveness of passwords in access control. (L2-Understand, L1-Remember)
C423.2	Understand the basic concepts of Cryptography, encryption and decryption Techniques. (Evaluating)
C423.3	Understand the various network security applications, IPsec, Web Security, Email Security and Kerberos, X.509 etc. (L2-Understand)
C423.4	Apply firewall principles, honey pots, IDS, IPS, Authentication, Mechanisms. (L2-Understand)
C423.5	Analyze diverse viewpoints to ethical dilemmas in the Information Technology field andrecommend appropriate actions. (L2-Understand)
C423.6	Understand the role of third-party agents in the provision of Authentication Services. (L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
C423.1	1	-	1	-	1	-	-	-	-	-	-	-	-	1	-
C423.2	2	1	2	2	1	-	1	-	-	-	-	-	1	2	1
C423.3	1	3	3	2	2	-	-	-	-	1	2	1	1	2	2
C423.4	1	1	1	1	-	-	-	-	-	-	-	-	1	1	1
C423.5	-	1	1	1	3	1	1	-	-	1	-	-	-	-	-
C423.6	1	1	1	1	2	2	1	-	1	2	1	1	-	1	1
C423	1.2	1.4	1.5	1.4	1.8	1.5	1	-	1	1.33	1.5	1	1	1.4	1.25

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MISSION:

DM 1: To provide value added education in civil engineering.
DM 2: To provide conductive environment oriented towards innovation.
DM 3: To impart training on emerging technologies like STAAD Pro, AUTOCAD and ETABSinvolvement of stake holders.
DM 4: Inculcating ethical values ability towards lifelong learning and social responsibilities.

PROGRAM OUTCOMES

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Computer Science and Engineering graduates will be able to:

Program Specific Outcomes	
PSO 1	**Basic Civil Engineering Knowledge:** Apply basic knowledge related to CivilEngineering design Structural, Roads and Buildings, dams and Staad Pro to solve various engineering problems.
PSO 2	**Design Methods:** Design, Verify and Fabricate suitable civil functionalelements for steel and concrete structures, roads, buildings, Dams and Bridges and High Raised Buildings, Sky Ways and High Ways
PSO 3	**Experimentation and Analysis:** Analyse, Plan and Prototype civilexperiments/Projects.

II YEAR CIVIL SEMESTER - I (REGULATION – R20)
ACADEMIC YEAR: 2020-2021

Course Code &Name: R20CIV2101& SURVEYING & GEOMATICS

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C211.1	Apply the knowledge to calculate angles, distances and levels**(L3 applying)**
C211.2	Identify data collection methods and prepare field notes**(L1 remembering)**
C211.3	Understand the working principles of survey instruments, measurement errors and **(L2 understanding)**
C211.4	Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern **(L3 applying)**
C211.5	Electronic distance measuring equipment, total stations, theodolites, compasses, remote sensing equipment, GPS base and rover Receivers, datacollectors and hand-help programmable calculators. (**L5 evaluating)**
C211.6	Practice in the establishment of monuments, corners, lines and witness pointsin accordance with available data. Practice in the preparation of land boundary descriptions and survey plats.**(L6 analyzing)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C211.1	3	-	2	-	-	-	-	-	-	-	1	3	2	2	1
C211.2	-	3	-	-	-	-	-	-	2	2	-	3	-	1	-
C211.3	3	2	-	-	-	-	-	-	-	-	-	2	-	-	1
C211.4	3	2	-	-	-	-	-	-	-	-	-	2	-	-	1
C211.5	3	2	-	-	1	-	-	-	-	-	-	2	3	2	1
C211.6	-	-	-	-	-	-	-	-	-	-	-	1	1	2	1
C211	2	1.8	0.3	-	-	-	-	-	0.3	0.3	0.1	2.1	1	1.16	0.83

Course Code &Name: R20MED2105 & **HYDRAULICS AND HYDRAULIC MACHINERY**
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C212.1	apply their knowledge of fluid mechanics in addressing problems in open channels andhydraulic machinery**(L3 applying)**
C212.2	Understand and solve problems in uniform, gradually and rapidly varied flows in openchannel in steady state conditions.**(L2 understanding)**
C212.3	apply dimensional analysis and to differentiate the model, prototype and similitudeconditions for practical problems.**(L3 applying)**
C212.4	the knowledge on different hydraulic machinery devices and its principles that willbe utilized in hydropower development and for other practical usages **(L3 applying)**
C212.5	To provide the students with a solid foundation in fluid flow principles To provide the students knowledge in calculating performance analysis in turbines andpumps and can be used in power plants**(L3 applying)**

CO	PO 1	PO 2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO 1	PSO 2	PSO3
C212.1	3	2	-	1	2	1	1	1	2	1	1	3	2	1	1
C212.2	1	1	-	-	-	-	-	-	-	-	-	1	1	2	1
C212.3	1	-	-	3	1	-	-	1	1	1	-	-	2	3	1
C212.4	3	2	1	-	3	1	1	1	3	1	-	3	-	-	1
C212.5	2	-	-	-	2	-	-	-	2	-	-	3	2	1	1
C212	2	1	0.2	0.8	1.6	0.4	0.4	0.6	1.6	0.6	0.2	2	1.4	1.4	1

Course Code &Name: R20CIV2102 & **STRENGTH OF MATERIALS-I**
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C213.1	Determine stresses in the member subjected to Torsion**(L3 applying)**
C213.2	Analyze columns and struts**(L4 analyzing)**
C213.3	Understand the concept of direct and bending stresses**(L2 understanding)**
C213.4	Analyze and design springs, thin and thick cylinders**(L4 analyzing)**
C213.5	Understand the concept of unsymmetrical bending**(L2 understanding)**
C213.6	To understand the basics of material properties, stress and strain. **(L2 understanding)**

CO	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C213.1	3	2	1	-	-	1	1	1	1	-	-	1	2	1	1
C213.2	2	3	-	1	-	1	-	-	1	-	-	1	3	1	1
C213.3	3	-	-	-	-	-	-	1	-	-	-	1	1	2	-
C213.4	1	3	-	2	1	-	-	2	-	-	-	2	1	-	3
C213.5	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
C213.6	3	1	-	-	-	-	-	-	-	-	-	3	2	1	-
C213	2	1.66	0.16	0.5	0.16	0.33	0.16	0.66	0.33	-	-	1.33	1.5	0.83	0.83

Course Code &Name: R20MTH2102 & **PROBABILITY DISTRIBUTIONS AND STATISTICAL METHODS**

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C214.1	Apply the concepts of probability and distributions to some case studies **(L3 applying)**
C214.2	Correlate the material of one unit to the material in other units **(L4 analyzing)**
C214.3	Resolve the potential misconceptions and hazards in each topic of study. Estimate the quantity of the items required to complete the project **(L2 understanding)**
C214.4	Determine the line of best fit in any regression analysis using Least Square Method**(L3 applying)**
C214.5	Apply the Statistical Hypothesis Testing to determine whether an experiment conducted provides enough evidence to reject a proposition.**(L3 applying)**

CO	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C214.1	3	2	1	-	-	-	-	-	-	-	-	1	-	-	-
C214.2	-	1	-	-	-	-	-	-	-	-	-	1	-	1	-
C214.3	2	1	1	-	-	-	-	-	-	-	-	-	-	-	1
C214.4	2	1	-	-	-	-	-	-	-	-	-	1	2	-	-
C214.5	3	2	2	-	-	-	-	-	-	-	-	2	-	3	-
C214	2	1.4	0.6	-	-	-	-	-	-	-	-	1	0.4	0.8	0.2

Course Code &Name: R20MED2106 & **FLUID MECHANICS**
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C215.1	Apply conservation laws to derive governing equations of fluid flows**(L3 applying)**
C215.2	Compute hydrostatic and hydrodynamic forces.**(L2 understanding)**
C215.3	Analyze and design simple pipe systems.**(L4 analyzing)**
C215.4	Apply principles of dimensional analysis to design experiments.**(L3 applying)**
C215.5	Compute drag and lift coefficients**(L2 understanding)**
C215.6	Student will be able to apply Bernouli principle and compute pressure drop in flow systems ofdifferent configurations**(L3 applying)**

CO	**PO 1**	**PO 2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO 8**	**PO9**	**P10**	**P11**	**P12**	**PSO 1**	**PSO2**	**PSO 3**
C215.1	3	1	-	-	-	-	-	-	-	-	-	1	2	-	1
C215.2	1	2	1	-	-	-	-	-	-	-	-	1	-	3	-
C215.3	1	3	1	-	1	-	-	-	-	-	-	1	1	-	2
C215.4	2	1	1	-	1	-	-	-	-	-		-	-	1	-
C215.5	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-
C215.6	2	1	1	-	-	-	-	-	-	-	-	2	-	2	-
C215	**1.5**	**1.8**	**1**	**-**	**0.3**	**-**	**-**	**-**	**-**	**-**	**-**	**0.8**	**0.5**	**1**	**0.5**

Course Code &Name: & (R20CIV21L1) SURVEYING LAB

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C21L1.1	A appreciate the need for accurate and thorough note taking in field work to serve as a legalrecord**(L3 applying)**
C21L1.2	Gain the ability to use modern survey equipment to measure angles and distances **(L1 remembering)**
C21L1.3	Gain a basic understanding of the principles and operation of the Global Positioning System**(L1 remembering)**
C21L1.4	Gain the ability to measure differences in elevation, draw and utilize contour plots, andcalculate volumes for earthwork**(L1 remembering)**
C21L1.5	Improve ability to function as a member of a survey party in completing the assigned fieldwork **(L2 understanding)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L1.1	2	2	1	-	1	-	-	-	1	-	-	1	-	-	1
C21L1.2	2	1	1	-	2	-	-	-	-	-	-	1	2	-	1
C21L1.3	1	-	-	-	1	-	-	-	-	-	-	1	-	-	3
C21L1.4	1	1	1	-	-	-	-	-	-	-	-	2	-	1	-
C21L1.5	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-
C21L1	1.4	1	1	-	0.8	-	-	-	0.2	-	-	1	0.4	0.2	1

Course Code &Name: R20CIV21L2 & **STRENGTH OF MATERIALS LAB**
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C21L2.1	Conduct tension test on Materials like steel etc. **(L5 evaluating)**
C21L2.2	Conduct compression tests on spring, wood and concrete **(L5 evaluating)**
C21L2.3	Conduct flexural and torsion test to determine elastic constants **(L5 evaluating)**
C21L2.4	Determine hardness of metals**(L3 applying)**
C21L2.5	An ability to design a system, component, or process to meet desired needs such as economic, environmental, social, political, ethical, health and safety, manufacturability,and sustainability**(L1 remembering)**
C21L2.6	An ability to use the techniques, skills and modern engineering tools necessary forengineering practice**(L1 remembering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L 2.1	3	1	1	-	-	-	-	-	-	-	-	1	-	-	1
C21L 2.2	1	-	-	-	1	-	-	-	-	-	-	1	-	-	1
C21L 2.3	1	-	-	-	1	-	-	-	-	-	-	1	2	-	-
C21L 2.4	1	-	-	-	-	-	-	-	-	-	-	2	-	3	-
C21L 2.5	3	2	1	-	-	3	-	1	2	-	-	1	-	-	-
C21L 2.6	1	-	-	-	3	-	-	-	-	-	-	2	3	-	1
C21L 2	1.6	0.5	0.3	-	0.8	0.5	-	0.1	0.3	-	-	1.3	0.8	0.5	0.5

Course Code &Name: R20CIV21L4&HYDRAULICS & HYDRAULIC MACHINERY LAB
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C21L3.1	Compute drag coefficients**(L2 understanding)**
C21L3.2	Test the performance of pumps and turbines**(L5 evaluating)**
C21L3.3	Determine Manning's and Chezy's coefficients for smooth and rough channels **(L3 applying)**
C21L3.4	Determine Energy loss in Hydraulic jump and Calibrate standing wave flume **(L3 applying)**
C21L3.5	Develop understanding about fluid action in open channel flow **(L2 understanding)**
C21L3.6	Ability to select hydraulic turbines for hydropower plants **(L1 remembering)**
C21L3.7	Identify the application of fluid in open channel flow and hydraulic machines **(L3 applying)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L3.1	2	-	-	-	-	-	-	-	-	-	-	1	-	-	1
C21L3.2	3	1	1	-	3	-	-	1	1	-	-	1	-	2	-
C21L3.3	-	**1**	-	-	-	-	-	-	-	-	-	-	-	-	1
C21L3.4	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-	1
C21L3.5	**1**	-	-	-	-	-	-	-	-	-	-	-	**2**	-	-
C21L3.6	3	1	1	-	2	-	-	-	1	-	-	3	-	-	3
C21L3.7	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
C21L3	1.5	0.5	0.4	-	0.7	-	-	0.1	0.2	-	-	0.7	0.2	0.2	0.7

II YEAR CIVIL SEMESTER - II (REGULATION – R20)
ACADEMIC YEAR: 2018-2019

Course Code &Name: (R20EEE2205) BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C221.1	Knowledge on basic electrical circuits, parameters, Solution of resistive circuits withindependent sources and different types of instruments. **(L1 remembering)**
C221.2	To explain the working principle, construction, applications of DC machines. **(L4 analyzing)**
C221.3	Highlight the importance of transformers in transmission and distribution of electricpower.(**L1 remembering**)
C221.4	To Gain the knowledge on working principle, construction ,applications of ACmachines(**L1 remembering**)
C221.5	Operation of diodes, transistors, realization of various electronic circuits with thevarious semiconductor devices. **(L3 applying)**
C221.6	Cathode ray oscilloscope, with which he/she can able to apply the above conceptualthings to real world electrical and electronics problems and applications.**(L3 applying)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C221.1	3	2	1	-	-	-	-	-	-	-	-	1	1	-	1
C221.2	1	-	-	-	-	-	-	-	-	-	-	1	1	2	-
C221.3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C221.4	3	2	1	-	1	-	-	-	-	-	-	2	-	-	2
C221.5	1	-	-	-	-	-	-	-	-	-	-	3	-	-	-
C221.6	1	3	1	-	-	-	-	-	-	-	-	-	-	1	-
C221	**1.6**	**1.1**	**0.5**	**-**	**0.1**	**-**	**-**	**-**	**-**	**-**	**-**	**1.1**	**0.3**	**0.5**	**0.5**

Course Code &Name: (R20CIV2201) BUILDING MATERIALS, CONSTRUCTION AND PLANNING

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C222.1	Predict the properties of building stones and its classifications. Understand the concept of various methods of manufacture of bricks. Identify rock usingbasic geological classification systems. **(L2 understanding)**
C222.2	Obtain differentiate the fine aggregates and coarse aggregates under various views. Explain various types of cements and their applications in construction.Various field and laboratory tests on cement.**(L4 analyzing)**
C222.3	Analyze the importance of mineral and chemical admixtures, requirements ofthe concrete in construction.**(L4 analyzing)**
C222.4	Explain different types of lintel, arches and the materials which are commonlyused for construction.**(L4 analyzing)**
C222.5	Explain the suitability of floors in buildings like mosaic flooring, terrazzoflooring, rubber flooring, asphalt flooring.**(L4 analyzing)**
C222.6	Understand the different types of trusses, RCC roofs, and madrasterrace/shell roofs.**(L2 understanding)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C222.1	2	1	-	-	1	-	-	-	-	-	-	1	-	-	1
C222.2	3	1	-	-	-	-	-	-	-	-	-	1	-	2	-
C222.3	2	-	-	-	-	-	-	-	-	-	-	3	-	-	1
C222.4	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
C222.5	1	-	-	-	-	-	-	1	1	-	-	2	-	1	-
C222.6	2	-	-	-	-	-	-	-	-	-	-	1	2	-	-
C222	**1.8**	**0.3**	**-**	**-**	**0.1**	**-**	**-**	**0.1**	**0.1**	**-**	**-**	**1.5**	**0.3**	**0.5**	**0.3**

Course Code &Name: (R20CIV2202) STRENGTH OF MATERIALS-II
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C223.1	Analyze columns and struts Understand the concept of direct and bending stresses**(L4 analyzing)**
C223.2	Analyze and design springs, thin and thick cylinders**(L4 analyzing)**
C223.3	Understand the concept of unsymmetrical bending. **(L2 understanding)**
C223.4	Recognize physical phenomenon in the context of strength of materials. Demonstrate anunderstanding of the structural mechanics theory for deformable bodies**(L4 analyzing)**
C223.5	Apply structural mechanics of deformable bodies to solve engineering problems Demonstrate an understanding of the relationships between loads, member forces anddeformations and material stresses and strains**(L3 applying)**
C223.6	Demonstrate an understanding of the assumptions and limitations of the structuralmechanics theory Competence in problem identification, formulation and solution**(L4 analyzing)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO 2	PSO3
C223 .1	2	3	1	-	-	-	-	-	-	-	-	1	-	-	1
C223 .2	1	1	-	-	-	-	-	-	-	-	-	-	3	-	-
C223 .3	1	3	-	-	-	-	-	-	-	-	-	1	-	-	-
C223 .4	3	1	-	-	-	-	-	-	-	-	-	1	-	2	-
C223 .5	1	2	-	-	-	-	-	-	-	-	-	-	-	-	2
C223 .6	-	2	1	-	-	-	-	-	-	-	-	1	1	-	-
C223	**1.3**	**2**	**0.3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.5**	**0 . 6**	**0.3**	**0.5**

Course Code &Name: (R20CIV2203) STRUCTURAL ANALYSIS –I

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C224.1	Analyze Perfect , Imperfect And Redundant Frames**(L4 analyzing)**
C224.2	Formulate Equilibrium and compatibility equations for structural members **(L1 remembering)**
C224.3	Analyze one dimensional and two dimensional problems using classical methods **(L4 analyzing)**
C224.4	Analyze indeterminate structures**(L4 analyzing)**
C224.5	Analyze structures for gravity loads, moving loads and lateral loads **(L4 analyzing)**
C224.6	Evaluate and draw the influence lines for reactions, shears, and bending moments inbeams and girders due to moving loads. **(L5 evaluating)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C224.1	3	3	1	-	-	-	-	-	-	-	-	1	1	-	-
C224.2	2	1	-	-	-	-	-	-	-	-	-	1	-	3	-
C224.3	1	1	1	-	-	-	-	-	-	-	-	-	-	-	1
C224.4	2	3	1	-	-	-	-	-	-	-	-	1	1	-	-
C224.5	1	-	-	-	-	-	-	-	-	-	-	1	2	-	-
C224.6	3	1	1	-	-	-	-	-	-	-	-	1	-	-	3
C224	**2**	**1.5**	**0.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.8**	**0.6**	**0.5**	**0.6**

Course Code &Name: (**R20CIV2204**) **ENGINEERING GEOLOGY**

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C225.1	Understand weathering process and mass movement **(L2 understanding)**
C225.2	Distinguish geological formations**(L4 analyzing)**
C225.3	Identify geological structures and processes for rock mass quality**(L1 remembering)**
C225.4	Identify subsurface information and groundwater potential sites throughgeophysical investigations**(L1 remembering)**
C225.5	Apply geological principles for mitigation of natural hazards and select sites for dams andtunnels **(L3 applying)**
C225.6	To understand issues concerning the geological basement and structure of a region. To describe and interpret the geological structures in the geological maps and cross sections.**(L2 understanding)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C225.1	2	-	-	-	-	-	-	-	-	-	-	2	2	-	-
C225.2	2	-	-	-	--	-	-	-	-	-	-	2	-	-	3
C225.3	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
C225.4	1	-	-	3	-	-	-	-	-	-	-	-	-	2	-
C225.5	1	-	-	-	-	-	1	2	-	-	-	-	1	-	-
C225.6	1	1	-	2	1	-	-	-	-	-	-	2	--	-	2
C225	**1.3**	**0.1**	**-**	**0.8**	**0.1**	-	**0.1**	0.3	-	-	-	**1.1**	**0.5**	**0.3**	**0.8**

Course Code &Name: (R20CIV22L1) COMPUTER AIDED CIVIL ENGINEERING DRAWING

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C22L1.1	Use the Autocad commands for drawing 2D & 3D building drawings required fordifferent civil engg applications.**(L1 remembering)**
C22L1.2	Plan and draw Civil Engineering Buildings as per aspect and orientation. **(L6 creating)**
C22L1.3	Presenting drawings as per user requirements and preparation of technical report **(L3 applying)**
C22L1.4	Introduction to computer aided drafting, Software for CAD – Introduction to differentsoftwares, Practice exercises on CAD software .**(L1 remembering)**
C22L1.5	Drawing of plans of buildings using software a) Single storied buildings b) multi storied buildings **(L6 creating)**
C22L1.6	Detailing of building components like Doors, Windows, Roof Trusses etc. usingCAD softwares. Exercises on development of working drawings of buildings **(L4 analyzing)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	P10	P11	P12	PSO1	PSO2	PSO3
C22L 1.1	3	-	-	-	-	-	-	-	-	-	-	3	3	3	**1**
C22L 1.2	1	-	-	-	-	1	1	1	3	1	2	3	3	-	**2**
C22L 1.3	1	-	-	-	-	-	-	-	1	1	2	3	2	3	-
C22L 1.4	2	-	-	-	-	-	-	-	2	-	-	-	1	-	**2**
C22L 1.5	1	-	-	-	-	-	-	-	-	-	-	-	3	-	**1**
C22L 1.6	-	-	-	-	-	-	-	-	2	-	-	1	2	1	**1**
C22L 6	**1.3**	**-**	**-**	**-**	**-**	**0.1**	**0.1**	**0. 1**	**1.3**	**0.3**	**0.6**	**1.6**	**2.3**	**1.16**	**1.16**

Course Code &Name: (R20CIV22L2) ENGINEERING GEOLOGY LAB

Upon completion of the course, students will be able to:

Course Name	Course outcomes
C22L2.1	Position to read, understand and interpret different maps like Toposheet, Structural Geology maps, Stratigraphic maps, geological cross-sections, Isopach maps, StructuralContour maps etc. **.(L1 remembering)**
C22L2.2	Understand how to locate own / outcrop positions on Toposheet and how to take traverse**(L2 understanding)**
C22L2.3	Understand geological formations and measure dip and strike reading correctly in the filed **(L2 understanding)**
C22L2.4	Calculate true dip, true thickness, Oil Water Contact (OWC) from given maps **(L4 analyzing)**
C22L2.5	Explain different sediment depositional environments from stratigraphic columns **(L4 analyzing)**
C22L2.6	Ability to categorize rocks and minerals by their origin and engineering properties. **(L1 remembering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L 2.1	1	-	-	-	-	1	-	-	-	-	-	3	3	-	-
C22L 2.2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
C22L 2.3	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-
C22L 2.4	2	-	-	-	-	-	-	-	-	-	-	-	-	3	-
C22L 2.5	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-
C22L 2.6	1	-	-	-	-	-	-	-	-	-	-	2	-	-	2
C22L 2	0.8	-	-	0.3	-	0.1	-	-	-	-	-	1	0.8	0.5	0.5

Course Code &Name: (R20EEE22L3) ELECTRICAL & ELECTRONICS LAB

Upon completion of the course, Students will be able to:

Course Name	Course outcomes
C22L3.1	Explain the basic electrical DC and AC circuits.**(L1 remembering)**
C22L3.2	Construction operation characteristics of DC and AC machines and also the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc &different semiconductor devices. **(L4 analyzing)**
C22L3.3	Describe the operation of the transformers in the energy conversion process. **(L4 analyzing)**
C22L3.4	Summarize the operation of diodes, transistors, realization of various electronic circuits withthe various semiconductor devices. **(L2 understanding)**
C22L3.5	Explain the principles cathode ray oscilloscope and its applications. **(L4 analyzing)**
C22L3.6	Apply the above conceptual things to real world electrical and electronics problems andapplications. **(L3 applying)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C22L3.1	3	2	-	-	1	-	2	1	-	1	-	3	1	-	2
C22L3.2	1	1	-	2	2	-	1	-	1	-	1	2	-	2	-
C22L3.3	2	-	-	-	-	-	-	3	1	-	2	1	-	-	1
C22L3.4	1	-	2	-	2	1	2	-	-	2	-	1	-	-	-
C22L3.5	-	-	-	-	2	-	-	-	-	-	-	1	2	3	-
C22L3.6	1	1	-	-	-	-	-	1	-	-	-	3	-	-	1
C22L3	**1.3**	**0.6**	**0.3**	**0.3**	**1.16**	**0.16**	**0.8**	**0.8**	**0.3**	**0.5**	**0.5**	**1.8**	**0.5**	**0.8**	**0.6**

Department Vision (DV):

To produce competent professionals recognized for excellence, innovation and societal relevance by impacting their knowledge of Artificial Intelligence and Data Science.

Department Mission (DM):

DM 1: To produce industry-ready professionals and leverage Artificial Intelligence and Data science innovative models for automation, effective decision-making and competitive advantage.
DM 2: To develop state-the-art of academic and infrastructural services with modern learning resources to produce self-sustainable professionals.
DM 3: To inculcate the prominence of higher studies, research and entrepreneurship to pursue global standards.

Program Educational Objectives (PEO's):

PEO I: Comply with the contemporary trends and best practices of industry and research standards of Artificial Intelligence and Data Science
PEO II: Develop Artificial Intelligence and Data Science based solutions to address diverse needs of the community for improving the quality of life and environment.
PEO III: To produce creative and technically strong engineers with research pioneering solutions to meet global challenges
PEO IV: Inculcate values of professional ethics, social concerns, environment protection and life-long learning.

Program Specific Outcomes (PSO's):

PSO 1: Adapt, contribute and innovate new technologies in the key domains of Artificial Intelligence & Data Science during higher studies / product development
PSO 2: To equip students with interdisciplinary skill sets to be able to build an intelligent system which in turn provides dynamic and promising careers in the global marketplace.
PSO 3: Utilize Artificial Intelligence and Data Science tools to provide innovative business solutions.

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	**Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological Change
Program Specific Outcomes	
PSO 1	Adapt, contribute and innovate new technologies in the key domains of Artificial Intelligence & Data Science during higher studies / product development.
PSO 2	To equip students with interdisciplinary skill sets to be able to build an intelligent system which in turn provides dynamic and promising careers in the global marketplace.
PSO 3	Utilize Artificial Intelligence and Data Science tools to provide innovative business solutions.

COURSE OUTCOMES (CO's)

Academic Year : 2022-23

Class **:** II YEAR-I SEM**.**

Course Name **:** DISCRETE MATHEMATICS (R20CSE2201)

C211.1	To understand and construct precise mathematical proofs.
C211.2	To use logic and set theory to formulate precise statements.
C211.3	To analyze and solve counting problems on finite and discrete structures.
C211.4	To describe and manipulate sequences.
C211.5	To apply graph theory in solving computing problems.
C211.6	Solve recurrence relation by using different methods.

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C211.1	3	1	2	3	3	1	-	-	-	-	-	1	-	2	-
C211.2	2	-	2	3	3	-	-	-	-	-	-	-	-	1	-
C211.3	2	3	3	1	1	1	-	-	-	-	-	1	-	1	-
C211.4	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
C211.5	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C211.6	1	-	-	3	3	-	-	-	-	-	-	-	-	1	-
C211	1.67	0.83	1.16	2.67	2.6	0.33	-	-	-	-	-	0.33	-	1	-

COURSE OUTCOMES (CO's)

Academic Year : 2022-23

Class **:** II YEAR-I SEM**.**

Course Name **:** DATA STRUCTURES (R20CSE2101)

C212.1	Ability to Select the data structures that efficiently model the information in a problem.
C212.2	Ability to assess efficiency trade-offs among different data structure implementations or combinations.
C212.3	Implement and know the application of algorithms for sorting and searching.
C212.4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
C212.5	Ability to select the data structures that efficiently model the information in a problem.
C212.6	Illustrate the concept of Text pattern matching algorithm.

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C212.1	3	3	1	1	1	-	-	1	-	3	-	3	2	-	-
C212.2	1	2	2	1	1	-	-	1	-	-	-	-	2	2	-
C212.3	3	3	3	3	1	-	-	1	3	1	-	1	3	-	-
C212.4	3	3	3	3	2	-	-	1	3	1	-	-	3	3	-
C212.5	2	3	3	2	-	-	-	1	2	3	-	2	3	1	1
C212.6	3	3	3	3	3	-	-	1	3	1	-	2	3	3	2
C212	2.5	2.8	2.5	2.2	1.3	-	-	1	1.8	1.5	-	1.3	2.7	1.5	0.5

COURSE OUTCOMES (CO's)

Academic Year : 2022-23

Class **:** II YEAR-I SEM.

Course Name **:** MATHEMATICAL AND STATISTICAL FOUNDATIONS (R20MTH2104)

C213.1	Apply the number theory concepts to cryptography domain
C213.2	Apply the concepts of probability and distributions to some case studies
C213.3	Calculate the areas under the normal curve& applications of the normal distribution
C213.4	Analyze the fundamental sampling distributions
C213.5	Test the Hypothesis of single mean, double mean , single proportion, double proportion
C213.6	Evaluate Transition Probability matrix

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C213.1	3	2	2	2	-	-	-	-	-	-	-	3	2	3	-
C213.2	3	3	2	2	-	-	-	-	-	-	-	3	3	3	-
C213.3	3	3	3	2	-	-	-	-	-	-	-	3	2	3	-
C213.4	3	3	3	3	-	-	-	-	-	-	-	3	3	3	-
C213.5	3	3	3	3	-	-	-	-	-	-	-	2	3	3	-
C213.6	3	3	3	3	-	-	-	-	-	-	-	2	2	3	-
C213	3	2.8	2.7	2.5	-	-	-	-	-	-	-	2.7	2.5	3	-

COURSE OUTCOMES (CO's)

Academic Year : 2022-23

Class **:** II YEAR-I SEM**.**

Course Name **:** COMPUTER ORGANIZATION & ARCHITECTURE (R20CSE2102)

C214.1	Understand the basics of instructions sets and their impact on processor design.
C214.2	Demonstrate an understanding of the design of the functional units of a digital computer system.
C214.3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
C214.4	Design a pipeline for consistent execution of instructions with minimum hazards.
C214.5	Recognize and manipulate representations of numbers stored in digital computers.
C214.6	To analyze processor performance improvement using instruction level parallelism

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C214.1	3	2	2	2	2	-	-	-	-	-	3	2	2	3	-
C214.2	3	2	2	2	2	-	-	-	-	-	2	2	1	3	-
C214.3	1	1	1	3	3	-	-	2	-	-	3	3	3	3	-
C214.4	1	2	2	-	2	-	-	-	-	-	2	2	1	2	-
C214.5	1	3	3	2	-	-	-	-	-	-	3	2	2	3	-
C214.6	3	1	1	2	3	-	-	-	-	-	3	3	3	3	-
C214	2	2	2	2	2.5	-	-	2	-	-	2.7	2.3	2	2.8	-

COURSE OUTCOMES (CO's)

Academic Year : 2022-23

Class **:** II YEAR-I SEM**.**

Course Name **:** PYTHON PROGRAMMING (R20CSE2104)

C215.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
C215.2	Demonstrate proficiency in handling Strings and File Systems.
C215.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C215.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C215.5	Implement exemplary applications related to Network Programming and Web Services in Python.
C215.6	Demonstrate about the database connections in python.

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C215.1	2	-	-	-	2	-	-	-	-	-	-	-	2	1	1
C215.2	2	2	3	1	2	-	-	-	-	-	1	-	2	2	1
C215.3	2	2	2	1	2	-	-	-	-	-	1	2	2	2	1
C215.4	2	2	3	1	2	-	-	-	1	-	2	-	2	2	1
C215.5	2	2	-	2	2	1	-	-	1	-	2	2	2	1	2
C215.6	2	2	2	2	2	1	-	-	3	3	2	-	2	2	2
C215	2	2	2	1.5	2	1	-	-	1.3	3	1.6	2	2	1.6	1.3

COURSE OUTCOMES (CO's)

Academic Year : 2022-23

Class **:** II YEAR-I SEM**.**

Course Name **:** BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (R20CSE2201)

C216.1	Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in market structures
C216.2	Gain and insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.
C216.3	Develop and understanding of market and different forms of business organization.
C216.4	Analyze how capital budgeting decisions are carried out.
C216.5	Understanding the framework for both manual and computerized accounting process.
C216.6	Know how to analyze and interpret the financial statement through ratio analysis.

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C216.1	-	3	-	-	-	-	-	3	2	-	3	3	-	-	-
C216.2	-	3	-	2	-	-	-	2	3	-	3	3	-	-	-
C216.3	-	3	-	2	-	-	-	2	1	-	-	3	-	-	-
C216.4	-	1	3	2	-	-	-	1	3	-	3	3	-	-	-
C216.5	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C216.6	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C216	-	2.6	1.5	2	-	-	-	2.33	2.5	-	2.5	3	-	-	-

R20CSE21L1-Data Structures Lab

C21L7.1	Understand the concept of data structures, python and apply algorithm for solving problems like Sorting, searching, insertion and deletion of data.
C21L7.2	Understand linear data structures for processing of ordered or unordered data.
C21L7.3	Explore various operations on dynamic data structures like single linked list, circular linked list and doubly linked list.
C21L7.4	Explore the concept of non-linear data structures such as trees and graphs.
C21L7.5	Understand the binary search trees, hash function, and concepts of collision and its resolution methods.
C21L7.6	Identify suitable data structure to solve various computing problems.

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C21L7.1	2	3	3	-	3	-	-	-	-	-	-	-	3	3	3
C21L7.2	1	2	2	2	3	-	-	-	-	-	-	-	3	3	3
C21L7.3	3	-	1	-	2	-	-	-	-	-	-	-	3	3	3
C21L7.4	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C21L7.5	2	-	-	1	3	-	-	-	-	-	-	-	3	3	3
C21L7.6	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C21L7	2.33	2.5	2	1.5	2.5	-	-	-	-	-	-	-	3	3	3

R20CSE21L4-Python Programming Lab

C21L8.1	Write, Test and Debug Python Programs.
C21L8.2	Implement Conditionals and Loops for Python Programs.
C21L8.3	Use functions and represent Compound data using Lists,
C21L8.4	Tuples and Dictionaries.
C21L8.5	Read and write data from & to files in Python and develop
C21L8.6	Application using Pygame.

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C21L8.1	2	3	3	-	3	-	-	-	-	-	-	-	3	3	3
C21L8.2	1	2	2	2	3	-	-	-	-	-	-	-	3	3	3
C21L8.3	3	-	1	-	2	-	-	-	-	-	-	-	3	3	3
C21L8.4	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C21L8.5	2	-	-	1	3	-	-	-	-	-	-	-	3	3	3
C21L8.6	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C21L8	2.33	2.5	2	1.5	2.5	-	-	-	-	-	-	-	3	3	3

R20MAC2100-Gender Sensitization Lab (An Activity-based Course)

C21L9.1	Understanding the important issues related to gender in contemporary India.
C21L9.2	Sensitize to basic dimensions of the biological, sociological, psychological and legal aspects of gender.
C21L9.3	Grasp of how gender discrimination works in our society and how to counter it.
C21L9.4	Acquire insight into the gendered division of labour and its relation to politics and economics.
C21L9.5	To develop a sense of appreciation of women in all walks of life.
C21L9.6	Equip to work and live together as equals.

COURSE ARTICULATION MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C21L9.1	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L9.2	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L9.3	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L9.4	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L9.5	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L9.6	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C219	2.33	2.5	2	1.5	2.5	3	3	3	3	3	3	3	-	-	3

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

Sheriguda Village, Ibrahimpatnam Mandal, Ranga Reddy Dist. – 501 510
Department Of Electronics & Communication Engineering

Vision of the Department

To be a centre of excellence in Electronics and Communication Engineering Education to produce professionals for ever-growing needs of society.

Mission of the Department

DM_1: To promote and facilitate student-centric learning.

DM_2: To involve in activities that enable overall development of stakeholders.

DM_3: To provide holistic environment with state-of-art facilities for students to develop solutions for various social needs.

DM_4: Organize trainings in Embedded Systems with Industry interaction.

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

Sheriguda Village, Ibrahimpatnam Mandal, Ranga Reddy Dist. – 501 510
Department Of Electronics & Communication Engineering

PROGRAM OUTCOMES (POs):

PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design / Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and

	responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

Sheriguda Village, Ibrahimpatnam Mandal, Ranga Reddy Dist. – 501 510
Department Of Electronics & Communication Engineering

PROGRAM SPECIFIC OUTCOMES(PSOs):

PSO1	**Basic Electronic and communications knowledge:** Apply basic knowledge related to electronic circuits, VLSI, communication systems, signal processing and embedded systems to solve engineering/societal problems.
PSO2	**Design Methods:** Design, verify and authenticate electronic functional elements for different applications, with skills to interpret and communicate results.
PSO3	**Experimentation & Communications:** Engineering and management concepts are used to analyze specifications and prototype electronic experiments/projects either independently or in teams.

Program Educational Objectives (PEOs):

PEO1	**Higher Degrees & Professional Employment:** Graduates with ability to pursue career in core industries or higher studies in reputed institution.
PE02	**Domain Knowledge:** Graduates with ability to apply professional knowledge/ skills to design and develop product or process.
PEO3	**Engineering Career:** Graduates with excellence in Electronics and Communication Engineering along with effective inter-personnel skills.
PEO4	**Lifelong Learning:** Graduates equipped with skills in recent technologies and be receptive to attain professional competence through life-long learning.

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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B. Tech. ELECTRONICS & COMMUNICATIONENGINEERING

REGULATIONS –18

(R18EEE2107) Network Theory

Course Outcomes:

At the end of the course the student will be able to:

C212.1. Apply the knowledge of basic Magnetic Circuits

C212.2. Analyze the planar networks by using Graph Theory

C212.3. Analyze the three phase circuits using Star Delta

C212.4. Evaluate Transient Response, Steady State response by using Laplace Transform method

C212.5. Evaluate Two Port network parameter and analyze the transmission line and transistor network

C212.6. Describe the basic filters and classifies the filters

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C212.1	3	3	3	-	-	-	-	-	-	-	-	-	3	2	-
C212.2	2	3	3	3	-	-	-	-	-	-	-	-	3	2	-
C212.3	3	3	2	2	2	-	-	-	-	-	-	-	3	2	-
C212.4	3	3	2	2	2	-	-	-	-	-	-	-	3	2	-
C212.5	3	3	2	2	2	-	-	-	-	-	-	-	3	2	-
C212.6	3	3	2	2	3	-	-	-	-	-	-	-	3	2	-
C212	**2.8**	**3**	**2.3**	**2.2**	**2.2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2**	**-**

(R18ECE2102) Digital Logic Design

Course Outcomes:

Upon completion of the course, students should possess the following skills:

C213.1 Interpret the various number systems & code converters, error detecting and correcting, BCD, Gray Code, EX-3. (K2-Understanding)

C213.2 Describe the operation of logic gates and Apply Boolean Algebra on K- map. (K3-Applying)

C213.3 Design / Analysis of Combinational Circuits. (K6-Create)

C213.4 Diagram illustrates the operation &timing constrains for Latches &Flip-Flops and Registers and Counters. (K4-Analyzing)

C213.5 Design &analyze sequential circuits. (K6-Create)

C213.6 Use HDL &appropriate EDA tools for digital logic design &simulation. (K3-Apply**)**

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C213.1	3	3	2	-	-	2	-	-	-	-	-	-	3	3	-
C213.2	3	3	2	-	-	-	-	-	-	-	-	-	3	3	-
C213.3	3	3	3	3	2	-	-	-	-	-	-	-	3	3	-
C213.4	3	3	3	3	2	-	-	-	-	-	-	-	3	3	-
C213.5	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C213.6	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C213	**3**	**3**	**2.6**	**3**	**2.5**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**-**

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(R18ECE2103) Signals and Systems

Course Outcomes:

Upon completing this course the student will be able to:

C214.1.Interpret any signal in terms of complete sets of orthogonal functions and understands the principles of basic signals.(K2-Understand)

C214.2 .Sketch Fourier spectrum by using Fourier series and Fourier transforms. (K3-Apply)

C214.3. Describe sampling theorem to reconstruct signal from its samples.(K2-Understand)

C214.4. Design a distortion less LTI system and derive filter characteristics of a system.(K6-Create)

C214.5. Test parsevals theorem and explain the concepts convolution, correlation in time domain and frequency domain.(K2-Understand)

C214.6. Analyze Lapalce Transforms, Fourier Transforms and Z-Transforms.(K4-Analyze)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C214.1	3	3	2	-	3	-	-	-	-	-	-	-	3	-	2
C214.2	3	3	3	-	3	-	-	-	-	-	-	-	3	-	2
C214.3	3	3	3	-	3	-	-	-	-	-	-	-	3	-	2
C214.4	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C214.5	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C214.6	3	3	3	2	3	-	-	-	-	-	-	-	3	-	3
C214	**3**	**3**	**2.8**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2.5**

(R18ECE2104) Probability Theory and Stochastic Processes

Outcomes:

Upon completion of the subject, students will be able to compute:

C215.1. Illustrate and formulate fundamental probability distribution and density functions, as well as functions of random variables (K3- Applying)

C215.2. Explain the concepts of expectation and conditional expectation, and describe their properties (K2- Understanding)

C215.3. Analyze continuous and discrete-time random processes (K4-Analyzing)

C215.4. Explain the concepts of stationary and wide-sense Stationarity, and appreciate their significance (K2- Understanding)

C215.5. Apply the theory of stochastic processes to analyze linear systems (K3- Applying)

C215.6. Apply the above knowledge to solve basic problems in filtering, prediction and smoothing (K3- Applying)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C215.1	3	-	2	2	-	-	-	-	-	-	-	-	3	3	-
C215.2	-	2	3	3	-	-	-	-	-	-	-	-	3	2	-
C215.3	3	3	3	2	-	-	-	-	-	-	-	-	3	3	-
C215.4	3	3	-	3	3	-	-	-	-	-	-	-	3	3	-
C215.5	3	3	-	3	3	-	-	-	-	-	-	-	3	3	-
C215.6	3	3	-	3	3	-	-	-	-	-	-	-	3	3	-
C215	**3**	**2.8**	**2.7**	**2.7**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.8**	**-**

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(R18ECE21L1) Electronic Devices and Circuits Lab

Outcomes:

Upon completion of the Course, students will be able to:

C216.1 Determine the P-N-Junction diode & Zener diode characteristics (K3-Apply).

C216.2 Calculate the Input and Output characteristics of BJT and FET (K3-Apply).

C216.3 Evaluate Half Wave and Full Wave Rectifier with and without filters (K5-Evaluate).

C216.4 Differentiate Measurement of h-parameters of transistor in CB, CE, CC configurations (K2-Understand).

C216.5 Analyse the Frequency response of CE, CC and Common Source FET Amplifier (K4-Analyse).

C216.6 Measure SCR and UJT characteristics (K5-Evaluate).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C216.1	3	3	-	-	2	-	-	-	2	-	-	2	3	-	3
C216.2	3	3	-	-	2	-	-	-	2	-	-	2	3	-	3
C216.3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	3
C216.4	3	3	2	-	2	-	-	-	2	-	-	2	3	-	3
C216.5	3	3	2	-	2.5	-	-	-	-	-	-	2	3	-	3
C216.6	3	3	2	-	2.5	-	-	-	-	-	-	2	3	-	3
C216	**3**	**3**	**2**	-	**2.1**	-	-	-	**2**	-	-	**2**	**3**	-	**3**

(R18ECE21L2) Digital Logic Design Lab

Outcomes:

Upon completion of the Course, students will be able to:

C217.1. Explain theory of Boolean Algebra & the Underlying features of various number systems. (K2-Understanding)

C217.2. Use the concepts of Boolean Algebra for the analysis &design of various combinational logic circuits. (K3-Apply)

C217.3. Use the concepts of Boolean Algebra for the analysis &design of various sequential logic circuits. (K3-Apply)

C217.4. Design various logic gates starting from simple ordinary gates to complex Programmable logic devices & arrays. (K6-Create)

C217.5. Analyze the various coding schemes are the part of the digital circuit design. (K4 -Analyse)

C217.6. Design of various circuits with the help of VHDL coding techniques. (K6-Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C217.1	3	3	2	-	-	2	-	-	-	-	-	-	3	3	-
C217.2	3	3	2	-	-	-	-	-	-	-	-	-	3	3	-
C217.3	3	3	3	3	2	-	-	-	-	-	-	-	3	3	-
C217.4	3	3	3	3	2	-	-	-	-	-	-	-	3	3	-
C217.5	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C217.6	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C217	**3**	**3**	**2.6**	**3**	**2.5**	**2**	-	-	-	-	-	-	**3**	**3**	-

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(R18ECE21L3) Basic Simulation Lab

Outcomes:

Upon completion of the Course, students will be able to:

C218.1.Interpret any signal in terms of complete sets of orthogonal functions and understands the principles of basic signals(K2-Understand)

C218.2 .Sketch Fourier spectrum by using Fourier series and Fourier transforms. (K3-Apply)

C218.3. Apply sampling theorem to reconstruct signal from its samples.(K2-Understand)

C218.4.Design a distortion less LTI system and derive filter characteristics of a system.(K6-Create)

C218.5. Determine convolution, correlation in time domain and frequency domain.(K2-Understand)

C218.6.Analyze Laplace Transforms, Fourier Transforms and Z-Transforms.(K4-Analyze)

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C218.1	3	3	2	-	3	-	-	-	-	-	-	-	3	-	2
C218.2	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C218.3	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C218.4	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C218.5	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C218.6	3	3	3	2	3	-	-	-	-	-	-	-	3	-	3
C218	**3**	**3**	**2.8**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2.8**

(R18MAC2100) Gender Sensitization Lab

Course Outcomes:

Upon completion of the Course, students will be able to:

219.1 Describe the important issues related to gender in contemporary India.

219.2 Predict basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.

219.3 Explain a finer grasp of how gender discrimination works in our society and how to counter it.

219.4 Show insight into the gendered division of labour and its relation to politics and economics.

219.5 Men and women students and professionals will be better equipped to work and live together as equals.

219.6 Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C219.1	-	-	-	-	-	2	2	3	-	2	-	-	3	-	2
C219.2	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219.3	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219.4	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219.5	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219.6	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219	**-**	**-**	**-**	**-**	**-**	**2.8**	**2.8**	**3**	**-**	**2.8**	**-**	**-**	**3**	**-**	**2.8**

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B.Tech. - II Year – II Semester

(R18MTH2201) Laplace Transforms, Numerical Methods & Complex Variables

Course outcomes:

After learning the contents of this paper the student must be able to

C221.1 Use the Laplace transforms techniques for solving ODE's (k3-apply)

C221.2 Calculate the root of a given Equation (k3-apply)

C221.3 Determine the value for the data using interpolation. (k3-apply)

C221.4 Evaluate the numerical solutions for a given ODE's (k5- evaluate)

C221.5 Analyse the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems (k4-analyse)

C221.6 Expand complex functions in Taylor's series & Laurent's series (k2- understand)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C221.1	3	3	3	2	-	-	-	-	-	-	-	3	-	-	-
C221.2	3	3	3	3	-	-	-	-	-	-	-	3	-	-	-
C221.3	3	3	3	2	-	-	-	-	-	-	-	3	-	-	-
C221.4	3	3	2	3	-	-	-	-	-	-	-	2	-	-	-
C221.5	3	3	2	3	-	-	-	-	-	-	-	2	-	-	-
C221.6	3	3	2	3	-	-	-	-	-	-	-	2	-	-	-
C221	**3**	**3**	**2.5**	**2.3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**-**	**-**	**-**

(R18ECE2201) Electromagnetic Theory and Transmission Lines

Course Outcomes:

Upon successful completion of the course, students will be able to:

C222.1. Differentiate the electric and magnetic field intensity ,flux density and maxwell's equations for electric and magnetic static fields (K2-Understand).

C222.2. Apply time varying maxwell's equations and their applications in electromagnetic propagation (K3-Apply).

C222.3. Select maxwell's equations to describe the propagation of electromagnetic waves in vaccume and dielectric media (K4-Analyse).

C222.4. Demonstrate the reflection and refraction of waves at boundaries (K3-Apply).

C222.5. Analyse basic transmission line parameters in phasor domain and basic wave guide operations and parameters (K4-Analyse).

C222.6. Measure the input and output impedances of transmission lines (K5-Evaluate).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C225.1	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
C225.2	3	3	-	-	-	-	-	-	-	-	-	-	3	2	-
C225.3	3	3	-	-	-	-	-	-	-	-	-	-	3	2	-
C225.4	3	3	3	-	-	-	-	-	-	-	-	-	3	3	-
C225.5	3	2	3	-	-	-	3	-	-	-	-	3	3	3	-
C225.6	3	2	3	-	-	-	2	-	-	-	-	2	3	3	-
C225	**3**	**2.7**	**3**	**-**	**-**	**-**	**2.5**	**-**	**-**	**-**	**-**	**2.5**	**3**	**2.6**	**-**

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(R18ECE2202) Analog and Digital Communications

Course Outcomes:

At the end of this course students will be able to :

C223.1. Differentiate various elements, processes, and parameters in communication systems, and describe their functions, effects, and interrelationship (K2-Understand).

C223.2. Analyze and compare different analog modulation schemes for their efficiency and Bandwidth (K4-Analyse).

C223.3. Illustrate the behavior of a communication system in presence of noise (K3-Apply).

C223.4. Describe pulse modulation system and analyze their system performance (K4-Analyse).

C223.5. Analyze different digital modulation schemes and to compute the bit error performance (K4-Analyse).

C223.6. Understand basic knowledge of optimum demodulation of digital signals (K2-Understand).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C223.1	3	-	3	3	3	-	-	-	-	-	-	-	3	2.5	-
C223.2	3	3	-	3	2	-	-	-	-	-	-	-	3	3	-
C223.3	3	2	3	2	3	-	-	-	-	-	-	-	3	2	-
C223.4	3	2	-	3	3	-	-	-	-	-	-	-	3	2	-
C223.5	3	3	-	3	2	-	-	-	-	-	-	-	3	2	-
C223.6	3	3	-	2	3	-	-	-	-	-	-	-	3	2	-
C223	**3**	**2.6**	**3**	**2.6**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.2**	**-**

(R18ECE2203) Linear and Digital IC Applications

Course Outcomes:

At the end of this course students will be able to :

C224.1.Interpret the operational amplifiers with linear integrated circuits (K2-Understand).

C224.2.Demonstrate the operational amplifiers for various applications (K3-Apply).

C224.3.Describe the circuits based on analog to digital and digital to analog converters (K2-Understand).

C224.4.Describe the different families of digital integrated circuits and their characteristics (K2-Understand).

C224.5.Analyze the concepts of combinational and sequential circuits (K4-Analyse).

C224.6.Evaluate the characteristics of memory and their classification (K5-Evaluate).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C224.1	3	2	3	2	-	-	-	-	-	-	-	-	3	2	-
C224.2	3	2	3	2	-	-	-	-	-	-	-	-	3	2	-
C224.3	3	2	-	2	-	-	-	-	-	-	-	-	3	2	-
C224.4	3	2	3	2	2	-	-	-	-	-	-	-	3	3	-
C224.5	3	3	3	2	2	-	-	-	-	-	-	-	3	3	-
C224.6	3	3	3	2	2	-	-	-	-	-	-	-	3	3	-
C224	**3**	**2.3**	**3**	**2**	**2**	-	-	-	-	-	-	-	**3**	**2.5**	-

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R18ECE2204) Electronic Circuit Analysis

Course Outcomes:

At the end of this course students will be able to :

C225.1. Interpret the single stage amplifiers and multi stage amplifiers. (K2-Understand)
C225.2. Analyze the DC bias circuitry of BJT and FET. (K4-Analyze)
C225.3. Describe the types of amplifier operation and characteristics. (K2-Understand)
C225.4. Test the operation of oscillators.(K5-Evaluate)
C225.5. Determine efficiency of power amplifier. (K3-Apply)
C225.6. Design tuned amplifiers and bandwidth by using BJT. (K6-Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C225.1	3	3	3	2	3	-	-	-	-	-	-	-	3	2	-
C225.2	3	3	-	2	3	-	-	-	-	-	-	-	3	2	-
C225.3	3	3	2	3	3	-	-	-	-	-	-	-	3	2	-
C225.4	3	3	2	3	3	-	-	-	-	-	-	-	3	2	-
C225.5	3	3	-	2	3	-	-	-	-	-	-	-	3	2	-
C225.6	3	3	3	2	3	-	-	-	-	-	-	-	3	2	-
C225	**3**	**3**	**2.5**	**2.3**	**3**	-	-	-	-	-	-	-	**3**	**2**	-

(R18ECE22L1) Analog and Digital Communications Lab

Course Outcomes:

At the end of this course students will be able to :

C226.1. Generate AM wave and calculate the modulation index of AM wave and predict the modulation index (β) of FM wave and simulate (K6-Create).
C226.2. Tabulate the values of gain in Pre-Emphasis & De-Emphasis and analyse and simulate various pulse modulation techniques (K4-Analyze)
C226.3. Interpret the input and output characteristics of AGC receivers and analyze simulate TDM and FDM multiplexing methods. (K4-Analyze)
C226.4. Describe the basic components of digital communication systems and base band data transmission concepts (K2-Understand)
C226.5. Analyze the error performance of the digital modulation techniques (K4-Analyze)
C226.6. Demonstrate the design of optimum receivers for the digital modulation techniques (K3-Apply)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C226.1	3	3	3	-	3	-	2	-	2	-	-	-	3	-	2
C226.2	3	3	3	-	3	-	2	-	2	-	-	-	3	-	2
C226.3	3	2	3	-	2	-	2	-	2	-	-	-	3	-	2
C226.4	2	-	3	-	3	-	2	-	2	-	-	-	3	-	2
C226.5	-	3	3	-	2	-	2	-	2	-	-	-	3	-	3
C226.6	-	2	3	-	2	-	2	-	2	-	-	-	3	-	2
C226	**2.7**	**2.6**	**3**	-	**2.5**	-	**2**	-	**2**	-	-	-	**3**	-	**2.16**

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(R18ECE22L2) IC Application Lab

Course Outcomes:

At the end of this course students will be able to :

C227.1.Understand the concepts of operational amplifier IC 741, Timer IC 555 & its specifications.(K2-Understand).

C227.2.Interpret the operational amplifiers with linear integrated circuits (K2-Understand).

C227.3.predict the operational amplifiers for various applications.(K3-Apply).

C227.4.Diagram illustrate the frequency response of first order HPF and LPF. (K4-Analyse).

C227.5.Sketch the circuits using operational amplifiers for waveform generator (K3-Apply).

C227.6.Calculate the pulsewidth of Mo

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C227.1	3	2	-	-	-	-	-	-	2	-	-	-	3	-	3
C227.2	3	3	2	-	-	-	-	-	2	-	-	-	3	-	2
C227.3	3	2	3	-	-	-	-	-	2	-	-	-	3	-	3
C227.4	3	-	3	3	3	-	-	-	2	-	-	-	3	-	2
C227.5	3	-	3	3	3	-	-	-	2	-	-	-	3	-	3
C227.6	3	-	3	3	3	-	-	-	2	-	-	-	3	-	3
C227	**3**	**2.3**	**3**	**3**	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	-	**2.6**

(R18ECE22L3) Electronic Circuit Analysis Lab

Course Outcomes:

At the end of this course students will be able to :

C228.1 Calculate the gain and bandwidth of common emitter and common base amplifier by using BJT (K3-Analysis).

C228.2 Calculate the gain and bandwidth of common emitter and common source and common gate amplifier by using FET (K3-Analysis).

C228.3 Differentiate gain and bandwidth of the single stage and two stage RC coupled amplifiers (K2- Understand).

C228.4 Analyze the values of gain in feedback amplifiers techniques (current shunt and voltage series) (K4-Analyse).

C228.5 Differentiate the theoretical and practical values of operating frequency in oscillators using transistors (K2-Understand).

C228.6 Measure the efficiency of class A and class b power amplifiers (K5-evaluate).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C228.1	3	-	3	2	-	-	-	-	2	-	-	-	3	-	2
C228.2	3	2	3	2	2	-	-	-	2	-	-	-	3	-	2
C228.3	3	2	3	2	2	-	-	-	2	-	-	-	3	-	2
C228.4	3	3	3	2	3	-	-	-	2	-	-	-	3	-	2
C228.5	3	3	3	3	3	-	-	-	2	-	-	-	3	-	2
C228.6	3	3	3	3	3	-	-	-	2	-	-	-	3	-	2
C228	**3**	**2.6**	**3**	**2.3**	**2.6**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**-**	**2**

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REGULATIONS –18

B.Tech. - III Year – I Semester

(R18MBA2201) Business Economics & Financial Analysis

Course out comes (COs):

C311.1. Understand the market demand and supply analysis and pricing in different market structures (K2-Understand).

C311.2. Analyze hoe production functions are carried out and analyze the cost (K4-Analyse).

C311.3. understand different markets and types of business organization (K2-Understand).

C311.4. Analyze how capital budgeting decisions are carried out (K4-Analyse).

C311.5. understand the framework for both manual and computerized accounting process (K2-Understand).

C311.6. Analyze and interpret financial statements through ratio analysis (K4-Analyse).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C311.1	-	3	3	2	-	3	3	-	-	-	2	-	-	-	-
C311.2	-	3	3	2	-	3	3	-	-	-	2	-	-	-	-
C311.3	-	3	3	2	-	3	3	-	-	-	2	-	-	-	-
C311.4	-	3	3	2	-	3	3	-	-	-	2	-	-	-	-
C311.5	-	3	3	2	-	3	3	-	-	-	2.5	-	-	-	-
C311.6	-	3	3	3	-	3	3	-	-	-	2.5	-	-	-	-
C311	**-**	**3**	**3**	**2.2**	**-**	**3**	**3**	**-**	**-**	**-**	**2.1**	**-**	**-**	**-**	**-**

(R18ECE3101) Microprocessors & Microcontrollers

Course Outcomes:

At the end of this course students will be able to :

C312.1 Describe the internal details of microprocessors 8086

C312.2 Interpret the various types of instruction sets of microprocessor 8086 to write programs.

C312.3 Analyze and apply different interfacing techniques to interface I/O devices with microprocessor 8086.

C312.4 Describe the internal details of microcontroller 8051

C312.5 Interpret the various types of instruction sets of microcontroller 8051 to write programs.

C312.6 Analyze and apply different programming techniques to control its supporting peripheral devices in real time.

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C312.1	3	2	3	2	-	-	-	-	-	-	-	-	3	2	-
C312.2	3	3	3	2	-	-	-	-	-	-	-	-	3	3	-
C312.3	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C312.4	3	2	3	3	-	-	-	-	-	-	-	-	3	3	-
C312.5	3	3	3	3	**2**	-	-	-	-	-	-	-	3	3	-
C312.6	3	3	3	3	**3**	-	-	-	-	-	-	-	3	3	-
C312	**3**	**2.6**	**3**	**2.6**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.8**	**-**

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REGULATIONS –18

(R18INF3103) Data Communications and Networks

Course Outcomes:

At the end of this course students will be able to :

C313.1 Understand the terminology and concepts of the OSI reference model and the TCP-IP reference model.(Understand)

C313.2 Demonstrate the transmission media, design issues and determine the CRC codes.(Apply)

C313.3 Classify the various protocols of physical layer and MAC layer.(Analyse)

C313.4 Explain the design issues, switching and evaluate the routing algorithms of network layer. (Evaluate)

C313.5Examine the various Internetworking and Internet Transport protocols.(Apply)

C313.6 Design a network based on a specified network layer protocols.(Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C313.1	3	1	2	3	-	3	-	-	-	-	-	-	-	-	-
C313.2	3	3	2	1	-	2	-	-	-	-	-	-	-	-	-
C313.3	2	3	2	2	-	2	-	-	-	-	-	-	-	-	-
C313.4	3	3	2	2	-	1	-	-	-	-	-	-	-	-	-
C313.5	3	3	3	2	-	1	-	-	-	-	-	-	-	-	-
C313.6	2	2	3	2	-	2	-	-	-	-	-	-	-	-	-
C313	**2.6**	**2.5**	**2.3**	**2**	**-**	**1.8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

(R18EEE2202) Control Systems

Course Outcomes:

At the end of this course students will be able to :

C314.1. Classify the control systems and feedbacks (K4-Analyse)

C314.2. Sketch the block diagram of electrical systems and signal flow graphs (K3-Apply)

C314.3. Analyze the time response and transient response of first order, second order systems proportional derivative proportional integral systems stability of control systems in S- domain through RH criteria (K4-Analyse)

C314.4.Sketch the root locus by adding poles and zeros (K3-apply)

C314.5.Analyse the frequency response of system from bode plots, polar plots and nyquist plots(K4- analyse)

C314.6.Compare the state transition matrix with transfer function (K5-Evaluate)

course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C314.1	3	2	2	2	-	-	-	-	-	-	-	-	3	-	-
C314.2	3	3	2	3	-	-	-	-	-	-	-	-	3	-	-
C314.3	3	3	2	3	-	-	-	-	-	-	-	-	3	-	-
C314.4	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
C314.5	3	3	2	3	3	-	-	-	-	-	-	-	3	-	-
C314.6	3	-	3	-	2	-	-	-	-	-	-	-	3	-	-
C314	**3**	**2.8**	**2.3**	**2.8**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**

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REGULATIONS –18

Professional Elective - I

(R18CSE3114) Computer Organization & Operating Systems

Course Outcomes:

At the end of this course students will be able to :

C315.1. Conceptually understand basic structure of computer, register transfer language and micro operations. (K2-Understanding)

C315.2 Understand working process and design of micro programmed control unit. (K2-Understanding)

C315.3. Understand concepts of memory, input-output organization. (K2-Understanding)

C315.4 Understand functions, services of operating system. (K2-Understanding)

C315.5 Understand memory management, dead lock and file management concepts. (K2 Understanding)

C315.6 Design operating system (K6-Creating)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C315.1	2	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C315.2	2	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C315.3	2	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C315.4	2	2	3	-	3	-	-	-	-	-	-	-	-	-	-
C315.5	2	2	3	-	3	-	-	-	-	-	-	-	-	-	-
C315.6	3	3	3	-	3	-	-	-	-	-	-	-	-	-	-
C315	**2.2**	**2.2**	**2.5**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

(R18ECE31L1) Microprocessors & Microcontrollers Lab

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C316.1. Develop the programs for 16-bit arithmetic operation, sorting, searching, string manipulations on 8086 microprocessor. (K6-Creating)

C316.2. Design and develop program for digital clock, parallel communication using 8255 and serial communication using 8251. (K6-Creating)

C316.3. Demonstrate and write program for interfacing ADC, DAC and stepper motor to 8086. (K3-apply)

C316.4. Develop the programs for arithmetic, logical and bit manipulation instructions of 8051 and verify Timer/counter, interrupt handling in 8051 microcontroller. (K6-Creating)

C316.5. Demonstrate the interfacing of LCD and Matrix/keyboard to 8051 and communication between 8051 kit and PC. (K3-apply)

C316.6. Develop the program for UART and data transfer program from peripheral to memory through DMA controller 8237/8257. (K6-Creating)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C316.1	3	2	2	3	-	-	-	-	2	-	-	-	3	-	3
C316.2	3	2	3	3	-	-	-	-	2	-	-	-	3	-	3
C316.3	3	2	3	2	-	-	-	-	2	-	-	-	3	-	3
C316.4	3	3	3	3	2	-	-	-	2	-	-	-	3	-	3
C316.5	3	3	3	2	3	-	-	-	2	-	-	-	3	-	3
C316.6	3	3	3	2	3	-	-	-	2	-	-	-	3	-	3
C316	**3**	**2.5**	**2.8**	**2.5**	**2.6**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**-**	**3**

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REGULATIONS –18

(R18INF31L2) Data Communications and Networks Lab

Course Outcomes:

C317.1. Apply appropriate algorithm for the finding of shortest route. (K3-Apply)
C317.2. Develop the routing table System / Software Requirement. (K6-Create)
C317.3. Analysis the performance of various protocols in different layers. (K4-Analyze)
C317.4. Create communication between two desktop computers. (K6-Create)
C317.5. Apply appropriate algorithm for the finding of shortest route. (K3-Apply)
C317.6. Use appropriate network tools to build network topologies. (K3-Apply)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C317.1	3	2	2	3	-	-	-	-	2	2	-	-	3	-	3
C317.2	3	2	3	3	-	-	-	-	2	2	-	-	3	-	3
C317.3	3	2	3	2	-	-	-	-	2	2	-	-	3	-	3
C317.4	3	3	3	3	3	-	-	-	2	3	-	-	3	-	3
C317.5	3	3	3	2	3	-	-	-	2	2	-	-	3	-	3
C317.6	3	3	3	2	3	-	-	-	2	2	-	-	3	-	3
C317	**3**	**2.5**	**2.8**	**2.5**	**3**	**-**	**-**	**-**	**2**	**2**	**-**	**-**	**3**	**-**	**3**

(R18HAS31L1) Advanced Communication Skills Lab

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C318.1. Speak effectively (Apply, K3)

C318.2. Express and communicate fluently and appropriately in social professional contexts (Apply, K3)

C318.3.The development of comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects (Understand K2)

C318.4.The awareness of English lab enriches their communication and soft skills contributing to their overall development and success(Analyze, K4)

C318.5. Draft various letters and reports for all official purpose (Create K6)

C318.6. Take part in social and professional communication (Apply, K3)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C318.1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
C318.2	-	-	-	-	2	-	-	-	2	2	-	2	-	-	-
C318.3	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-
C318.4	-	-	2	2	2	-	2	-	2	2	-	2	-	-	-
C318.5	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-
C318.6	-	-	-	-	3	-	2	-	-	-	-	3	-	-	-
C318	**-**	**-**	**2**	**2**	**2.2**	**-**	**2**	**-**	**2**	**2**	**-**	**2.2**	**-**	**-**	**-**

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REGULATIONS –18

B.Tech. - III Year – II Semester

(R18ECE3201) Antennas and Wave Propagation

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C321.1. Explain basic terminology and concepts of Antennas (K2-Understanding).

C321.2. Discuss the basic parameters those are considered in the antenna design process and the analysis (K2-Understanding).

C321.3. Calculate the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis (K3-apply).

C321.4. Select designed antenna and field evaluation under various conditions(K4-Analyse).

C321.5. design antennas that suits the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure (K6-Creating).

C321.6. Design the bench setup for antenna parameter measurement of testing for their effectiveness (K6-Creating).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C321.1	3	-	3	-	-	2	-	-	-	-	-	-	3	2	-
C321.2	3	2	3	-	2	2	-	-	-	-	-	-	3	3	-
C321.3	3	3	3	-	2	3	-	-	-	-	-	-	3	3	-
C321.4	3	3	2	-	2	3	-	-	-	-	-	-	3	2	-
C321.5	3	3	3	-	2	3	-	-	-	-	-	-	3	3	-
C321.6	3	3	3	-	3	3	-	-	-	-	-	-	3	2	-
C321	**3**	**2.7**	**2.8**	**-**	**2.2**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.5**	**-**

(R18ECE3202) Digital Signal Processing

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C322.1 Restate time, frequency and Z - transform analysis on signals and systems. (K2 Understand)

C322.2 Differentiate the inter-relationship between DFT and various transforms. (K2 Understand)

C322.3 Analyze the Fast computation of DFT and appreciate the FFT processing (K4 Analyze)

C322.4 Analyze IIR Digital Filters for a given specifications (K4 Analyze)

C322.5 Design FIR Digital filters using Window Techniques. (K6 Create)

C322.6 Evaluate the multi rate DSP techniques and finite word length effects. (K5 Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C322.1	3	3	2	-	-	2	-	-	-	-	-	-	3	2	-
C322.2	3	3	2	-	-	3	-	-	-	-	-	-	3	-	-
C322.3	3	3	3	-	-	2	-	-	-	-	-	-	3	-	-
C322.4	3	3	3	-	2	2	-	-	-	-	-	-	3	-	-
C322.5	3	3	3	-	3	2	-	-	-	-	-	-	3	3	-
C322.6	3	3	3		3	2	-	-	-	-	-	-	3	-	-
C322	**3**	**3**	**2.6**	**-**	**2.6**	**2.2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.5**	**-**

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REGULATIONS –18

(R18ECE3203) VLSI Design

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C323.1. Describe the fabrication process of integrated circuit using MOS transistors. (K2-Understand)

C323.2. Choose an appropriate inverter depending on specifications required for a circuit. (K4-analyse)

C323.3. Sketch the layout and estimate parasitics of any logic circuit. (K3-Apply)

C323.4. Design different types of logic gates using CMOS inverter. (K6- Create)

C323.5. Design building blocks of datapath using gates and memories using MOS transistors. (K6-Create)

C323.6. Design Programmable logic devices and interpret the concept of testing to improve testability of system. (K6-Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C323.1	3	2	-	-	-	-	-	-	-	-	-	3	3	2.5	-
C323.2	3	3	3	2	-	-	-	-	-	-	-	3	3	2.5	-
C323.3	3	3	3	2	-	-	-	-	-	-	-	2	3	3	-
C323.4	3	3	3	3	-	-	-	-	-	-	-	3	3	2	-
C323.5	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C323.6	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C323	**3**	**2.8**	**3**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**3**	**2.3**	**-**

Professional Elective - II

(R18ECE3221) Embedded System Design

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C324.1. Explain the history ,classification, characteristics, applications ,quality attributes and purpose of embedded systems(K2-Understand)

C324.2. Describe the core of the embedded systems and categorize the types of memories and memory selection sensors and actuators and communication interfaces (K2-Understand)

C324.3. Apply the various embedded systems hardware circuits and embedded firmware design approaches and Development languages (K3-Apply)

C324.4. Discuss the basics of Operating systems and RTOS and explain multitasking and multiprocessing. (K2-Understand)

C324.5. Select the task communication via shared memory Message Passing, Remote Procedure Call and Sockets and explain the Device Drivers (K4-Analyse)

C324.6. Predict the Task Communication/Synchronization Issues and Techniques, and choose an RTOS. (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C324.1	3	-	2	3	3	-	-	-	-	-	-	-	3	2	-
C324.2	3	2	3	-	2	-	-	-	-	-	-	-	3	2	-
C324.3	3	-	3	2	3	-	-	-	-	2	-	-	3	3	-
C324.4	3	2	3	-	3	-	-	-	-	2	-	-	3	3	-
C324.5	3	2	2	-	2	-	-	-	-	-	-	-	3	3	-
C324.6	3	3	2	-	3	-	-	-	-	2	-	-	3	3	-

C324	**3**	**2.2**	**2.5**	**2.5**	**2.7**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**3**	**2.7**	**-**

(R18ECE3273) Consumer Electronics

Course Outcomes:

C325.1. summarize the consumer electronics fundamentals and explain about microprocessors and microcontrollers, energy management and intelligent building perspective (K2-Understand)

C325.2. Demonstrate Audio systems, Display systems, video systems and recording systems (K3-Apply)

C325.3. Describe the smart Home, Home Virtual Assistants, Home security systems and Different types of sensors (K2-Understand)

C325.4. Outline the home enablement systems like RFID Home, kitchen electronics and smart alarms, smart toilet, smart floor and smart locks. (K4-Analyse)

C325.5. Discuss cordless telephones, Fax machines PDA's TABLETs Smart phones and Smart watches.

C325.6. Compare and explain Android and iOS and demonstrate Video conferencing systems, Internet enabled systems, Wi-Fi, Li-Fi, GPS and Tracking systems. (K5-Evaluate)

(R18ECE32L1) Digital Signal Processing Lab

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C326.1. Generate sinusoidal waveforms on recursive difference equation and through filtering and DTMF signals. (K6-Create)

C326.2. Sketch the characteristic of FFT of a given sequence for LP FIR,HP FIR,LP IIR,HP IIR filters.(K3-Apply)

C326.3. Calculate the DFT/IDFT of given DT signal and show the frequency response of given system. Impulse response of first order and second order systems. (K3-Apply)

C326.4. Determine the power spectrum of a given sequence. (K3-Apply)

C326.5. Diagram illustrates of Decimation, Interpolation and I/D sampling rate converters. (K4-Analyse)

C326.6. Experiment the audio application and noise removal. (K3-Apply)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C326.1	3	2	3	3	3	-	-	-	-	-	-	-	3	-	3
C326.2	3	3	3	3	3	-	-	-	-	-	-	-	3	-	3
C326.3	3	3	2	2.5	2	-	-	-	-	-	-	-	3	-	3
C326.4	3	3	3	2	3	-	-	-	-	-	-	-	3	-	3
C326.5	3	3	2	2.5	2	-	-	-	-	-	-	-	3	-	3
C326.6	3	3	2	2	2	-	-	-	-	-	-	-	3	-	3
C326	**3**	**2.8**	**2.5**	**2.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**3**

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REGULATIONS –18

(R18ECE32L2) E – CAD Lab

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C327.1. Describe Verilog hardware description languages (HDL) (K2-Understand).

C327.2. Design various logic gates using HDL. (K6-Create)

C327.3. Use the concepts of Boolean algebra for the analysis &design of various combinational logic circuits. (K3-Apply)

C327.4. Use the concepts of Boolean algebra for the analysis &design of various sequential logic circuits. (K3-Apply)

C327.5. Design Entry, simulation of flip-flop circuits with test bench & functional verification. (K6-Create)

C327.6. Describe the Finite state machine (K2-Understand).

B.Tech. - IV Year – I Semester

(R18ECE4101) Microwave and Optical Communication

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C411.1. Analyze the (microwave active devices) various Microwave solid state devices, Bipolar transistors, FET, & microwave tubes. (K4- ANALYZE)

C411.2. Demonstrate the (microwave active devices) waveguide multiport junctions, ferrite devices. (K3- APPLY)

C411.3. Measure the scattering matrix and microwave parameters using Microwave Bench setup (K5- EVALUATE)

C411.4. Describe the constructional parameters of optical fibers and calculate the losses. (K3-Apply)

C411.5. Explain the optical sources and choose the optical detectors. (K4-Analyse)

C411.6. Evaluate optical system, power budget analysis and networking. (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C411.1	3	3	3	-	3	-	-	-	-	-	-	2	3	3	-
C411.2	3	2	3	3	3	-	-	-	-	-	-	2	3	2	-
C411.3	3	3	-	3	3	-	-	-	-	-	-	2	3	3	-
C411.4	3	3	-	2	3	-	-	-	-	-	-	3	3	3	-
C411.5	3	2	3	-	3	-	-	-	-	-	-	2	3	2	-
C411.6	3	3	3	3	3	-	-	-	-	-	-	2	3	3	-
C411	**3**	**2.7**	**3**	**2.7**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**2.2**	**3**	**2.7**	**-**

(R18HAS4101) Professional Practice, Law & Ethics

Goals & Outcomes:

- To familiarise the students to what constitutes professional practice, introduction of various stakeholders and their respective roles; understanding the fundamental ethics governing the profession
- To give a good insight into contracts and contracts management in civil engineering, dispute resolution mechanisms; laws governing engagement of labour
- To give an understanding of Intellectual Property Rights, Patents.
- To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
- To develop good ideas of the legal and practical aspects of their profession

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REGULATIONS –18

Professional Elective - III

(R18ECE4131) Digital Image Processing

Course Outcomes:

Upon successfully completing the course, the student should:

C413.1: Define basics of images and analyze the various advanced image transforms and their Properties. (K3-Apply).

C413.2: Discuss different techniques employed for the enhancement (spatial and frequency domain) and restoration of images. (K2-Understanding).

C413.3: Determine degradation model and calculate various restoration techniques. (K3-Apply).

C413.4: Analyze the concepts of segmentation and various basic morphological operations in image processing. (K4-Analyse).

C413.5: Describe the various compression techniques and explain redundancies and their removal methods. (K2-understanding).

C413.6: Evaluate various compression coding techniques and compare JPEG standards. (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C413.1	3	2	-	-	-	1	-	-	-	-	-	2	3	-	-
C413.2	3	3	-	-	-	1	-	-	-	-	-	2	3	2	-
C413.3	3	3	2	-	-	2	-	-	-	-	-	2	3	-	-
C413.4	3	2	2	-	-	2	-	-	-	-	-	2	3	2	-
C413.5	3	3	2	-	-	-	-	-	-	-	-	3	3	2	-
C413.6	3	2	2	-	-	2	-	-	-	-	-	3	3	3	-
C413	**3**	**2.5**	**2**	**-**	**-**	**1.6**	**-**	**-**	**-**	**-**	**-**	**2.5**	**3**	**2.2**	**-**

Professional Elective - IV

(R18ECE4141) Cellular & Mobile Communications

Course Outcomes:

After the course the student should be able to:

C414.1. Analyse the fundamental techniques to overcome the difficult fading effects(K4-Analyse)

C414.2. Interpret the cellular concepts /Frequency reuse (K2 –Understand)

C414.3. Describe the co-channel and non co channel interferences (K2-Understand)

C414.4. Illustrate the cell coverage for signal and traffic, diversity techniques and mobile antennas (K3-Apply)

C414.5. Outline the frequency management and channel assignment (K4-Analyse)

C414.6. Explain the types of handoff and handoff's strategies (K2-Understand)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C414.1	3	2	2	-	-	-	2	-	-	-	-	2	3	2	-
C414.2	3	2	2	-	-	-	2	-	-	-	-	2	3	2	-
C414.3	3	2	3	-	-	-	2	-	-	-	-	2	3	2	-
C414.4	3	2	3	-	-	-	2	-	-	-	-	2	3	2	-
C414.5	3	2	-	-	-	-	2	-	-	-	-	2	3	3	-
C414.6	3	2	-	-	-	-	2	-	-	-	-	2	3	3	-
C414	**3**	**2**	**2.5**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**3**	**2.3**	**-**

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REGULATIONS –18

(R18ECE4183) Principles of Modern Communication Systems

Course outcomes

After completion of the course, students will be able to:

C415.1. Differentiate various elements, processes, and parameters in communication systems, and describe their functions, effects, and interrelationship (K2-Understand).

C415.2. Interpret the mobile cellular concepts, standards and all generations of cellular systems. (K2-understand)

C415.3. Describe the existing and emerging wireless standards and Compare various wireless networks and their specifications. (K5-Evaluate)

C415.4. Demonstrate the history of Satellite communication, applications and orbit concepts, Placement of a Satellite in a Geo-Stationary orbit and GPS concept (K3- Apply)

C415.5 Summarize the radar fundamentals and analysis of the radar signals. (K4- Analyze)

C415.6 Explain the Navigation systems (K2-Understand).

(R18ECE41L1) Microwave & Optical Communications Lab

Course outcomes (COs):

After completion of the course, students will be able to:

C416.1. Analyze the characteristic of microwave tubes and compare them (K4- Analyze)

C416.2. Explain the various Microwave solid state devices. (K2-Understand)

C416.3. Measure the scattering matrix and microwave parameters using Microwave Bench setup (K5- Evaluate)

C416.4. Calculate the power dividing properties of various Microwave junctions, directional couplers & ferrite devices.(K3-Apply)

C416.5. Analyze the optical sources like LED and LASER diode (K4-Analyze)

C416.6. Calculate the Data rate for Digital Optical Link, NA and losses in Analog Optical Link. (K3-Apply)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C416.1	3	3	2	-	-	2	-	-	2	-	-	-	3	-	2
C416.2	3	3	3	-	-	2	-	-	-	-	-	-	3	-	3
C416.3	3	2	3	-	-	2	-	-	-	-	-	-	3	-	2
C416.4	3	2	3	-	3	3	-	-	2	-	-	-	3	-	3
C416.5	3	3	3	-	2	3	-	-	2	-	-	-	3	-	3
C416.6	3	3	3	-	3	2	-	-	2	-	-	-	3	-	3
C416	**3**	**2.6**	**2.8**	**-**	**2.6**	**2.1**	**-**	**-**	**2**	-	-	**-**	**3**	**-**	**2.6**

B.Tech. - IV Year – II Semester

Professional Elective - V (R18ECE4251) Satellite Communications

Course Outcomes:

After completion of the course, students will be able to:

C421.1. Describe the history, frequency allocations, applications and orbit concepts and Placement of a Satellite in a Geo-Stationary orbit (K2- Understand)

C421.2. Demonstrate satellite Subsystems like Attitude and Orbit Control system, Telemetry, Tracking, Command Satellite Antenna Equipment.(K3-Apply)

C421.3. Apply the system Noise Temperature and G/T ratio, Link and Interference Analysis, and design of satellite Links for a specified C/N, Link Budget .(K3-Apply)

C421.4. explain the different attenuations and classify the multiple access systems (K4 Analyse)

C421.5. Describe the earth station technology, Power Test Methods, Lower Orbit Considerations. Navigation and GPS (K2-Understand)

C421.6. Compare the different satellite packet communications (K5-Evaluate)

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REGULATIONS –18

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C421.1	3	3	-	-	-	-	-	-	-	-	-	2	3	3	-
C421.2	3	3	3	-	-	-	-	-	-	-	-	-	3	2	-
C421.3	3	2	3	2	3	-	-	-	-	-	-	2	3	3	-
C421.4	3	-	3	3	-	-	-	-	-	-	-	2	3	3	-
C421.5	3	-	-	-	-	-	-	-	-	-	-	2	3	**2**	-
C421	**3**	**2.6**	**3**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**2.7**	**-**

Professional Elective – V (R18ECE4253) Wireless Sensor Networks

Course outcomes

After completion of the course, students will be able to:

C421.1. Understand the basis of wireless sensor networks (K2-Understand).

C421.2. Illustrate the state-of-the-art in wireless sensor networks, architectures and applications (K3-Apply)

C421.3. Describe the design, frame work and the performance of MAC layer protocols of wireless sensor networks (K2-Understand).

C421.4. Analyze existing network layer protocols and routing metrics (K4- Analyze)

C421.5. Explain time Synchronization protocols in wireless sensor networks (K2-Understand).

C421.6. Interpret the fundamentals and challenges of security in wireless sensor networks (K2-Understand).

(R18ECE4261) Wireless Communication & Networks

Course Outcomes:

Upon completion of the course, the students will be able to:

C422.1. Define and explain the cellular concepts and all design fundamentals. (K2-understand)

C422.2. Demonstrate the Radio wave propagation indoor and outdoor propagation models. (K3-Apply)

C422.3. Illustrate the small scale fading and multipath measurements. (K3-Apply)

C422.4. Analyze the various Equalization & Diversity techniques used in wirelesscommunication.(K4- Analyze)

C422.5. Describe some of the existing and emerging wireless standards. (K2-understand)

C422.6. Compare various wireless area networks and their specifications. (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C422.1	3	2	3	-	-	2	-	-	-	-	-	2	3	3	-
C422.2	3	2	3	-	2	2	-	-	-	-	-	2	3	3	-
C422.3	3	2	3	-	2	2	-	-	-	-	-	2	2	2	-
C422.4	3	-	2	-	2	2.5	-	-	-	-	-	2	2	2	-
C422.5	3	-	3	-	3	2.5	-	-	-	-	-	-	3	2	-
C422.6	3	-	-	-	-	2	-	-	-	-	-	-	3	3	-
C422	**3**	**2**	**2.8**	**-**	**2.2**	**2.1**	**-**	**-**	**-**	**-**	**-**	**2**	**2.6**	**2.5**	**-**

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REGULATIONS –20

B.Tech. - II Year – I Semester

(R20ECE2101) Electronic Devices and Circuits

Course Outcomes:

At the end of the course the student will be able to:

C211.1. Describe the construction, operation and characteristics of electronic devices like P-N Junction and special Purpose diodes (K2-Understand).

C211.2. Determine the application of diode as a rectifier (K3-Apply)

C211.3. Illustrate the application of transistors as amplifier employing BJT devices (K3-Apply)

C211.4 Analyse the Biasing circuits using BJT Transistor Amplifier Circuit (K4-Analyse)

C211.5 Evaluate construction, operation and characteristics of FET (K5-Evaluate)

C211.6 Select Biasing circuits using FET Amplifiers (K4-Analyse)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C211.1	3	3	-	-	-	-	-	-	-	-	-	-	3	2	2
C211.2	3	3	-	-	-	-	-	-	-	-	-	-	3	2	2
C211.3	3	2	3	3	-	2	-	-	-	-	-	-	3	2	2
C211.4	3	2	3	3	-	2	-	-	-	-	-	-	3	2	3
C211.5	3	2	3	3	-	2	-	-	-	-	-	-	3	2	3
C211.6	3	2	3	3	-	3	-	-	-	-	-	-	3	2	3
C211	**3**	**2.3**	**3**	**3**	**-**	**2.2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2**	**2.5**

(R20EEE2104) Network Theory

Course Outcomes:

At the end of the course the student will be able to:

C212.1. Apply the knowledge of basic Magnetic Circuits

C212.2. Analyze the planar networks by using Graph Theory

C212.3. Analyze the three phase circuits using Star Delta

C212.4. Evaluate Transient Response, Steady State response by using Laplace Transform method

C212.5. Evaluate Two Port network parameter and analyze the transmission line and transistor network

C212.6. Describe the basic filters and classifies the filters

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C212.1	3	3	3	-	-	-	-	-	-	-	-	-	3	2	-
C212.2	2	3	3	3	-	-	-	-	-	-	-	-	3	2	-
C212.3	3	3	2	2	2	-	-	-	-	-	-	-	3	2	-
C212.4	3	3	2	2	2	-	-	-	-	-	-	-	3	2	-
C212.5	3	3	2	2	2	-	-	-	-	-	-	-	3	2	-
C212.6	3	3	2	2	3	-	-	-	-	-	-	-	3	2	-
C212	**2.8**	**3**	**2.3**	**2.2**	**2.2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2**	**-**

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REGULATIONS –20

(R20ECE2102) Digital Logic Design

Course Outcomes:

Upon completion of the course, students should possess the following skills:

C213.1 Interpret the various number systems & code converters, error detecting and correcting, BCD, Gray Code, EX-3. (K2-Understanding)

C213.2 Describe the operation of logic gates and Apply Boolean Algebra on K- map. (K3-Applying)

C213.3 Design / Analysis of Combinational Circuits. (K6-Create)

C213.4 Diagram illustrates the operation &timing constrains for Latches &Flip-Flops and Registers and Counters. (K4-Analyzing)

C213.5 Design &analyze sequential circuits. (K6-Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C213.1	3	3	2	-	-	2	-	-	-	-	-	-	3	3	-
C213.2	3	3	2	-	-	-	-	-	-	-	-	-	3	3	-
C213.3	3	3	3	3	2	-	-	-	-	-	-	-	3	3	-
C213.4	3	3	3	3	2	-	-	-	-	-	-	-	3	3	-
C213.5	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C213	**3**	**3**	**2.6**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**-**

(R20ECE2103) Signals and Systems

Course Outcomes:

Upon completing this course the student will be able to:

C214.1.Interpret any signal in terms of complete sets of orthogonal functions and understands the principles of basic signals.(K2-Understand)

C214.2 .Sketch Fourier spectrum by using Fourier series and Fourier transforms. (K3-Apply)

C214.3. Describe sampling theorem to reconstruct signal from its samples.(K2-Understand)

C214.4. Design a distortion less LTI system and derive filter characteristics of a system.(K6-Create)

C214.5. Test parsevals theorem and explain the concepts convolution, correlation in time domain and frequency domain.(K2-Understand)

C214.6. Analyze Lapalce Transforms, Fourier Transforms and Z-Transforms.(K4-Analyze)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C214.1	3	3	2	-	3	-	-	-	-	-	-	-	3	-	2
C214.2	3	3	3	-	3	-	-	-	-	-	-	-	3	-	2
C214.3	3	3	3	-	3	-	-	-	-	-	-	-	3	-	2
C214.4	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C214.5	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C214.6	3	3	3	2	3	-	-	-	-	-	-	-	3	-	3
C214	**3**	**3**	**2.8**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2.5**

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REGULATIONS –20

(R20ECE2104) Probability Theory and Stochastic Processes

Outcomes:

Upon completion of the subject, students will be able to compute:

C215.1. Illustrate and formulate fundamental probability distribution and density functions, as well as functions of random variables (K3- Applying)

C215.2. Explain the concepts of expectation and conditional expectation, and describe their properties (K2- Understanding)

C215.3. Analyze continuous and discrete-time random processes (K4-Analyzing)

C215.4. Explain the concepts of stationary and wide-sense Stationarity, and appreciate their significance (K2- Understanding)

C215.5. Apply the theory of stochastic processes to analyze linear systems (K3- Applying)

C215.6. Apply the above knowledge to solve basic problems in filtering, prediction and smoothing (K3- Applying)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C215.1	3	-	2	2	-	-	-	-	-	-	-	-	3	3	-
C215.2	-	2	3	3	-	-	-	-	-	-	-	-	3	2	-
C215.3	3	3	3	2	-	-	-	-	-	-	-	-	3	3	-
C215.4	3	3	-	3	3	-	-	-	-	-	-	-	3	3	-
C215.5	3	3	-	3	3	-	-	-	-	-	-	-	3	3	-
C215.6	3	3	-	3	3	-	-	-	-	-	-	-	3	3	-
C215	**3**	**2.8**	**2.7**	**2.7**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.8**	**-**

(R20ECE21L1) Electronic Devices and Circuits Lab

Outcomes:

Upon completion of the Course, students will be able to:

C216.1 Determine the P-N-Junction diode & Zener diode characteristics (K3-Apply).

C216.2 Calculate the Input and Output characteristics of BJT and FET (K3-Apply).

C216.3 Evaluate Half Wave and Full Wave Rectifier with and without filters (K5-Evaluate).

C216.4 Differentiate Measurement of h-parameters of transistor in CB, CE, CC configurations (K2-Understand).

C216.5 Analyse the Frequency response of CE, CC and Common Source FET Amplifier (K4-Analyse).

C216.6 Measure SCR and UJT characteristics (K5-Evaluate).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C216.1	3	3	-	-	2	-	-	-	2	-	-	2	3	-	3
C216.2	3	3	-	-	2	-	-	-	2	-	-	2	3	-	3
C216.3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	3
C216.4	3	3	2	-	2	-	-	-	2	-	-	2	3	-	3
C216.5	3	3	2	-	2.5	-	-	-	-	-	-	2	3	-	3
C216.6	3	3	2	-	2.5	-	-	-	-	-	-	2	3	-	3
C216	**3**	**3**	**2**	**-**	**2.1**	**-**	**-**	**-**	**2**	**-**	**-**	**2**	**3**	**-**	**3**

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REGULATIONS –20

(R20ECE21L2) Digital Logic Design Lab

Outcomes:

Upon completion of the Course, students will be able to:

C217.1. Explain theory of Boolean Algebra & the Underlying features of various number systems. (K2-Understanding)

C217.2. Use the concepts of Boolean Algebra for the analysis &design of various combinational logic circuits. (K3-Apply)

C217.3. Use the concepts of Boolean Algebra for the analysis &design of various sequential logic circuits. (K3-Apply)

C217.4. Design various logic gates starting from simple ordinary gates to complex Programmable logic devices & arrays. (K6-Create)

C217.5. Analyze the various coding schemes are the part of the digital circuit design. (K4 -Analyse)

C217.6. Design of various circuits with the help of VHDL coding techniques. (K6-Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C217.1	3	3	2	-	-	2	-	-	-	-	-	-	3	3	-
C217.2	3	3	2	-	-	-	-	-	-	-	-	-	3	3	-
C217.3	3	3	3	3	2	-	-	-	-	-	-	-	3	3	-
C217.4	3	3	3	3	2	-	-	-	-	-	-	-	3	3	-
C217.5	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C217.6	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C217	**3**	**3**	**2.6**	**3**	**2.5**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**-**

(R20ECE21L3) Basic Simulation Lab

Outcomes:

Upon completion of the Course, students will be able to:

C218.1.Interpret any signal in terms of complete sets of orthogonal functions and understands the principles of basic signals(K2-Understand)

C218.2 .Sketch Fourier spectrum by using Fourier series and Fourier transforms. (K3-Apply)

C218.3. Apply sampling theorem to reconstruct signal from its samples.(K2-Understand)

C218.4.Design a distortion less LTI system and derive filter characteristics of a system.(K6-Create)

C218.5. Determine convolution, correlation in time domain and frequency domain.(K2-Understand)

C218.6.Analyze Laplace Transforms, Fourier Transforms and Z-Transforms.(K4-Analyze)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C218.1	3	3	2	-	3	-	-	-	-	-	-	-	3	-	2
C218.2	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C218.3	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C218.4	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C218.5	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3
C218.6	3	3	3	2	3	-	-	-	-	-	-	-	3	-	3
C218	**3**	**3**	**2.8**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2.8**

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REGULATIONS –20

(R20MAC2100) Gender Sensitization Lab

Course Outcomes:

Upon completion of the Course, students will be able to:

219.1 Describe the important issues related to gender in contemporary India.

219.2 Predict basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.

219.3 Explain a finer grasp of how gender discrimination works in our society and how to counter it.

219.4 Show insight into the gendered division of labour and its relation to politics and economics.

219.5 Men and women students and professionals will be better equipped to work and live together as equals.

219.6 Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C219.1	-	-	-	-	-	2	2	3	-	2	-	-	3	-	2
C219.2	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219.3	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219.4	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219.5	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219.6	-	-	-	-	-	3	3	3	-	3	-	-	3	-	3
C219	**-**	**-**	**-**	**-**	**-**	**2.8**	**2.8**	**3**	**-**	**2.8**	**-**	**-**	**3**	**-**	**2.8**

B.Tech. - II Year – II Semester

(R20MTH2201) Laplace Transforms, Numerical Methods & Complex Variables

Course outcomes:

After learning the contents of this paper the student must be able to

C221.1 Use the Laplace transforms techniques for solving ODE's (k3-apply)

C221.2 Calculate the root of a given Equation (k3-apply)

C221.3 Determine the value for the data using interpolation. (k3-apply)

C221.4 Evaluate the numerical solutions for a given ODE's (k5- evaluate)

C221.5 Analyse the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems (k4-analyse)

C221.6 Expand complex functions in Taylor's series & Laurent's series (k2- understand**)**

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C221.1	3	3	3	2	-	-	-	-	-	-	-	3	-	-	-
C221.2	3	3	3	3	-	-	-	-	-	-	-	3	-	-	-
C221.3	3	3	3	2	-	-	-	-	-	-	-	3	-	-	-
C221.4	3	3	2	3	-	-	-	-	-	-	-	2	-	-	-
C221.5	3	3	2	3	-	-	-	-	-	-	-	2	-	-	-
C221.6	3	3	2	3	-	-	-	-	-	-	-	2	-	-	-
C221	**3**	**3**	**2.5**	**2.3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**-**	**-**	**-**

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REGULATIONS –20

(R20ECE2201) Electromagnetic Theory and Transmission Lines

Course Outcomes:

Upon successful completion of the course, students will be able to:

C222.1. Differentiate the electric and magnetic field intensity ,flux density and maxwell's equations for electric and magnetic static fields (K2-Understand).

C222.2. Apply time varying maxwell's equations and their applications in electromagnetic propagation (K3-Apply).

C222.3. Select maxwell's equations to describe the propagation of electromagnetic waves in vaccume and dielectric media (K4-Analyse).

C222.4. Demonstrate the reflection and refraction of waves at boundaries (K3-Apply).

C222.5. Analyse basic transmission line parameters in phasor domain and basic wave guide operations and parameters (K4-Analyse).

C222.6. Measure the input and output impedances of transmission lines (K5-Evaluate).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C225.1	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
C225.2	3	3	-	-	-	-	-	-	-	-	-	-	3	2	-
C225.3	3	3	-	-	-	-	-	-	-	-	-	-	3	2	-
C225.4	3	3	3	-	-	-	-	-	-	-	-	-	3	3	-
C225.5	3	2	3	-	-	-	3	-	-	-	-	3	3	3	-
C225.6	3	2	3	-	-	-	2	-	-	-	-	2	3	3	-
C225.7	**3**	**2.7**	**3**	**-**	**-**	**-**	**2.5**	**-**	**-**	**-**	**-**	**2.5**	**3**	**2.6**	**-**

(R20ECE2202) Analog and Digital Communications

Course Outcomes:

At the end of this course students will be able to :

C223.1. Differentiate various elements, processes, and parameters in communication systems, and describe their functions, effects, and interrelationship (K2-Understand).

C223.2. Analyze and compare different analog modulation schemes for their efficiency and Bandwidth (K4-Analyse).

C223.3. Illustrate the behavior of a communication system in presence of noise (K3-Apply).

C223.4. Describe pulse modulation system and analyze their system performance (K4-Analyse).

C223.5. Analyze different digital modulation schemes and to compute the bit error performance (K4-Analyse).

C223.6. Understand basic knowledge of optimum demodulation of digital signals (K2-Understand).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C223.1	3	-	3	3	3	-	-	-	-	-	-	-	3	2.5	-
C223.2	3	3	-	3	2	-	-	-	-	-	-	-	3	3	-
C223.3	3	2	3	2	3	-	-	-	-	-	-	-	3	2	-
C223.4	3	2	-	3	3	-	-	-	-	-	-	-	3	2	-
C223.5	3	3	-	3	2	-	-	-	-	-	-	-	3	2	-
C223.6	3	3	-	2	3	-	-	-	-	-	-	-	3	2	-
C223	**3**	**2.6**	**3**	**2.6**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.2**	**-**

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REGULATIONS –20

(R20ECE2203) Linear and Digital IC Applications

Course Outcomes:

At the end of this course students will be able to :

C224.1.Interpret the operational amplifiers with linear integrated circuits (K2-Understand).

C224.2.Demonstrate the operational amplifiers for various applications (K3-Apply).

C224.3.Describe the circuits based on analog to digital and digital to analog converters (K2-Understand).

C224.4.Describe the different families of digital integrated circuits and their characteristics (K2-Understand).

C224.5.Analyze the concepts of combinational and sequential circuits (K4-Analyse).

C224.6.Evaluate the characteristics of memory and their classification (K5-Evaluate).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C224.1	3	2	3	2	-	-	-	-	-	-	-	-	3	2	-
C224.2	3	2	3	2	-	-	-	-	-	-	-	-	3	2	-
C224.3	3	2	-	2	-	-	-	-	-	-	-	-	3	2	-
C224.4	3	2	3	2	2	-	-	-	-	-	-	-	3	3	-
C224.5	3	3	3	2	2	-	-	-	-	-	-	-	3	3	-
C224.6	3	3	3	2	2	-	-	-	-	-	-	-	3	3	-
C224	**3**	**2.3**	**3**	**2**	**2**	-	-	-	-	-	-	-	**3**	**2.5**	-

(R20ECE2204) Electronic Circuit Analysis

Course Outcomes:

At the end of this course students will be able to :

C225.1. Interpret the single stage amplifiers and multi stage amplifiers. (K2-Understand)

C225.2. Analyze the DC bias circuitry of BJT and FET. (K4-Analyze)

C225.3. Describe the types of amplifier operation and characteristics. (K2-Understand)

C225.4. Test the operation of oscillators.(K5-Evaluate)

C225.5. Determine efficiency of power amplifier. (K3-Apply)

C225.6. Design tuned amplifiers and bandwidth by using BJT. (K6-Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C225.1	3	3	3	2	3	-	-	-	-	-	-	-	3	2	-
C225.2	3	3	-	2	3	-	-	-	-	-	-	-	3	2	-
C225.3	3	3	2	3	3	-	-	-	-	-	-	-	3	2	-
C225.4	3	3	2	3	3	-	-	-	-	-	-	-	3	2	-
C225.5	3	3	-	2	3	-	-	-	-	-	-	-	3	2	-
C225.6	3	3	3	2	3	-	-	-	-	-	-	-	3	2	-
C225	**3**	**3**	**2.5**	**2.3**	**3**	-	-	-	-	-	-	-	**3**	**2**	-

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REGULATIONS –20

(R20ECE22L1) Analog and Digital Communications Lab

Course Outcomes:

At the end of this course students will be able to :

C226.1. Generate AM wave and calculate the modulation index of AM wave and predict the modulation index (β) of FM wave and simulate (K6-Create).

C226.2. Tabulate the values of gain in Pre-Emphasis&De-Emphasis and analyse and simulate various pulse modulation techniques (K4-Analyze)

C226.3. Interpret the input and output characteristics of AGC receivers and analyze simulate TDM and FDM multiplexing methods. (K4-Analyze)

C226.4. Describe the basic components of digital communication systems and base band data transmission concepts (K2-Understand)

C226.5. Analyze the error performance of the digital modulation techniques (K4-Analyze)

C226.6. Demonstrate the design of optimum receivers for the digital modulation techniques (K3-Apply)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C226.1	3	3	3	-	3	-	2	-	2	-	-	-	3	-	2
C226.2	3	3	3	-	3	-	2	-	2	-	-	-	3	-	2
C226.3	3	2	3	-	2	-	2	-	2	-	-	-	3	-	2
C226.4	2	-	3	-	3	-	2	-	2	-	-	-	3	-	2
C226.5	-	3	3	-	2	-	2	-	2	-	-	-	3	-	3
C226.6	-	2	3	-	2	-	2	-	2	-	-	-	3	-	2
C226	**2.7**	**2.6**	**3**	-	**2.5**	-	**2**	-	**2**	-	-	-	**3**	-	**2.16**

(R20ECE22L2) IC Application Lab

Course Outcomes:

At the end of this course students will be able to :

C227.1.Understand the concepts of operational amplifier IC 741, Timer IC 555 & its specifications.(K2-Understand).

C227.2.Interpret the operational amplifiers with linear integrated circuits (K2-Understand).

C227.3.predict the operational amplifiers for various applications.(K3-Apply).

C227.4.Diagram illustrate the frequency response of first order HPF and LPF. (K4-Analyse).

C227.5.Sketch the circuits using operational amplifiers for waveform generator (K3-Apply).

C227.6.Calculate the pulsewidth of Mo

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C227.1	3	2	-	-	-	-	-	-	2	-	-	-	3	-	3
C227.2	3	3	2	-	-	-	-	-	2	-	-	-	3	-	2
C227.3	3	2	3	-	-	-	-	-	2	-	-	-	3	-	3
C227.4	3	-	3	3	3	-	-	-	2	-	-	-	3	-	2
C227.5	3	-	3	3	3	-	-	-	2	-	-	-	3	-	3
C227.6	3	-	3	3	3	-	-	-	2	-	-	-	3	-	3
C227	**3**	**2.3**	**3**	**3**	**3**	-	-	-	**2**	-	-	-	**3**	-	**2.6**

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REGULATIONS –20

(R20ECE22L3) Electronic Circuit Analysis Lab

Course Outcomes:

At the end of this course students will be able to :

C228.1 Calculate the gain and bandwidth of common emitter and common base amplifier by using BJT (K3-Analysis).

C228.2 Calculate the gain and bandwidth of common emitter and common source and common gate amplifier by using FET (K3-Analysis).

C228.3 Differentiate gain and bandwidth of the single stage and two stage RC coupled amplifiers (K2- Understand).

C228.4 Analyze the values of gain in feedback amplifiers techniques (current shunt and voltage series) (K4-Analyse).

C228.5 Differentiate the theoretical and practical values of operating frequency in oscillators using transistors (K2-Understand).

C228.6 Measure the efficiency of class A and class b power amplifiers (K5-evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C228.1	3	-	3	2	-	-	-	-	2	-	-	-	3	-	2
C228.2	3	2	3	2	2	-	-	-	2	-	-	-	3	-	2
C228.3	3	2	3	2	2	-	-	-	2	-	-	-	3	-	2
C228.4	3	3	3	2	3	-	-	-	2	-	-	-	3	-	2
C228.5	3	3	3	3	3	-	-	-	2	-	-	-	3	-	2
C228.6	3	3	3	3	3	-	-	-	2	-	-	-	3	-	2
C228	**3**	**2.6**	**3**	**2.3**	**2.6**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**-**	**2**

B.Tech. - III Year – I Semester

(R20MBA2201) Business Economics & Financial Analysis

Course out comes (COs):

C311.1. Understand the market demand and supply analysis and pricing in different market structures (K2-Understand).

C311.2. Analyze hoe production functions are carried out and analyze the cost (K4-Analyse).

C311.3. understand different markets and types of business organization (K2-Understand).

C311.4. Analyze how capital budgeting decisions are carried out (K4-Analyse).

C311.5. understand the framework for both manual and computerized accounting process (K2-Understand).

C311.6. Analyze and interpret financial statements through ratio analysis (K4-Analyse).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C311.1	-	3	3	2	-	3	3	-	-	-	2	-	-	-	-
C311.2	-	3	3	2	-	3	3	-	-	-	2	-	-	-	-
C311.3	-	3	3	2	-	3	3	-	-	-	2	-	-	-	-
C311.4	-	3	3	2	-	3	3	-	-	-	2	-	-	-	-
C311.5	-	3	3	2	-	3	3	-	-	-	2.5	-	-	-	-
C311.6	-	3	3	3	-	3	3	-	-	-	2.5	-	-	-	-
C311	**-**	**3**	**3**	**2.2**	**-**	**3**	**3**	**-**	**-**	**-**	**2.1**	**-**	**-**	**-**	**-**

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REGULATIONS –20

(R20ECE3101) Microprocessors & Microcontrollers

Course Outcomes:

At the end of this course students will be able to :

C312.1 Describe the internal details of microprocessors 8086

C312.2 Interpret the various types of instruction sets of microprocessor 8086 to write programs.

C312.3 Analyze and apply different interfacing techniques to interface I/O devices with microprocessor 8086.

C312.4 Describe the internal details of microcontroller 8051

C312.5 Interpret the various types of instruction sets of microcontroller 8051 to write programs.

C312.6 Analyze and Understands the internal architecture of ARM processors

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C312.1	3	2	3	2	-	-	-	-	-	-	-	-	3	2	-
C312.2	3	3	3	2	-	-	-	-	-	-	-	-	3	3	-
C312.3	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
C312.4	3	2	3	3	-	-	-	-	-	-	-	-	3	3	-
C312.5	3	3	3	3	**2**	-	-	-	-	-	-	-	3	3	-
C312.6	3	3	3	3	**3**	-	-	-	-	-	-	-	3	3	-
C312	**3**	**2.6**	**3**	**2.6**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.8**	**-**

(R20INF3103) Data Communications and Networks

Course Outcomes:

At the end of this course students will be able to :

C313.1 Understand the terminology and concepts of the OSI reference model and the TCP-IP reference
model.(Understand)

C313.2 Demonstrate the transmission media, design issues and determine the CRC codes.(Apply)

C313.3 Classify the various protocols of physical layer and MAC layer.(Analyse)

C313.4 Explain the design issues, switching and evaluate the routing algorithms of network layer. (Evaluate)

C313.5Examine the various Internetworking and Internet Transport protocols.(Apply)

C313.6 Design a network based on a specified network layer protocols.(Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C313.1	3	1	2	3	-	3	-	-	-	-	-	-	-	-	-
C313.2	3	3	2	1	-	2	-	-	-	-	-	-	-	-	-
C313.3	2	3	2	2	-	2	-	-	-	-	-	-	-	-	-
C313.4	3	3	2	2	-	1	-	-	-	-	-	-	-	-	-
C313.5	3	3	3	2	-	1	-	-	-	-	-	-	-	-	-
C313.6	2	2	3	2	-	2	-	-	-	-	-	-	-	-	-
C313	**2.6**	**2.5**	**2.3**	**2**	**-**	**1.8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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REGULATIONS –20

(R20EEE2202) Control Systems

Course Outcomes:

At the end of this course students will be able to :

C314.1. Classify the control systems and feedbacks (K4-Analyse)

C314.2. Sketch the block diagram of electrical systems and signal flow graphs (K3-Apply)

C314.3. Analyze the time response and transient response of first order, second order systems proportional derivative proportional integral systems stability of control systems in S- domain through RH criteria (K4-Analyse)

C314.4.Sketch the root locus by adding poles and zeros (K3-apply)

C314.5.Analyse the frequency response of system from bode plots, polar plots and nyquist plots(K4-analyse)

C314.6.Compare the state transition matrix with transfer function (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C314.1	3	2	2	2	-	-	-	-	-	-	-	-	3	-	-
C314.2	3	3	2	3	-	-	-	-	-	-	-	-	3	-	-
C314.3	3	3	2	3	-	-	-	-	-	-	-	-	3	-	-
C314.4	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
C314.5	3	3	2	3	3	-	-	-	-	-	-	-	3	-	-
C314.6	3	-	3	-	2	-	-	-	-	-	-	-	3	-	-
C314	**3**	**2.8**	**2.3**	**2.8**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**

Professional Elective - I (R20CSE3114) Computer Organization & Operating Systems

Course Outcomes:

At the end of this course students will be able to :

C315.1. Conceptually understand basic structure of computer, register transfer language and micro operations. (K2-Understanding)

C315.2 Understand working process and design of micro programmed control unit. (K2-Understanding)

C315.3. Understand concepts of memory, input-output organization. (K2-Understanding)

C315.4 Understand functions, services of operating system. (K2-Understanding)

C315.5 Understand memory management, dead lock and file management concepts. (K2 Understanding)

C315.6 Design operating system (K6-Creating)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C315.1	2	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C315.2	2	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C315.3	2	2	2	-	3	-	-	-	-	-	-	-	-	-	-
C315.4	2	2	3	-	3	-	-	-	-	-	-	-	-	-	-
C315.5	2	2	3	-	3	-	-	-	-	-	-	-	-	-	-
C315.6	3	3	3	-	3	-	-	-	-	-	-	-	-	-	-
C315	**2.2**	**2.2**	**2.5**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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REGULATIONS –20

(R20ECE31L1) Microprocessors & Microcontrollers Lab

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C316.1. Develop the programs for 16-bit arithmetic operation, sorting, searching, string manipulations on 8086 microprocessor. (K6-Creating)

C316.2. Design and develop program for digital clock, parallel communication using 8255 and serial communication using 8251. (K6-Creating)

C316.3. Demonstrate and write program for interfacing ADC, DAC and stepper motor to 8086. (K3-apply)

C316.4. Develop the programs for arithmetic, logical and bit manipulation instructions of 8051 and verify Timer/counter, interrupt handling in 8051 microcontroller. (K6-Creating)

C316.5. Demonstrate the interfacing of LCD and Matrix/keyboard to 8051 and communication between 8051 kit and PC. (K3-apply)

C316.6. Develop the program for UART and data transfer program from peripheral to memory through DMA controller 8237/8257. (K6-Creating)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C316.1	3	2	2	3	-	-	-	-	2	-	-	-	3	-	3
C316.2	3	2	3	3	-	-	-	-	2	-	-	-	3	-	3
C316.3	3	2	3	2	-	-	-	-	2	-	-	-	3	-	3
C316.4	3	3	3	3	2	-	-	-	2	-	-	-	3	-	3
C316.5	3	3	3	2	3	-	-	-	2	-	-	-	3	-	3
C316.6	3	3	3	2	3	-	-	-	2	-	-	-	3	-	3
C316	**3**	**2.5**	**2.8**	**2.5**	**2.6**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**-**	**3**

(R20INF31L2) Data Communications and Networks Lab

Course Outcomes:

C317.1. Apply appropriate algorithm for the finding of shortest route. (K3-Apply)

C317.2. Develop the routing table System / Software Requirement. (K6-Create)

C317.3. Analysis the performance of various protocols in different layers. (K4-Analyze)

C317.4. Create communication between two desktop computers. (K6-Create)

C317.5. Apply appropriate algorithm for the finding of shortest route. (K3-Apply)

C317.6. Use appropriate network tools to build network topologies. (K3-Apply)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C317.1	3	2	2	3	-	-	-	-	2	2	-	-	3	-	3
C317.2	3	2	3	3	-	-	-	-	2	2	-	-	3	-	3
C317.3	3	2	3	2	-	-	-	-	2	2	-	-	3	-	3
C317.4	3	3	3	3	3	-	-	-	2	3	-	-	3	-	3
C317.5	3	3	3	2	3	-	-	-	2	2	-	-	3	-	3
C317.6	3	3	3	2	3	-	-	-	2	2	-	-	3	-	3
C317	**3**	**2.5**	**2.8**	**2.5**	**3**	**-**	**-**	**-**	**2**	**2**	**-**	**-**	**3**	**-**	**3**

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REGULATIONS –20

(R20HAS31L1) Advanced Communication Skills Lab

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C318.1. Speak effectively (Apply, K3)

C318.2. Express and communicate fluently and appropriately in social professional contexts (Apply, K3)

C318.3.The development of comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects (Understand K2)

C318.4.The awareness of English lab enriches their communication and soft skills contributing to their overall development and success(Analyze, K4)

C318.5. Draft various letters and reports for all official purpose (Create K6)

C318.6. Take part in social and professional communication (Apply, K3)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C318.1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
C318.2	-	-	-	-	2	-	-	-	2	2	-	2	-	-	-
C318.3	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-
C318.4	-	-	2	2	2	-	2	-	2	2	-	2	-	-	-
C318.5	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-
C318.6	-	-	-	-	3	-	2	-	-	-	-	3	-	-	-
C318	**-**	**-**	**2**	**2**	**2.2**	**-**	**2**	**-**	**2**	**2**	**-**	**2.2**	**-**	**-**	**-**

B.Tech. - III Year – II Semester

(R20ECE3201) Antennas and Wave Propagation

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C321.1. Explain basic terminology and concepts of Antennas (K2-Understanding).

C321.2. Discuss the basic parameters those are considered in the antenna design process and the analysis (K2-Understanding).

C321.3. Calculate the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis (K3-apply).

C321.4. Select designed antenna and field evaluation under various conditions(K4-Analyse).

C321.5. design antennas that suits the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure (K6-Creating).

C321.6. Design the bench setup for antenna parameter measurement of testing for their effectiveness (K6-Creating).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C321.1	3	-	3	-	-	2	-	-	-	-	-	-	3	2	-
C321.2	3	2	3	-	2	2	-	-	-	-	-	-	3	3	-
C321.3	3	3	3	-	2	3	-	-	-	-	-	-	3	3	-
C321.4	3	3	2	-	2	3	-	-	-	-	-	-	3	2	-
C321.5	3	3	3	-	2	3	-	-	-	-	-	-	3	3	-
C321.6	3	3	3	-	3	3	-	-	-	-	-	-	3	2	-
C321	**3**	**2.7**	**2.8**	**-**	**2.2**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.5**	**-**

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REGULATIONS –20

(R20ECE3202) Digital Signal Processing

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C322.1 Restate time, frequency and Z - transform analysis on signals and systems. (K2 Understand)

C322.2 Differentiate the inter-relationship between DFT and various transforms. (K2 Understand)

C322.3 Analyze the Fast computation of DFT and appreciate the FFT processing (K4 Analyze)

C322.4 Analyze IIR Digital Filters for a given specifications (K4 Analyze)

C322.5 Design FIR Digital filters using Window Techniques. (K6 Create)

C322.6 Evaluate the multi rate DSP techniques and finite word length effects. (K5 Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C322.1	3	3	2	-	-	2	-	-	-	-	-	-	3	2	-
C322.2	3	3	2	-	-	3	-	-	-	-	-	-	3	-	-
C322.3	3	3	3	-	-	2	-	-	-	-	-	-	3	-	-
C322.4	3	3	3	-	2	2	-	-	-	-	-	-	3	-	-
C322.5	3	3	3	-	3	2	-	-	-	-	-	-	3	3	-
C322.6	3	3	3		3	2	-	-	-	-	-	-	3	-	-
C322	**3**	**3**	**2.6**	**-**	**2.6**	**2.2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.5**	**-**

(R20ECE3203) VLSI Design

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C323.1. Describe the fabrication process of integrated circuit using MOS transistors. (K2-Understand)

C323.2. Choose an appropriate inverter depending on specifications required for a circuit. (K4-analyse)

C323.3. Sketch the layout and estimate parasitics of any logic circuit. (K3-Apply)

C323.4. Design different types of logic gates using CMOS inverter. (K6- Create)

C323.5. Design building blocks of datapath using gates and memories using MOS transistors. (K6-Create)

C323.6. Design Programmable logic devices and interpret the concept of testing to improve testability of system. (K6-Create)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C323.1	3	2	-	-	-	-	-	-	-	-	-	3	3	2.5	-
C323.2	3	3	3	2	-	-	-	-	-	-	-	3	3	2.5	-
C323.3	3	3	3	2	-	-	-	-	-	-	-	2	3	3	-
C323.4	3	3	3	3	-	-	-	-	-	-	-	3	3	2	-
C323.5	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C323.6	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C323	**3**	**2.8**	**3**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**3**	**2.3**	**-**

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REGULATIONS –20

Professional Elective - II (R20ECE3221) Embedded System Design

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C324.1. Explain the history ,classification, characteristics, applications ,quality attributes and purpose of embedded systems(K2-Understand)

C324.2. Describe the core of the embedded systems and categorize the types of memories and memory selection sensors and actuators and communication interfaces (K2-Understand)

C324.3. Apply the various embedded systems hardware circuits and embedded firmware design approaches and Development languages (K3-Apply)

C324.4. Discuss the basics of Operating systems and RTOS and explain multitasking and multiprocessing. (K2-Understand)

C324.5. Select the task communication via shared memory Message Passing, Remote Procedure Call and Sockets and explain the Device Drivers (K4-Analyse)

C324.6. Predict the Task Communication/Synchronization Issues and Techniques, and choose an RTOS. (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C324.1	3	-	2	3	3	-	-	-	-	-	-	-	3	2	-
C324.2	3	2	3	-	2	-	-	-	-	-	-	-	3	2	-
C324.3	3	-	3	2	3	-	-	-	-	2	-	-	3	3	-
C324.4	3	2	3	-	3	-	-	-	-	2	-	-	3	3	-
C324.5	3	2	2	-	2	-	-	-	-	-	-	-	3	3	-
C324.6	3	3	2	-	3	-	-	-	-	2	-	-	3	3	-
C324	**3**	**2.2**	**2.5**	**2.5**	**2.7**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**3**	**2.7**	**-**

(R20ECE32L1) Digital Signal Processing Lab

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C326.1. Generate sinusoidal waveforms on recursive difference equation and through filtering and DTMF signals. (K6-Create)

C326.2. Sketch the characteristic of FFT of a given sequence for LP FIR,HP FIR,LP IIR,HP IIR filters.(K3-Apply)

C326.3. Calculate the DFT/IDFT of given DT signal and show the frequency response of given system.

Impulse response of first order and second order systems. (K3-Apply)

C326.4. Determine the power spectrum of a given sequence. (K3-Apply)

C326.5. Diagram illustrates of Decimation, Interpolation and I/D sampling rate converters. (K4-Analyse)

C326.6. Experiment the audio application and noise removal. (K3-Apply)

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C326.1	3	2	3	3	3	-	-	-	-	-	-	-	3	-	3
C326.2	3	3	3	3	3	-	-	-	-	-	-	-	3	-	3
C326.3	3	3	2	2.5	2	-	-	-	-	-	-	-	3	-	3
C326.4	3	3	3	2	3	-	-	-	-	-	-	-	3	-	3
C326.5	3	3	2	2.5	2	-	-	-	-	-	-	-	3	-	3
C326.6	3	3	2	2	2	-	-	-	-	-	-	-	3	-	3
C326	**3**	**2.8**	**2.5**	**2.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**3**

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REGULATIONS –20

(R20ECE32L2) VLSI & e-CAD Design Lab

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C327.1. Describe Verilog hardware description languages (HDL) (K2-Understand).

C327.2. Design various logic gates using HDL. (K6-Create)

C327.3. Use the concepts of Boolean algebra for the analysis &design of various combinational logic circuits. (K3-Apply)

C327.4. Use the concepts of Boolean algebra for the analysis &design of various sequential logic circuits. (K3-Apply)

C327.5. Design Entry, simulation of flip-flop circuits with test bench & functional verification. (K6-Create)

C327.6. Describe the Finite state machine (K2-Understand).

B.Tech. - IV Year – I Semester

(R20ECE4101) Microwave and Optical Communication

Upon a successful completion of this course, the student will be able to:

C411.1. Analyze the (microwave active devices) various Microwave solid state devices, Bipolar transistors, FET, & microwave tubes. (K4- ANALYZE)

C411.2. Demonstrate the (microwave active devices) waveguide multiport junctions, ferrite devices. (K3- APPLY)

C411.3. Measure the scattering matrix and microwave parameters using Microwave Bench setup (K5- EVALUATE)

C411.4. Describe the constructional parameters of optical fibers and calculate the losses. (K3-Apply)

C411.5. Explain the optical sources and choose the optical detectors. (K4-Analyse)

C411.6. Evaluate optical system, power budget analysis and networking. (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C411.1	3	3	3	-	3	-	-	-	-	-	-	2	3	3	-
C411.2	3	2	3	3	3	-	-	-	-	-	-	2	3	2	-
C411.3	3	3	-	3	3	-	-	-	-	-	-	2	3	3	-
C411.4	3	3	-	2	3	-	-	-	-	-	-	3	3	3	-
C411.5	3	2	3	-	3	-	-	-	-	-	-	2	3	2	-
C411.6	3	3	3	3	3	-	-	-	-	-	-	2	3	3	-
C411	**3**	**2.7**	**3**	**2.7**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**2.2**	**3**	**2.7**	**-**

(R20HAS4101) Professional Practice, Law & Ethics

Goals & Outcomes:

- To familiarise the students to what constitutes professional practice, introduction of various stakeholders and their respective roles; understanding the fundamental ethics governing the profession
- To give a good insight into contracts and contracts management in civil engineering, dispute resolution mechanisms; laws governing engagement of labour
- To give an understanding of Intellectual Property Rights, Patents.
- To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
- To develop good ideas of the legal and practical aspects of their profession

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REGULATIONS –20

Professional Elective - III (R20ECE4131) Digital Image Processing

Course Outcomes:

Upon successfully completing the course, the student should:

C413.1: Define basics of images and analyze the various advanced image transforms and their Properties. (K3-Apply).

C413.2: Discuss different techniques employed for the enhancement (spatial and frequency domain) and restoration of images. (K2-Understanding).

C413.3: Determine degradation model and calculate various restoration techniques. (K3-Apply).

C413.4: Analyze the concepts of segmentation and various basic morphological operations in image processing. (K4-Analyse).

C413.5: Describe the various compression techniques and explain redundancies and their removal methods. (K2-understanding).

C413.6: Evaluate various compression coding techniques and compare JPEG standards. (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C413.1	3	2	-	-	-	1	-	-	-	-	-	2	3	-	-
C413.2	3	3	-	-	-	1	-	-	-	-	-	2	3	2	-
C413.3	3	3	2	-	-	2	-	-	-	-	-	2	3	-	-
C413.4	3	2	2	-	-	2	-	-	-	-	-	2	3	2	-
C413.5	3	3	2	-	-	-	-	-	-	-	-	3	3	2	-
C413.6	3	2	2	-	-	2	-	-	-	-	-	3	3	3	-
C413	**3**	**2.5**	**2**	**-**	**-**	**1.6**	**-**	**-**	**-**	**-**	**-**	**2.5**	**3**	**2.2**	**-**

Professional Elective - IV (R20ECE4141) Cellular & Mobile Communications

Course Outcomes:

After the course the student should be able to:

C414.1. Analyse the fundamental techniques to overcome the difficult fading effects(K4-Analyse)

C414.2. Interpret the cellular concepts /Frequency reuse (K2 –Understand)

C414.3. Describe the co-channel and non co channel interferences (K2-Understand)

C414.4. Illustrate the cell coverage for signal and traffic, diversity techniques and mobile antennas (K3-Apply)

C414.5. Outline the frequency management and channel assignment (K4-Analyse)

C414.6. Explain the types of handoff and handoff's strategies (K2-Understand)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C414.1	3	2	2	-	-	-	2	-	-	-	-	2	3	2	-
C414.2	3	2	2	-	-	-	2	-	-	-	-	2	3	2	-
C414.3	3	2	3	-	-	-	2	-	-	-	-	2	3	2	-
C414.4	3	2	3	-	-	-	2	-	-	-	-	2	3	2	-
C414.5	3	2	-	-	-	-	2	-	-	-	-	2	3	3	-
C414.6	3	2	-	-	-	-	2	-	-	-	-	2	3	3	-
C414	**3**	**2**	**2.5**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**3**	**2.3**	**-**

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REGULATIONS –20

(R20ECE41L1) Microwave & Optical Communications Lab

Course outcomes (COs):

After completion of the course, students will be able to:

C416.1. Analyze the characteristic of microwave tubes and compare them (K4- Analyze)

C416.2. Explain the various Microwave solid state devices. (K2-Understand)

C416.3. Measure the scattering matrix and microwave parameters using Microwave Bench setup (K5- Evaluate)

C416.4. Calculate the power dividing properties of various Microwave junctions, directional couplers & ferrite devices.(K3-Apply)

C416.5. Analyze the optical sources like LED and LASER diode (K4-Analyze)

C416.6. Calculate the Data rate for Digital Optical Link, NA and losses in Analog Optical Link. (K3-Apply)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C416.1	3	3	2	-	-	2	-	-	2	-	-	-	3	-	2
C416.2	3	3	3	-	-	2	-	-	-	-	-	-	3	-	3
C416.3	3	2	3	-	-	2	-	-	-	-	-	-	3	-	2
C416.4	3	2	3	-	3	3	-	-	2	-	-	-	3	-	3
C416.5	3	3	3	-	2	3	-	-	2	-	-	-	3	-	3
C416.6	3	3	3	-	3	2	-	-	2	-	-	-	3	-	3
C416	**3**	**2.6**	**2.8**	**-**	**2.6**	**2.1**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**-**	**2.6**

B.Tech. - IV Year – II Semester

Professional Elective - V (R20ECE4251) Satellite Communications

Course Outcomes:

After completion of the course, students will be able to:

C421.1. Describe the history, frequency allocations, applications and orbit concepts and Placement of a Satellite in a Geo-Stationary orbit (K2- Understand)

C421.2. Demonstrate satellite Subsystems like Attitude and Orbit Control system, Telemetry, Tracking, Command Satellite Antenna Equipment.(K3-Apply)

C421.3. Apply the system Noise Temperature and G/T ratio, Link and Interference Analysis, and design of satellite Links for a specified C/N, Link Budget .(K3-Apply)

C421.4. explain the different attenuations and classify the multiple access systems (K4 Analyse)

C421.5. Describe the earth station technology, Power Test Methods, Lower Orbit Considerations. Navigation and GPS (K2-Understand)

C421.6. Compare the different satellite packet communications (K5-Evaluate)

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C421.1	3	3	-	-	-	-	-	-	-	-	-	2	3	3	-
C421.2	3	3	3	-	-	-	-	-	-	-	-	-	3	2	-
C421.3	3	2	3	2	3	-	-	-	-	-	-	2	3	3	-
C421.4	3	-	3	3	-	-	-	-	-	-	-	2	3	3	-
C421.5	3	-	-	-	-	-	-	-	-	-	-	2	3	**2**	-
C421	**3**	**2.6**	**3**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**2.7**	**-**

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B. Tech. ELECTRONICS & COMMUNICATIONENGINEERING

REGULATIONS –20

Professional Elective - V (R20ECE4253) Wireless Sensor Networks

Course outcomes

After completion of the course, students will be able to:

C421.1. Understand the basis of wireless sensor networks (K2-Understand).

C421.2. Illustrate the state-of-the-art in wireless sensor networks, architectures and applications (K3-Apply)

C421.3. Describe the design, frame work and the performance of MAC layer protocols of wireless sensor networks (K2-Understand).

C421.4. Analyze existing network layer protocols and routing metrics (K4- Analyze)

C421.5. Explain time Synchronization protocols in wireless sensor networks (K2-Understand).

C421.6. Interpret the fundamentals and challenges of security in wireless sensor networks (K2-Understand).

Course Articulation Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C422.1	3	2	3	-	-	2	-	-	-	-	-	2	3	3	-
C422.2	3	2	3	-	2	2	-	-	-	-	-	2	3	3	-
C422.3	3	2	3	-	2	2	-	-	-	-	-	2	2	2	-
C422.4	3	-	2	-	2	2.5	-	-	-	-	-	2	2	2	-
C422.5	3	-	3	-	3	2.5	-	-	-	-	-	-	3	2	-
C422.6	3	-	-	-	-	2	-	-	-	-	-	-	3	3	-
C422	**3**	**2**	**2.8**	**-**	**2.2**	**2.1**	**-**	**-**	**-**	**-**	**-**	**2**	**2.6**	**2.5**	**-**

R20ECE4183 Principles of Modern Communication Systems

Course outcomes

After completion of the course, students will be able to:

C415.1. Differentiate various elements, processes, and parameters in communication systems, and describe their functions, effects, and interrelationship (K2-Understand).

C415.2. Interpret the mobile cellular concepts, standards and all generations of cellular systems. (K2-understand)

C415.3. Describe the existing and emerging wireless standards and Compare various wireless networks
and their specifications. (K5-Evaluate)

C415.4. Demonstrate the history of Satellite communication, applications and orbit concepts, Placement of a Satellite in a Geo-Stationary orbit and GPS concept (K3- Apply)

C415.5 Summarize the radar fundamentals and analysis of the radar signals. (K4- Analyze)

C415.6 Explain the Navigation systems (K2-Understand).

Sri Indu College of Engineering & Technology

(An Autonomous Institution under JNTUH)

Sheriguda, Ibrahimpatnam, R.R. Dist, Telangana – 501 510

Department of Electrical and Electronics Engineering

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DEPARTMENT VISION

To provide quality education to enable the students:

- To develop creative solutions to the technological problems of society
- To compete globally for higher education
- To inculcate the moral and professional ethical values

DEPARTMENT MISSION

DM_1 To develop high quality, technically sound and social responsible engineers

DM_2 To conduct value addition training programmes

- Competitive exams
- Communication, personality development skills
- Analytical and problem solving techniques

To motivate and encourage the faculty members to participate in national and international conference

PROGRAM OUTCOMES

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design / Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

PSO 1: Able to apply the knowledge gained during the course of the program from Mathematics, Basic Computing, Basic Sciences and Social Sciences in general and all electrical courses in particular to identify, formulate and solve real life problems faced in industries and/or during research work.

PSO 2: Able to provide socially acceptable technical solutions to complex electrical engineering problems with the application of modern and appropriate techniques for sustainable development.

PSO 3: Able to apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.

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Department of Electrical and Electronics Engineering

II YEAR I SEMESTER (REGULATION – R20)

Course Name & Code: FLUID MECHANICS AND HYDRAULIC MACHINES (R20MED2203)

At the End of the course, student will be able to

CO	DESCRIPTION
C2203.1	Generate Mathematical models of fluid motion including steady and unsteady flow
C2203.2	State and visualize fluid kinetics and design a fluid dynamic system based on inviscid theory
C2203.3	To understand boundary layer concept, types of loses in pipes and measurement of flow
C2203.4	Able to understand basics of turbo machines, pelton wheel, francis turbine, and Kaplan turbine
C2203.5	Design of centrifugal pump and reciprocating pumps and their specifications

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
C2203.1	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
C2203.2	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
C2203.3	3	2	-	-	1	-	-	-	2	2	2	3	2	-	-
C2203.4	3	1	-	-	-	-	-	-	-	-	-	-	1	-	-
C2203.5	3	1	-	-	-	-	-	-	-	-	-	-	1	-	-
C2203	**3**	**1.6**	**-**	**-**	**1**	**-**	**-**	**-**	**2**	**2**	**2**	**3**	**1.4**	**-**	**-**

Course Name & Code: ELECTRICAL CIRCUIT ANALYSIS (R20EEE2101)

At the End of the course, student will be able to

CO	DESCRIPTION
C2101.1	To understand the concept of elements, input signals, circuit laws , reduction techniques and star to delta transformation
C2101.2	Knowledge in analysis of AC circuits for all combinations ,concept of phasor and power analysis resonance in series and parallel circuits
C2101.3	To know the basics of magnetic circuits and knowledge about the concepts of graph theory, analysis of networks using topology
C21014	To have knowledge in analysis of circuits by using Laplace Transforms
C2101.5	To Understand the relationship of different parameters in Two port network

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C2101.1	3	2	3	-	-	-	-	-	-	-	-	-	2	1	1
C2101.2	1	-	2	-	2	-	-	-	-	-	-	-	3	-	-
C2101.3	-	-	2	-	2	-	-	-	-	-	-	-	3	1	-
C2101.4	-	-	2	-	1	-	-	-	-	-	-	-	2	1	-
C2101.5	-	2	-	-	-	-	-	-	-	-	-	3	3	-	-

C2101	**2.0**	**2.0**	**2.25**	**-**	**1.6**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2.6**	**1**	**1**

Course Name & Code: ANALOG ELECTRONICS (R20ECE2105)

At the End of the course, student will be able to

CO No	DESCRIPTION
C2105.1	Describe the construction operation and characteristics of electronic devices like PN Junction and Special purpose diodes.
C2105.2	Determine the application of diode as rectifier
C2105.3	Illustrate the application of transistor as amplifier employing BJT devices
C2105.4	Analyze the biasing circuits using BJT transistor amplifier circuits.
C2105.5	Evaluate construction operation and characteristics of FET.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
C2105.1	3	3	-	-	-	-	-	-	-	-	-	-	3	2	2
C2105.2	3	3	-	-	-	-	-	-	-	-	-	-	3	2	2
C2105.3	3	2	3	3	-	2	-	-	-	-	-	-	3	2	2
C2105.4	3	2	3	3	-	2	-	-	-	-	-	-	3	2	3
C2105.5	3	2	3	3	-	2	-	-	-	-	-	-	3	2	3
C2105	**3**	**2.4**	**3**	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2**	**2.4**

Course Name & Code: ELECTRICAL MACHINES -1(R20EEE2102)

At the End of the course, student will be able to

CO No	DESCRIPTION
C2102.1	Identify different parts of a DC machine & understand its operation
C2102.2	Carry out different testing methods to predetermine the efficiency of DC machines
C2102.3	Understand different excitation and starting methods of DC machines
C21024	Control the voltage and speed of a DC machines
C2102.5	Analyze single phase and three phase transformers circuits.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C2102.1	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2
C2102.2	3	2	2	2	3	2	1	1	1	1	2	2	3	2	2
C2102.3	3	3	3	3	3	2	2	1	1	1	2	2	3	3	3
C2102.4	2	3	3	2	3	2	2	1	1	1	2	1	2	3	3
C2102.5	3	2	2	3	2	2	2	1	1	1	2	2	3	2	2
C2102	**2.6**	**2.4**	**2.4**	**2.4**	**2.6**	**2**	**1.6**	**1**	**1**	**1**	**1.8**	**1.6**	**2.6**	**2.4**	**2.4**

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Sheriguda, Ibrahimpatnam, R.R. Dist, Telangana – 501 510

Department of Electrical and Electronics Engineering

Course Name & Code: ELECTRO MAGNETIC FIELDS (R20EEE2103)

At the End of the course, student will be able to

CO No	DESCRIPTION
C2103.1	Should be able to specify the "constitutive relationships" for fields and understand why they are required
C2103.2	Apply vector calculus to static electric-magnetic fields in different engineering situations
C2103.3	Analyze maxwell's equation in different forms and apply them to diverse engineering problems
C2103.4	Analyze the nature of electromagnetic wave propogation in guided medium which are used in microwave applications.
C2103.5	Experimental measurement of voltages induced by time varying magnetic flux. Flux determimation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
C2103.1	3	2	3	-	-	-	-	-	-	-	-	-	2	1	-
C2103.2	2	-	2	-	-	-	-	-	-	-	-	-	2	-	-
C2103.3	3	2	2	-	-	-	-	-	-	-	-	-	2	1	-
C2103.4	2	-	2	-	-	-	-	-	-	-	-	2	2	-1	-
C2103.5	-	2	-	-	-	-	-	-	-	-	-	2	2	-	-
C2103	**2.5**	**2**	**2.25**	-	-	-	-	-	-	-	-	**2**	**2**	**1**	-

II YEAR Ii SEMESTER (REGULATION – R20)

Course Name & Code: Laplace Transforms, Numerical Methods & Complex variables(R20MTH2201)

At the End of the course, student will be able to

CO	DESCRIPTION
C2201.1	Use the Laplace transforms techniques for solving ODE's
C2201.2	Find the root of a given equation.
C2201.3	Estimate the value for the given data using interpolation
C2201.4	Find the numerical solutions for a given ODE's .
C2201.5	Analyse the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
C2201.6	Taylor's and Laurent's series expansions of complex function

Course Name & Code: Electrical Machines – II (R20EEE2201)

At the End of the course, student will be able to

CO	DESCRIPTION
C2201.1	To understand the application of Faraday's law to transformers with application to an equivalent circuit for a practical transformer
C2201.2	Able to study of single phase transformer operation, construction and performancecharacteristics.
C2201.3	To clearly understand the testing and maintenance of transformers.
C2201.4	To analyze the basic concepts of Auto and poly phase transformers and their performance

	characteristics
C2201.5	To Understand the concept of poly phase induction motors construction and its characteristics.
C2201.6	To understand the torque speed characteristics of an induction motor with application to the equivalent circuit of a induction motor.

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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C2102.1	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2
C2102.2	3	2	2	2	3	2	1	1	1	1	2	2	3	2	2
C2102.3	3	3	3	3	3	2	2	1	1	1	2	2	3	3	3
C2102.4	2	3	3	2	3	2	2	1	1	1	2	1	2	3	3
C2102.5	3	2	2	3	2	2	2	1	1	1	2	2	3	2	2
C2102.6	2	3	3	2	3	2	2	1	1	1	2	1	2	3	3
C2102	2.50	2.50	2.50	2.33	2.67	2.00	1.67	1.00	1.00	1.00	1.83	1.50	2.50	2.50	2.50

Course Name & Code: Digital Logic Design (R20ECE2102)

At the End of the course, student will be able to

CO	DESCRIPTION
C2202.1	Interpret the various number systems & code converters, error detecting and correcting, BCD, Gray Code, EX-3
C2202.2	Describe the operation of logic gates and Apply Boolean Algebra on K-map.
C2202.3	Design / Analysis of Combinational Circuits.
C2202.4	Diagram illustrates the operation &timing constrains for Latches &Flip-Flops and Registers andCounters.
C2202.5	Design &analyze sequential circuits.
C2202.6	Use HDL &appropriate EDA tools for digital logic design &simulation.

Course Name & Code: Control Systems (R20EEE2202)

At the End of the course, student will be able to

CO	DESCRIPTION
C2202.1	Express the basic elements and structures of feedback control systems.
C2202.2	Apply Routh-Hurwitz criterion, RootLocus, Bode Plot and Nyquist Plot to determine thedomain of stability of linear time-invariant system.
C2202.3	Determine the steady-state response, errors of stable control systems and design compensatorsto achieve the desired performance.
C2202.4	Analyse the stability of the system.
C2202.5	Design lead, lag, lead-lag compensators.
C2202.6	Express control system models on state space models, to express state transition matrix and calculation of variables.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C2202.1	1	2	3	1	-	-	-	-	-	-	-	-	3	3	3
C2202.2	2	3	1	-	-	-	-	-	-	-	-	-	3	3	3
C2202.3	1	3	-	2	-	-	-	-	-	-	-	2	3	3	3
C2202.4	1	3	2	-	-	-	-	-	-	-	-	2	3	3	3
C2202.5	2	3	-	-	-	-	-	-	-	-	-	-	3	3	3
C2202.6	1	3	-	2	-	-	-	-	-	-	-	2	3	3	3
C2202	1.25	2.75	2	1.5	-	-	-	-	-	-	-	2	3	3	3

Course Name & Code: Power System-I (R20EEE2203)

At the End of the course, student will be able to

CO	**DESCRIPTION**
C2203.1	Understand the concepts of power systems.
C2203.2	Understand the operation of conventional generating stations and renewable sources ofelectrical power
C2203.3	Evaluate the power tariff methods.
C2203.4	Determine the electrical circuit parameters of transmission lines
C2203.5	Understand the layout of substation and underground cables and corona.

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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C2203.1	2	2	-	-	3	3	-	-	-	-	-	-	3	3	3
C2203.2	2		2	2	2	2	-	-	-	-	-	-	3	3	3
C2203.3	3	2	-	2	-	-	-	-	-	-	-	2	3	3	3
C2203.4	-	2	2	-	2	2	-	-	-	-	-	2	3	3	3
C2203.5	2	2	2	2	-	-	-	-	-	-	-	-	3	3	3
C2203	**2.25**	**2**	**2**	**2**	**2.3**	**2.3**	-	-	-	-	-	**2**	**3**	**3**	**3**

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Department of Electrical and Electronics Engineering

III YEAR I SEMESTER (REGULATION – R20)

Course Name & Code: Power Electronics (R20EEE3101)

At the End of the course, student will be able to

CO	Statements
C3101.1	Understand the differences between signal level and power level devices.
C3101.2	Analyze controlled rectifier circuits.
C3101.3	Analyze the operation of DC-DC choppers.
C3101.4	Analyze the operation of voltage source inverters
C3101.5	Understand the differences between signal level and power level devices.
C3101.6	Analyze controlled rectifier circuits.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C3101.1	3	2	-	-	-	-	-	-	-	-	-	3	3	2.5	-
C3101.2	3	3	3	2	-	-	-	-	-	-	-	3	3	2.5	-
C3101.3	3	3	3	2	-	-	-	-	-	-	-	2	3	3	-
C3101.4	3	3	3	3	-	-	-	-	-	-	-	3	3	2	-
C3101.5	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C3101.6	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C3101	**3**	**2.8**	**3**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**3**	**2.3**	**-**

Course Name & Code: **POWER SYTEMS –II(R20EEE3102)**

At the end of the course student will be able to:

CO	Statements
3102.1	Analyze transmission line performance.
3102.2	Apply load compensation techniques to control reactive power.
3102.3	Understand the application of per unit quantities.
3102.4	To understand the factors affecting the performance of transients in transmission lines.
3102.5	Design over voltage protection and insulation coordination.
3102.6	Determine the fault currents for symmetrical and unbalanced faults.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3102.1	3	2	2	2	-	2	-	2	-	-	2	2	-	-	-
3102.2	3	2	3	-	-	2	-	2	-	2	-	2	-	-	-
3102.3	2	2	2	2	-	2	2	-	-	-	-	2	-	-	-
3102.4	2	2	-	2	-	-	-	-	-	2	-	1	-	-	-
3102.5	2	1	2	2	2	-	1	-	-	2	-	1	-	-	-
3102.6	2	-	-	2	-	1	-	1	-	-	-	-	-	-	-
3102	2.33	1.80	2.25	2.00	2.00	1.75	1.50	1.67	-	2.00	2.00	1.60	-	-	-

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(An Autonomous Institution under JNTUH)

Sheriguda, Ibrahimpatnam, R.R. Dist, Telangana – 501 510

Department of Electrical and Electronics Engineering

Course Name & Code: **MESAUREMENTS & INSTRUMENTATION(R20EEE3103)**

At the end of the course student will be able to:

CO	Statements
C3103.1	Understand different types of measuring instruments, their construction, operation and characteristics
C3103.2	Understand the Principle and operation Potentiometers & Instrument transformers
C3103.3	Identify the instruments suitable for typical measurements.
C3103.4	Apply the suitable method for measurement of resistance, inductance and capacitance
C3103.5	Understand the different types of bridges
C3103.6	Apply the knowledge about transducers and instrument transformers to use them effectively

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C3103.1	2	2	3	3	1	-	-	-	-	-	-	-	-	-	-
C3103.2	3	2	3	2	2	-	-	-	-	-	-	-	-	-	-
C3103.3	2	3	1	2	2	-	-	-	-	-	-	-	-	-	-
C3103.4	3	3	2	3	3	-	-	-	-	-	-	-	-	-	-
C3103.5	**2**	**3**	**2**	**3**	**1**	-	-	-	-	-	-	-	-	-	-
C3103.6	**3**	**3**	**3**	**2**	**3**	-	-	-	-	-	-	-	-	-	-
C3103	**2.5**	**2.6**	**2.33**	**2.5**	**2**	-	-	-	-	-	-	-	-	-	-

Course Name & Code: **HIGH VOLTAGE ENGINEERING (R20EEE3111)**

At the end of the course student will be able to:

CO	Statements
C3111.1	Gains knowledge on basic of high voltage engineering
C3111.2	To identify the break-down phenomenon in different type of dielectrics
C3111.3	To analyze the generation and measurement of high voltage and currents
C3111.4	To discuss the phenomenon of over-voltage system faults and other abnormal condition.
C3111.5	To discuss the concept of insulation coordination
C3111.6	To understanding testing of various materials and electrical apparatus used in high voltage engineering, with which he/she can apply the above conceptual things to real-world electrical and electronics problem and application

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C3111.1	3	2	1	-	-	-	1.5	-	-	1.5	-	-	2	2.5	-
C3111.2	3	2	2.5	2	-	-	-	-	-	-	-	-	2	2.5	-
C3111.3	3	2.5	2	2.5	-	-	2	-	-	-	1	-	2.5	2	-
C3111.4	1	2	2.5	2	1	2	2	-	-	-	-	-	-	-	-
C3111.5	1	1.5	2	1.5	-	-	1.5	-	-	-	1	2	-	-	-

C3111.6	1	2	2.5	2	1	2	2	-	-	-	-	-	-	-	-
C3111	**2.2**	**2**	**2**	**1.6**	**0.2**	**0.4**	**1.4**	**0**	**0**	**0.3**	**0.4**	**0.4**	**1.3**	**1.4**	**0**

Course Name & Code: **BUSINESS ECONOMICS AND FINANCIAL ANALYSIS(R20MBA2201)**

At the end of the course student will be able to:

CO	Statements
C32201.1	Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing inmarket structures
C32201.2	Gain and insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.
C32201.3	Develop and understanding of
C32201.4	Analyze how capital budgeting decisions are carried out.
C32201.5	Understanding the framework for both manual and computerized accounting process.
C32201.6	Know how to analyze and interpret the financial statement through ratioanalysis.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C32201.1	-	3	-	-	-	-	-	3	2	-	3	3	-	-	-
C32201.2	-	3	-	2	-	-	-	2	3	-	3	3	-	-	-
C32201.3	-	3	-	2	-	-	-	2	1	-	-	3	-	-	-
C32201.4	-	1	3	2	-	-	-	1	3	-	3	3	-	-	-
C32201.5	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C32201.6	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C32201	-	2.67	3.00	2.40	-	-	-	2.33	2.50	-	3.00	3.00	-	-	-

III YEAR II SEMESTER (REGULATION – R20)

Course Name & Code: **ELECTRICAL ESTIMATION AND COSTING (R20EEE3274)**

At the end of the course student will be able to:

CO	Statements
C321.1	Knowledge of Electrical Symbols & Diagrams, Wiring materials and accessories
C321.2	Knowledge of Light and fan circuits in a house
C321.3	To know the calculation of material & labor cost, calculation of total load in a house
C321.4	To gain the knowledge of material & labor cost up to 20 HP, determination of size of cables
C321.5	Acquires the Knowledge of Overhead and underground distribution lines with different accessories
C321.6	Acquires the Knowledge of different main equipment and auxiliaries on the sub-station

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C321.1	2	-	-	2	-	2	-	2	-	-	2	2	-	-	-
C321.2	2	-	-	-	-	2	-	2	-	-	-	2	-	-	-
C321.3	2	2	2	-	-	2	2	-	-	2	-	2	-	-	-
C321.4	2	2	-	-	-	2	-	-	-	2	-	1	-	-	-
C321.5	2	1	2	2	-	2	1	-	-	-	-	1	-	-	-
C321.6	2	-	-	1	-	1	-	1	-	-	-	-	-	-	-
C321	2.00	1.67	2.00	1.67	-	1.83	1.50	1.67	-	2.00	2.00	1.60	-	-	-

Course Name & Code: **POWER SEMICONDUCTOR DRIVES(R20EEE3221)**

At the end of the course student will be able to:

CO	Statements
3221.1	After going through this course the student gets a thorough knowledge on, steady-state analysis
3221.2	To understand the operation of control speed-torque characteristics and closed-loop operation of DC motors (separately excited, shunt motor and series motor) through phase controlled rectifiers
3221.3	To analyze the operation and working of choppers
3221.4	To understand different types of quadratic operations such as single-quadrant two- quadrant and four- quadrant operations
3221.5	To understand the concept of braking reverse-motoring reverse
3221.6	To regenerative braking operations of DC motor's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3221.1	3	2	-	-	-	-	-	-	-	-	-	3	3	2.5	-
3221.2	3	3	3	2	-	-	-	-	-	-	-	3	3	2.5	-
3221.3	3	3	3	2	-	-	-	-	-	-	-	2	3	3	-
3221.4	3	3	3	3	-	-	-	-	-	-	-	3	3	2	-
3221.5	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
3221.6	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C3221	3.00	2.83	3.00	2.60	-	-	-	-	-	-	-	2.50	3.00	2.33	-

Course Name & Code: **Signals and Systems (R20ECE2103)**

At the end of the course student will be able to:

CO	Statements
3203.1	Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands theprinciples of impulse functions, step function and signum function.
3203.2	Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrarysignal (discrete) as Fourier transform to draw the spectrum.

3203.3	Understands the principle of linear system, filter characteristics of a system and its bandwidth, theconcepts of auto correlation and cross correlation and power Density Spectrum
3203.4	Can design a system for sampling a signal.
3203.5	For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
3203.6	Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties,ROC of Z Transform

Course Name & Code: **Microprocessors & Microcontrollers (R20ECE3101)**

At the end of the course student will be able to:

CO	Statements
3101.1	The student will earn the internal organization of popular 8086
3101.2	8051microprocessors/microcontrollers.
3101.3	Understands the principle of linear system, filter characteristics of a system and its bandwidth, theconcepts of auto correlation and cross correlation and power Density Spectrum
3101.4	Can design a system for sampling a signal.
3101.5	For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
3101.6	The students will learn the design of microprocessors/microcontrollers-based systems.

Course Name & Code: **Power System Protection(R20EEE3201)**

At the end of the course student will be able to:

CO	Statements
3201.1	The student gets a thorough knowledge on, various types of protective devices (circuit breakers,relays etc..) and their co-ordination, protection of generators
3201.2	To understand the concept of protection of transformers, by using Buchholtz relayProtection
3201.3	Able to get knowledge about protection of feeders, bus-bars, through different types of protective devices
3201.4	To analyze the concept of overvoltage protection and lightening
3201.5	To understand the concept of earthling and grounding, with which he/she can able to apply
3201.6	theabove conceptual things to real-world electrical and electronics problems and applications.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3201.1	3	2	2	2	-	2	-	2	-	-	2	2	-	-	-
3201.2	3	2	3	-	-	2	-	2	-	2	-	2	-	-	-
3201.3	2	2	2	2	-	2	2	-	-	-	-	2	-	-	-
3201.4	2	2	-	2	-	-	-	-	-	2	-	1	-	-	-
3201.5	2	1	2	2	2	-	1	-	-	2	-	1	-	-	-
3201.6	2	-	-	2	-	1	-	1	-	-	-	-	-	-	-
3201	2.33	1.80	2.25	2.00	2.00	1.75	1.50	1.67	-	2.00	2.00	1.60	-	-	-

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Course Name & Code: **Power System Operation and Control (R20EEE3202)**

At the end of the course student will be able to:

CO	Statements
3202.1	After going through this course the student gets a thorough knowledge on, economic operation of power systems, scheduling of hydro-thermal power plants,
3202.2	To understand the modeling of the power system components like turbine, governor andexcitation systems, necessity of keeping the frequency of the power system constant
3202.3	To analyze the concept of load frequency control in single and two area systems
3202.4	To understand the operation of load frequency controllers
3202.5	To get knowledge about reactive power control, uncompensated transmission line.
3202.6	To understand the compensation in transmission systems through shunt and series compensations, with which he/she can able to apply the above conceptual things to real- world electrical and electronics problems and applications.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3202.1	3	2	-	-	-	-	-	-	-	-	-	3	3	2.5	-
3202.2	3	3	3	2	-	-	-	-	-	-	-	3	3	2.5	-
3202.3	3	3	3	2	-	-	-	-	-	-	-	2	3	3	-
32024	3	3	3	3	-	-	-	-	-	-	-	3	3	2	-
3202.5	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
3202.6	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
3202	3.00	2.83	3.00	2.60	-	-	-	-	-	-	-	2.50	3.00	2.33	-

IV YEAR I SEMESTER (REGULATION – R20)

Course Name & Code: **ILLUMINATION ENGINEERING (R20EEE4184)**

At the end of the course, the student will be able to

CO	Statements
C4184.1	Identify the criteria for the selection of lamps and lighting systems for an indoor or outdoorspace
C4184.2	Perform calculations on photometric performance of light sources
C4184.3	Evaluate different types of lighting designs and applications
C4184.4	luminaires for lightingdesign
C4184.5	To impart lighting fundamentals, measurement, and technology and
C4184.6	their application in theanalysis and design of architectural lighting systems.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C4184.1	-	3	-	-	-	-	-	3	2	-	3	3	-	-	-
C4184.2	-	3	-	2	-	-	-	2	3	-	3	3	-	-	-
C4184.3	-	3	-	2	-	-	-	2	1	-	-	3	-	-	-
C4184.4	-	1	3	2	-	-	-	1	3	-	3	3	-	-	-
C4184.5	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C4184.6	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-

C4184	-	**2.6**	**3**	**2.6**	-	-	-	**2.3**	**2.5**	-	**2.5**	**3**	-	-	-

Course Name & Code: (R20MBA4101) Fundamentals of Management for Engineers

At the end of the course, the student will be able to

CO	Statements
C4101.1	Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in market structures
C4101.2	Gain and insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.
C4101.3	Develop and understanding of
C4101.4	Analyze how capital budgeting decisions are carried out.
C4101.5	Understanding the framework for both manual and computerized accountingprocess.
C4101.6	Know how to analyze and interpret the financial statement through ratio analysis.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C4101.1	2	3	3	-	-	-	-	3	3	-	-	3	3	3	3
C4101.2	3	3	2	-	-	3	-	-	3	-	-	3	3	2	3
C4101.3	3	-	-	-	-	3	-	-	-	-	3	3	3	3	3
C4101.4	2	-	3	-	-	-	-	-	3	-	-	2	3	3	3
C4101.5	3	**3**	-	-	-	3	-	-	-	-	3	3	3	3	3
C4101.6	3	3	3	-	-	-	-	-	2	-	-	3	3	3	3
C4101	**2.6**	**3**	**2.75**	-	-	**3**	-	**3**	**2.8**	-	**3**	**2.8**	**3**	**2.8**	**3**

Course Name & Code: Electrical and Hybrid Vehicles (R20EEE4133)

At the end of the course, the student will be able to

CO	Statements
C4133.1	Understand the different strategies related to energy storage systems.
C4133.2	Understand working of different configurations of electric vehicles
C4133.3	Understand hybrid vehicle configuration and its components, performance analysis
C4133.4	Understand the properties of batteries and its types
C4133.5	Understand of electric vehicle drive systems
C4133.6	Understand of hybrid electric vehicles.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C4133.1	2	-	-	2	-	2	-	2	-	-	2	2	-	-	-
C4133.2	2	-	-	-	-	2	-	2	-	-	-	2	-	-	-
C4133.3	2	2	2	-	-	2	2	-	-	2	-	2	-	-	-
C4133.4	2	2	-	-	-	2	-	-	-	2	-	1	-	-	-
C4133.5	2	1	2	2	-	2	1	-	-	-	-	1	-	-	-
C4133.6	2	-	-	1	-	1	-	1	-	-	-	-	-	-	-
C4133	**2.00**	**0.83**	**0.66**	**0.83**	**-**	**1.83**	**0.5**	**0.83**	**-**	**0.66**	**0.33**	**1.33**	**-**	**-**	**-**

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Course Name & Code: HVDC Transmission (R20EEE4141)

At the end of the course, the student will be able to

CO	Statements
C4141.1	Understand the importance of Transmission power through HVDC.
C4141.2	Analyse the HVDC Converter operation.
C4141.3	Discuss firing angle control of 6 pulse,12 pulse circuits.
C4141.4	Discuss harmonics in HVDC.
C4141.5	Identify the need for propoer grounding for HVDC operation.
C4141.6	Analyse the impact of AC system faults on DC system operation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C4141.1	2	3	3	-	-	-	-	3	3	-	-	3	3	3	3
C4141.2	3	3	2	-	-	3	-	-	3	-	-	3	3	2	3
C4141.3	3	-	-	-	-	3	-	-	-	-	3	3	3	3	3
C4141.4	2	-	3	-	-	-	-	-	3	-	-	2	3	3	3
C4141.5	3	**3**	-	-	-	3	-	-	-	-	3	3	3	3	3
C4141.6	3	3	3	-	-	-	-	-	2	-	-	3	3	3	3
C4141	**2.6**	**3**	**2.75**	**-**	**-**	**3**	**-**	**3**	**2.8**	**-**	**3**	**2.8**	**3**	**2.8**	**3**

IV YEAR II SEMESTER (REGULATION – R20)

Course Name & Code: **Non Conventional Energy Resources (R20EEE4294)**

At the end of the course student will be able to:

CO No	DESCRIPTION
C4294.1	To emphasis the current energy status and role of non-conventional
C4294.2	To familiarize various aspects of Solar energy and utilization
C4294.3	To familiarize various aspects of Wind energy and utilization
C4294.4	To familiarize various aspects of Biomass energy and utilization
C4294.5	To emphasize the significance of Green Energy Technologies.
C4294.6	To familiarize various of renewable energy sources.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C4294.1	-	3	-	-	-	-	-	3	2	-	3	3	-	-	-
C4294.2	-	3	-	2	-	-	-	2	3	-	3	3	-	-	-
C4294.3	-	3	-	2	-	-	-	2	1	-	-	3	-	-	-
C4294.4	-	1	3	2	-	-	-	1	3	-	3	3	-	-	-
C4294.5	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C4294.6	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C4294	**-**	**2.6**	**3**	**2.6**	**-**	**-**	**-**	**2.3**	**2.5**	**-**	**2.5**	**3**	**-**	**-**	**-**

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Course Name & Code: **AI Techniques in Electrical Engineering (R20CSE4265)**

At the end of the course student will be able to:

CO No	DESCRIPTION
C4265.1	Understand feed forward neural networks,
C4265.2	To familiarize various aspects of feedback neural networks
C4265.3	To familiarize various aspects of and learningtechniques.
C4265.4	fuzziness involved in various systems and fuzzy set theory.
C4265.5	Develop fuzzy logic control for applications in electrical engineering
C4265.6	Develop genetic algorithms for applications in electrical engineering.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C4265.1	2	-	-	2	-	2	-	2	-	-	2	2	-	-	-
C4265.2	2	-	-	-	-	2	-	2	-	-	-	2	-	-	-
C4265.3	2	2	2	-	-	2	2	-	-	2	-	2	-	-	-
C4265.4	2	2	-	-	-	2	-	-	-	2	-	1	-	-	-
C4265.5	2	1	2	2	-	2	1	-	-	-	-	1	-	-	-
C4265.6	2	-	-	1	-	1	-	1	-	-	-	-	-	-	-
C4265	**2.00**	**0.83**	**0.66**	**0.83**	**-**	**1.83**	**0.5**	**0.83**	**-**	**0.66**	**0.33**	**1.33**	**-**	**-**	**-**

Course Name & Code: **Electrical Distribution Systems (R20EEE4262)**

At the end of the course student will be able to:

CO	DESCRIPTION
C4262.1	Perform load modeling and analyse the characteristics of loads .
C4262.2	Articulate the design concepts of primary and secondary systems.
C4262.3	Understand substation bus schemes and know the difference between 4&6 feeder patterns.
C4262.4	Apply Knowledge of SCADA concepts for functioning of substations.
C4262.5	Understand the coordination procedure of various protective devices.
C4262.6	Understand the importance of voltage control and know the equipment used for it.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C4262.1	-	3	-	-	-	-	-	3	2	-	3	3	-	-	-
C4262.2	-	3	-	2	-	-	-	2	3	-	3	3	-	-	-
C4262.3	-	3	-	2	-	-	-	2	1	-	-	3	-	-	-
C4262.4	-	1	3	2	-	-	-	1	3	-	3	3	-	-	-
C4262.5	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C4262.6	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C4262	**-**	**2.6**	**3**	**2.6**	**-**	**-**	**-**	**2.3**	**2.5**	**-**	**2.5**	**3**	**-**	**-**	**-**

II YEAR MECH SEMESTER-I (REGULATION –R20)
ACADEMIC YEAR: 2021-2022

Course Code &Name: R20MTH2101& Probability Distribution &Complex Variables
Year of study: 2021-2022

Course Name	Course outcomes
C211 .1	Formulate and solve problems involving random variables and apply statistical methods foranalysing experimental data.(Remember)L1
C211 .2	Analyse the complex function with reference to their analyticity, integration using Cauchy'sintegral and residue theorems(Remember)L1
C211 .3	Taylor's and Laurent's series ex pansions of complex function (Remember)L1
C211 .4	Differentiation and integration of complex valued functions (Understand)L1
C211 .5	Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem. I Expansion of complex functions using Taylor's and Laurent's series.(Create)L6
C211 .6	The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.(Remember)L1

CO	**PO 1**	**PO 2**	**PO3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**P1 0**	**P1 1**	**P1 2**	**PSO 1**	**PSO 2**	**PSO 3**
C211.1	3	1	2	-	-	-	-	1	-	-	-	2	3	2	-
C211.2	3	2	1	-	-	-	-	-	-	-	1	-	3	1	2
C211 3	2	3	1	-	-	-	-	-	-	1	-	-	3	-	3
C211.4	3	2	1	-	-	-	-	-	1	-	-	1	3	2	2
C211.5	1	3	2	-	-	-	-	-	-	1	-	-	3	1	-
C211.6	2	1	3	-	-	-	-	1	-	-	-	2	3	2	-
C211	2.33	2	1.6			-	-	1.5	0.66	0.33	0.16	0.83	3	1.33	1.16

Course Code &Name: R20MED2101& Mechanics of Solids
Year of study: 2021-2022

Course Name	Course outcomes
C212 .1	Solve the problems related to the theory of elasticity, concepts of stress and strain, strength and stiffness, deformations and displacements, strain energy, and load carrying capacity.(Apply)L3
C212 .2	List different materials and structural elements to the analysis of simple structures.(Remember)L1
C212 .3	Identify and formulate the structural problem and solve using a range of analytical methods (Remember).L1
C212 .4	Predict the behavior of the solid and hollow shafts subjected to various torsion loading. (Apply)L3
C212 .5	Describe the theories of failure applied for various materials fully (Understand)L1
C212 .6	Exposing the theory of thin and thick cylinders.(Create)L6

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C212.1	2	1	3	-	-	-	-	1	-	-	-	2	3	2	-
C212.2	3	2	1	-	-	-	-	-	1	-	-	-	3	1	1
C212.3	2	1	3	-	-	-	-	1	-	-	-	-	3	-	3
C212.4	3	2	1	-	-	-	-	-	-	-	1	1	3	2	2
C212.5	3	2	1	-	-	-	-	-	1	-	-	-	3	1	-
C212.6	3	2	1	-	-	-	-	-	-	1	-	3	3	-	-
C212	2.66	1.6	1.6					0.33	0.33	0.16	0.16	1	3	1	1

Course Code &Name R20MED2102 & Material Science& Metallurgy
Year of study: 2021-2022

Course Name	Course outcomes
C213.1	Summarize significance Develop concept of crystal structure and itsdefects. L3-Apply
C213.2	Metallurgy and material science andits role in manufacturing will be understood by student.L1-Understandig
C213.3	Able to know about steel making processes such as Bessemer convertor,LD Convertor and electric process.
C213.4	Classify different engineering material(metals, alloys, Steels, cast irons, non-ferrous metals and alloys, tool materials, ceramics, polymers, Semi-conductor and Composites). L1-Remembering
C213.5	Describe phase diagram, iron – carbondiagram and heat treatment processes and TTT diagram.L5-Evaluating
C213.6	Develop concept of diffusion, mechanical properties and hightemperature material problems. L3-Apply

CO	**PO1**	**PO2**	**PO3**	**PO 4**	**PO5**	**PO 6**	**P O 7**	**PO 8**	**PO 9**	**P1 0**	**P1 1**	**P12**	**PS O1**	**PSO 2**	**PSO 3**
C213.1	3	2	1	-	1	-	-	-	-	-	-	1	3	2	1
C213.2	3	1	2	-	-	1	-	-	-	-	-	-	3	1	2
C213.3	3	2	1	-	-	-	-	-	-	-	-	-	3	2	1
C213.4	2	3	1	-	-	-	-	1	-	-	-	-	-	-	-
C213.5	1	2	3	-	-	-	-	1	-	-	-	-	-	-	-
C213.6	1	3	2	-	-	-	-	-	-	-	1	-	-	-	-
C213	2.16	2.16	1.6	-	0.16	0.1 6	-	0.3 3	-	-	0. 16	0.16	1.5	0.83	0.66

Course Code &Name: R20MED2103 & Production Technology
Year of study: 2021-2022

Course Name	Course outcomes
C214.1	List fundamental techniques to manufacture an engineering component. (L-1Remember)
C214.2	Explain manufacture engineering components through foundry, cold and hot working, metal forming, all welding techniques, extrusion, forging.(L2Understand)
C214.3	Predict and develop a methodology and establish a manufacturing sequence to fabricate engineering components.(L3-Apply)
C214.4	Judge probable routes to manufacture a particular engineering component. (L5-Evaluate)
C214.5	Propose the most economical route to fabricate the required engineering component.(L3-Apply)
C214.6	Identify and distinguish different types of advanced manufacturing technologies.(L-1Remember)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C214.1	3	2	1	-	-	-	1	-	-	-	-	-	3	3	3
C214.2	1	3	2	-	-	-	-	-	2	-	-	-	3	2	3
C214.3	1	2	3	-	-	-	-	-	-	-	3	-	3	2	3
C214.4	3	1	2	-	-	-	-	-	-	1	-	-	3	-	2
C214.5	3	2	1	-	-	-	-	1	-	-	-	3	2	2	1
C214.6	2	3	1	-	-	-	-	-	-	-	-	-	1	1	-
C214	2.16	2.016	1.66	-	-	-	0.166	0.166	0.33	0.166	0.5	0.5	2.33	1.5	2

Course Code &Name: R20MED2104& Thermodynamics
Year of study: 2021-2022

Course Name	Course outcomes
C215 .1	Define the basic concepts of units anddimensions, systems(open and closed systems and control volumes) and its boundaries, properties, state, process, cycle, quasi-static process etc.- required as foundation for development of principles and laws of thermodynamics (L-1Remember)
C215 .2	Develop Intuitive problem solvingtechnique L-6 Create
C215 .3	Use & Practice two property rule and hence thermodynamic tables, thermodynamic diagrams and conceptof equation of state, also their simple application..(L3-Apply)
C215 .4	Explain heat, work and first law ofthermodynamics. Application of energy balance L2Understand)
C215 .5	Discuss Second law of thermodynamics and its corollariesviz. absolute (thermodynamic) temperature scale, reversibility, entropy, feasibility of a process based on first law and second law, isentropicefficiency of adiabatic machines. L2Understand)
C215 .6	All power cycles such as Otto, Diesel,Dual Combustion, Sterling, Atkinson,Ericsson , Lenoir Cycle will be thoroughly known to the students by going through their P–V and T-S diagrams.L4-Analysing

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO5**	**PO 6**	**PO 7**	**PO8**	**PO 9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C215.1	2	1	3		-	-	-	-	1	-	-	2	3	2	1
C215.2	3	2	1	-	-	-	-	-	-	1	-	-	3	1	2
C215.3	3	2	1	-	-	-	-	-	-	-	1	-	3	1	3
C215.4	2	1	3	-	-	-	1	-	-	-	-	1	3	2	2
C215.5	3	2	1	-	-	-	-	1	-	-	-	2	3	2	-
C215.6	3	2	1	-	-	-	-	-	2	2	2	3	3	1	2
C215	2.66	1.66	1.66				0.166	0.166	0.5	0.166	0.5	1.33	3	1.5	1.66

Course Code &Name: R20MED21L1& Production Technology Lab
Year of study: 2021-2022

Course Name	Course outcomes
C21L6.1	Apply some of the manufacturing (L3-Apply)
C21L6.2	Process directly in the preparation ofcomplicated jobs(L6- Create)
C21L6.3	Make different types patterns forcasting & drawing.(L3-Apply)
C21L6.4	Use welding machine for variouswelding processes.(L6- Create)
C21L6.5	Development of plastic bottles in moulding machines.(L1-Remember)
C21L6.6	Study of simple, compound andprogressive press tool in manufacturing process.(L3-Apply)

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**P10**	**P11**	**P12**	**PS O1**	**PS O2**	**PS O3**
C216 .1	3	2	**1**	1	-	-	-	-	-	-	-	-	3	3	3
C216 .2	3	1	2	-	-	-	-	-	1	-	-	-	3	2	3
C216 .3	1	2	3	-	-	-	-	-	-	-	2	-	3	2	3
C216 .4	2	3	1	-	-	-	-	1	-	-	-	-	3	-	2
C216 .5	3	2	1	-	-	-	1	-	-	-	-	3	2	2	1
C216 .6	3	1	**1**	-	-	2	-	-	-	-	-	-	3	3	3
C216	2.5	1.83	1.5	0.166	-	0.33	0.166	0.166	0.166	-	0.33	0.5	2.83	2	2.5

Course Code &Name: R20MED21L2& Machine Drawing Practice
Year of study: 2021-2022

Course Name	Course outcomes
C21L7 .1	Describe the theory of projections andIS Conventions of drawing (L1-Remember)
C21L7 .2	Apply various concepts engineering graphics like dimensioning, conventions and standards related to machine drawings in order to becomeprofessionally efficient.(L3-Apply)
C21L7 .3	Read and interpret assembly drawingswith moderate complexity.(L1-Remember)
C21L7 .4	Explain the conventions and themethods of assembly drawings.(L2-Understand)
C21L7 .5	Develop visualization skills so thatthey can apply these skills in developing new products.(L6- Create)
C21L7 .6	To understand the concepts ofdifferent types valves.(L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2
C21L7.1	3	2	1	1	-	-	-	-	-	-	-	-	3	3
C21L7.2	1	3	2	-	-	-	-	1	-	-	-	-	3	2
C21L7.3	2	3	1	-	-	-	-	-	1	-	-	-	3	2
C21L7.4	3	2	1	-	-	-	-	-	-	-	1	-	3	3
C21L7.5	1	3	2	-	-	-	-	-	-	1	-	-	3	2
C21L7.6	1	2	3	-	-	1	-	-	-	-	-	1	3	2
C217	1.83	2.5	1.66	0.166	-	0.166	-	0.166	0.166	0.166	0.166	0.16	3	2.33

Course Code &Name: R20MED21L3& Material Science& Mechanics of Solids Lab
Year of study: 2021-2022

Course Name	Course outcomes
C21L8.1	Prepare the samples and identify themicrostructures of Cu, Al, Iron.(L6- Create)
C21L8.2	Identify the differences between the microstructures of ferrous and non-ferrous alloys.(L1-Remember)
C21L8.3	Conduct standard tension tests ofsteel & other metals.(L3-Apply)
C21L8.4	Conduct compression and shear testson Cement Brick & Mild steel.(L3-Apply)
C21L8.5	Evaluate hardness and impact strength of the sample specimens. (L5 –Evaluating)
C21L8.6	Interpret & determine the standardmechanical properties from plots ofstress versus strain.(L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO
C21L8.1	3	3	3	-	-	-	-	1	-	-	-	-	3	3
C21L8.2	3	3	3	-	-	-	-	-	-	1	-	-	3	2
C21L8.3	3	3	3	1	-	-	-	-	-	-	-	-	3	2
C21L8.4	3	3	3	-	-	-	-	-	1	-	-	-	3	1
C21L8.5	3	2	1	-	-	-	-	-	-	-	1	3	2	2
C21L8.6	3	3	3	-	2	-	-	-	-	-	-	-	3	3
C21L8	3	2.83	2.66	0.166	0.33	-	-	0.166	0.166	0.166	0.166	0.5	2.83	2.16

Course Code &Name: R20MAC2100& Gender Sensitization Lab
Year of study: 2021-2022

Course Name	Course outcomes
C21L9 .1	Students will have developed a better understanding of important issues related to gender in contemporaryIndia.
C21L9 .2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
C21L9 .3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
C21L9 .4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.
C21L9 .5	Men and women students and professionals will be better equipped to work and live together as equals.
C21L9 .6	Students will develop a sense of appreciation of women in all walks of life.

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C21L9.1	3	2	1	-	-	-	-	3	-	-	-	-	3	3	3
C21L9.2	3	2	1		-	-	-	-	1	-	-	-	3	2	3
C21L9.3	3	1	2		-	-	-	-	-	1	-	-	3	2	3
C21L9.4	2	1	3	-	-	-	-	-	-	-	1	-	3	-	2
C21L9.5	3	2	1	1	-	-	-	-	-	-	-	3	2	2	1
C21L9.6	3	1	2	1	-	-	-	-	-	-	-	-	3	3	3
C21L9	2.83	1.5	1.66	0.33	-	-	-	-	0.166	0.166	0.166	0.5	2.83	2	2.5

II YEAR MECH SEMESTER-II (REGULATION –R20)
ACADEMIC YEAR: 2021-2022

Course Name : **R20EEE2205**& **Basics of Electrical &Electronics Engineering**

Year of study: 2021-2022

Course Name	Course outcomes
C221 .1	Explain the basic electrical DC andAC circuits.(L2-Understand)
C221 .2	Construction operation characteristicsof DC and AC machines and also the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc & (L6- Create)
C221 .3	Describe the operation of the transformers in the energy conversion process.(L2-Understand)
C221 .4	Summarize the operation of diodes,transistors, realization of various electronic circuits with the various semiconductor devices..(L2-Understand)
C221 .5	Explain the principles cathode rayoscilloscope and its applications.. (L2-Understand)
C221.6	Apply the above conceptual thingsto real world electrical and electronics problems and applications(L3-Apply)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P1 0	P1 1	P1 2	PSO 1	PSO 2	PSO 3
C221 .1	3	1	2	-	-	-	-	-	-	-	-	-	3	3	3
C221 .2	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
C221 .3	3	2	1		-	-	-	2	-	3	-	-	3	2	3
C221 .4	2	1	3	-	-	-	-	-	1	-	-	-	3	-	2
C221 .5	3	2	1	-	-	-	-	1	-	-	-	3	2	2	1
C221 .6	3	1	2		-	-	-	-	-	1		3	2	1	3
C221	2.83	1.5	1.66	0.166	-	-	-	0.5	0.166	0.66	-	1	2.66	1.66	2.5

Course Name: R20MED2201& Kinematics of Machinery
Year of study: 2021-2022

Course Name	Course outcomes
C222.1	Understand the fundamentals of thetheory of kinematics of machines. (L2-Understand)
C222.2	Understand techniques for studyingmotion of machines and their components. (L2-Understand)
C222.3	Distinguish kinematic and kinetic motion, change link machine structureand mechanism(L2-Understand)
C222.4	Identify the basic relations betweendistance, time, velocity, and acceleration. (L6-Create)
C222.5	Apply vector mechanics as a tool forsolving kinematic problems. (L6- Create)
C222.6	Create a velocity and accelerationdrawing of cam and a real-world mechanism. (L1-Remember)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C222.1	3	1	2	-	1	-	-	-	-	-	-	-	3	3	1
C222.2	3	1	2	-	-	-	-	1	-	-	-	-	3	2	1
C222.3	3	2	1	-		-	-	-	-	1	-	-	3	3	1
C222.4	3	1	2	-	-	-	-	-	2	-	-	-	3	3	1
C222.5	3	1	2	-	-	-	-	-	-	1	-	-	3	2	1
C222.6	3	2	1	-	-	-	-	-	-	-	1	-	3	3	1
C222	3	1.33	1.66	-	0.166	-	-	1.66-	0.33	0.33	0.166	-	3	2.66	1

Sub code &CourseName: R20MED2202& Thermal Engineering-I
Year of study: 2021-2022

Course Name	Course outcomes
C223.1	Classify various types of I.C. Enginesand Cycles of operation. (L4-Analysing)
C223.2	Express the effect of various operatingvariables on engine performance(L2-Understand)
C223.3	Discuss fuel metering and fuel supplysystems for different types of engines(L2-Understand)
C223.4	Distinguish normal and abnormal combustion phenomena in SI and CIengines (L2-Understand)
C223.5	Justify the suitability of conventional fuels for IC engines. (L5 –Evaluating)
C223.6	Rotary, axial, reciprocating air compressors , their working principles, capabilities performance are known after completion of course and types of refrigeration systems and (L1-Remember)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P10	P11	P1 2	PS O1	PS O2	PS O3
C223 .1	3	2	1	1	-	-	-	-	-	-	-	-	3	1	3
C223 .2	3	1	2	-	-	-	-	2	-	-	-	-	3	2	3
C223 .3	3	2	1	-	-	-	-	-	-	1	-	-	3	2	3
C223 .4	2	1	3	-	-	-	-	-	-	-	1	-	3	1	2
C223 .5	3	2	1	-	-	-	-	-	-	-	-	1	2	2	1
C223 .6	3	2	1	-	-	-	-	-	-			3	2	1	3
C22 3	2.8 3	1.6 6	1.5	0.1 66	-	-	-	0.3 3	-	0.1 66	0.1 66	0.6 6	2.66	1.5	2.5

Course Code &Name: R20MED2203 & **Fluid Mechanics & HydraulicMachines**
Year of study: 2021-2022

Course Name	Course outcomes
C224 .1	Generate mathematical models offluid motion including steady andunsteady flow.(L6- Create)
C224 .2	Recite fluid properties and fluidstatics.(L1-Remember)
C224 .3	State and visualize fluid kinematics.(L3-Apply)
C224 .4	Predict and design a fluid dynamicalsystem based on inviscid theory.(L3-Apply)
C224 .5	Model compressible flow systems.(L6- Create)
C224 .6	Design of hydraulic Impulse, Francis,Kaplan turbines and design of centrifugal and reciprocating pumps and their specifications , working principles and their characteristics(L2-Understand)

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**P10**	**P11**	**P12**	**PS O1**	**PS O2**	**PS O3**
C224 .1	3	2	1	-	-	-	-	1	-	-	-	-	3	3	3
C224 .2	3	1	2	-	-	-	-	-	2	-	-	-	3	2	3

C224.3	3	2	1	-	-	-	-	-	-	3	-	-	3	2	3
C224.4	3	2	1	1	-	-	-	-	-	-	-	-	3	-	2
C224.5	2	1	3	-	-	-	-	-	-	-	-	3	2	2	1
C224.6	3	1	2	-	-	-	-	-	-			3	2	1	3
C224	2.83	1.5	1.66	0.166	-	-	-	0.166	0.33	0.5	-	1	2.33	1.66	1.5

Course Code &Name: R20MED2204& Instrumentation ControlSystems
Year of study: 2021-2022

Course Name	Course outcomes
C225 .1	Interpret the knowledge of fieldinstrumentations.(L2-Understand)
C225 .2	Describe dynamic modeling andsystem behavior (L1-Remember)
C225 .3	Design of controllers.(L6- Create)
C225 .4	Application of control systems inprocesses.(L3-Apply)
C225 .5	Study of measurement of displacement, temperature, pressure,flow measurements, level measurements, speed, acceleration, vibration, stress and strain, humidity,force, torque and power.(L1-Remember)
C225 .6	Explain the types of transducers andtheir working principles.(L2-Understand)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P1 0	P1 1	P1 2	PS O1	PS O2	PS O3
C225 .1	3	1	2	-	-	-	-	1	-	-	-	-	3	3	3
C225 .2	3	2	1	-	-	-	-	-	1	-	-	-	3	2	3
C225 .3	2	3	1	-	-	-	-	-	-	1	-	-	3	2	3
C225 .4	3	2	1	-	-	-	-	-	-	-	1	-	3	-	2
C225 .5	3	2	1	-	-	-	-	-	-	1	-	-	2	2	1
C225 .6	1	3	2	-	-	-	-	-	-			3	2	1	3
C225	2.5	2.1 6	1.3 3	-	-	-	-	0.1 66	0.1 66	0.3 3	0.1 66	0.5	2.66	1.66	2.5

Sub code &Course Name: R20EEE22L4 & Basics of Electrical & Electronics Lab
Year of study: 2021-2022

Course Name	Course outcomes
C22L6.1	Explain the basic electrical DC andAC circuits. (L3-Apply)
C22L6.2	Construction operation characteristicsof DC and AC machines and also the constructional features and operation of measuring instruments like voltmeter, (L4-Analysing)
C22L6.3	Describe the operation of the transformers in the energy conversionprocess. (L1-Remember)
C22L6.4	Summarize the operation of diodes,transistors, realization of various electronic circuits with the various semiconductor devices. (L5 –Evaluating)
C22L6.5	Explain the principles cathode rayoscilloscope and its applications. (L3-Apply)
C21L1.6	Apply the above conceptual things toreal world electrical and electronics problems and applications. (L2-Understand)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P1 0	P1 1	P1 2	PS O1	PS O2	PS O3
C21L6 .1	3	1	2	1	-	-	-	-	-	-	-	-	2	1	1
C21L6 .2	1	2	3	-	-	-	-	1	-	-	-	-	3	1	2
C21L6 .3	3	1	2	-	-	-	-	-	-	1	-	-	3	2	2
C21L6 .4	1	3	2	-	-	-	-	-	-	-	-	3	3	1	3
C21L6 .5	1	2	3	-	-	-	-	-	-	-	-	3	3	3	3
C21L6 .6	1	2	3	-	-	-	-	-	-	-	2	-	2	3	3
C21L6	1.66	1.83	2.5	0.166	-	-	-	0.166	-	0.166	0.33	1	2.66	1.83	2.33

Course Code &Name: R20MED22L1& Fluid Mechanics & Hydraulic Machines Lab
Year of study: 2021-2022

Course Name	Course outcomes
C22L7.1	Conduct performance tests on impactof jet apparatus and determine the impact factor.(L3-Apply)
C22L7 .2	Analyze the performance curves ofdifferent turbines. (L4-Analysing)
C22L7 .3	Perform the tests on pumps and calculate the efficiency of pumps.(L3-Apply)
C22L7 .4	Calibrate the coefficient of dischargeof different flow meters.(L5 –Evaluating)
C22L7 .5	Conduct the test on Bernoulli'sapparatus and K5-Evaluate theBernoulli's theorem.(L3-Apply)
C22L7 .6	Determine the friction factor for agiven pipe. (L2-Understand)

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**P10**	**P11**	**P12**	**PS O1**	**PS O2**	**PS O3**
C22L 7.1	3	1	2	1	-	-	-	-	-	-	-	-	3	3	3
C22L 7.2	3	2	1	-	-	-	-	1	-	-	-	-	3	2	3
C22L 7.3	3	1	2	-	-	-	-	-	-	-	-	3	3	2	3
C22L 7.4	3	1	2	-	-	-	-	-	1	-	-	-	3	-	2
C22L 7.5	3	1	2	-	-	-	-	-	-	-	-	1	2	2	1
C22L 7.6	3	2	1	-	-	-	-	-	-	-	-	2	2	1	3
C22L 7	3	1.33	1.66	0.166	-	-	-	0.166	0.166	-	-	1	2.66	1.66	2.5

Course Code &Name: R20MED22L2 & **Instrumentation& Control Systems Lab**
Year of study: 2021-2022

Course Name	Course outcomes
C22L8 .1	Calibrate the pressure gauge, LVDTand capacitive transducer.(L5 –Evaluating)
C22L8 .2	Calibrate the thermocouple, RTD fortemperature measurement.(L5 – Evaluating)
C22L8.3	Calibrate the photo and magnetic speed pickups for measurement of speed.(L5 –Evaluating)
C22L8.4	Calibration of Rotameter for flow measurement.(L5 –Evaluating)
C22L8.5	Operate seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.(L5 –Evaluating)
C22L8.6	Calibration of Mcleod gauge for lowpressure (L4-Analysing)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C22L8.1	3	2	1	-	-	1	-	-	-	-	-	-	3	3	3
C22L8.2	3	1	2	-	-	-	1	-	-	-	-	-	3	2	3
C22L8.3	1	2	3	-	-	-	-	-	1	-	-	-	3	2	3
C22L8.4	3	1	2	-	-	-	-	-	-	1	-	-	3	-	2
C22L8.5	2	1	3	-	-	-	-	-	-	-	-	3	2	2	1
C22L8.6	3	2	1	-	-	-	-	-	-			3	2	1	3
C22L8	2.5	1.5	2	-	-	0.166	0.166	-	0.166	0.166	0.166	1	2.66	1.66	2.5

III YEAR MECH SEMESTER-I (REGULATION –R20)
ACADEMIC YEAR: 2019-2020

Course Code &Name: R20MED3101 & Dynamics of Machinery
Year of study: 2022-2023

Course Name	Course outcomes
C311.1	Use of mathematical methods to analyze the forces and motion of complex systems of linkages.
C311.2	Design linkage, cam and gear mechanisms for a given motion or agiven input/output motion or force relationship and friction circle and friction axis.
C311.3	K4-Analyze the motion and the dynamical forces acting on mechanical systems composed oflinkages, gears and cams.
C311.4	K4-Analyze all types of brakes, Governors, balancing of masses,Hammer blow, swaying couple, traction effort.
C311.5	Study of transverse and forced vibrations, whirling of shafts andtorsional vibrations.
C311.6	Explain the friction occurs invarious types of clutches.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C311.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C311.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C311.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C311.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C311.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C311.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C311	3	-	-	3	-	-	-	-	-			3	2	1	3

Course Code &Name: R20MED3102& Design ofMachine Members-I

Year of study: 2022-2023

Course Name	Course outcomes
C311.1	Students will be able to identify the elements of the design process.
C311.2	Students will be able to define strict liability, negligence and express and implied warrantee.
C311.3	Students will be able to list thefundamental canons of engineering ethics.
C311.4	Students will be able to identify ordefine the yield stress and the ultimatestress of a material.
C311.5	Students will be able to calculate the endurance limit of a material with appropriate corrections.
C311.6	Students will be able to identify the stresses acting on a surface and find principal stresses.

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C312.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C312.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C312.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C312.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C312.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C312.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C312	3	-	-	3	-	-	-	-	-			3	2	1	3

Course Code &Name: R20MED3103 Metrology &Machine Tools

Year of study: 2022-2023

Course Name	Course outcomes
C313.1	Formulate problems in metal cutting and evaluate the cutting parameters when vendor gives machine requirement or cutting condition requirement
C313.2	determine a complete solution to metal cutting problems using mathematical or graphical techniques, and
C313.3	determine physical and design interpretations of metal cutting parameters in design and sale of machine tools
C313.4	Thorough evaluation of newly developed products, to ensure that components designed are within the process and measuring instrument capabilities available in the plant.
C313.5	To determine the process capabilities and ensure that these are better than the relevant component tolerances
C313.6	To determine the measuring instrument capabilities and ensure that these are adequate for their respective measurements.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C313.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C313.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C313.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C313.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C313.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C313.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C313	3	-	-	3	-	-	-	-	-			3	2	1	3

Course Code &Name: R20MBA2201 & Business Economics &Financial Analysis

Year of study: 2022-2023

Course Name	Course outcomes
C314.1	Discuss the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing indifferent market structures.
C314.2	Justify the gain an insight into how production function is carried out toachieve least cost combination of inputs and cost analysis.
C314.3	Analyze how capital budgetingdecisions are carried out.
C314.4	Explain the framework for both manual and computerized accountingprocess.
C314.5	Analyze and interpret the financialstatements through ratio analysis.
C314.6	Explain the various methods of capitalbudgeting.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C314.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C314.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C314.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C314.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C314.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C314.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C314	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1

Course Code &Name: R20MED3104 & Thermal Engineering-II

Year of study: 2022-2023

Course Name	Course outcomes
C315.1	Conduct experiments on the Boilers,Turbines.
C315.2	Explain the principles of JetPropulsion and rockets.
C315.3	State the principles of steam turbines,Gas turbines, steam condensers.
C315.4	Describe the applications and analysisof steam nozzles.
C315.5	Discuss the types of compressors andtheir principles.
C315.6	Explain the basic concepts ofcombustion analysis.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C315.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C315.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C315.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C315.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C315.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C315.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C315	3	-	-	3	-	-	-	-	-			3	2	1	3

Course Code &Name: R20MTH3101& Operations Research

Year of study: 2022-2023

Course Name	Course outcomes
C316.1	Identify necessity and development ofmathematical models for various industries.
C316.2	Describe basic optimization and simulation techniques applied to various industries.
C316.3	Recall investment analysis and gametheory.
C316.4	Propose a queuing model based upongiven data.
C316.5	Define the different types ofsimulation models.
C316.6	Explain the types of inventory models

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C316.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C316.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C316.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C316.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C316.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C316.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C316	3	-	-	3	-	-	-	-	-			3	2	1	3

Course Code &Name: R20MED31L1 & Thermal Engineering Lab

Year of study: 2022-2023

Course Name	Course outcomes
C317.1	Conduct performance tests on 2 strokes and 4 strokes S.I and C.I engines.
C317.2	Perform heat balance sheet, Morse testand motoring test on given engine.
C317.3	Perform the assembly and disassembly of IC engine.
C317.4	K5-Evaluate volumetric efficiency of air compressor practically.
C317.5	Draw valve timing diagrams for 4stroke engines respectively.
C317.6	Summarize the working principle ofboilers.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C317.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C317.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C317.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C317.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C317.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C317.6	3	-	-	3	-	-	-	-	-			3	2	1	3
	3	-	-	3	-	-	-	-	-			3	2	1	3

Course Code &Name: R20MED31L2 & Metrology &Machine ToolsLab

Year of study: 2022-2023

Course Name	Course outcomes
C318.1	Explain the work on machines and usage of tools.
C318.2	Produce the required job as per given dimensions in different types of machines.
C318.3	Explain the Quick return mechanism in shaper.
C318.4	Describe the various types of measuring devices and its measuring methods
C318.5	Operate the Lathe machine and conduct tool alignment test
C318.6	Experiment on tool makers microscope and discuss its applications

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C318.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C318.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C318.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C318.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C318.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C318.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C318															

Course Code &Name: R20MED31L3 & Kinematics &Dynamics Lab

Year of study: 2022-2023

Course Name	Course outcomes
C319.1	Analyze forces and torques ofcomponents in linkages
C319.2	Understand static and dynamicbalance
C319.3	Understand forward and inverse kinematics of open-loop mechanisms
C319.4	To understand the critical speed ofa given shaft for different n- conditions
C319.5	To understand the effect of gyroscope for different motions
C319.6	To understand time period

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C319.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C319.2	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C319.3	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
C319.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	2
C319.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C319.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C319	3	2	-	3	-	-	-	-	-			3	2	1	3

III YEAR MECH SEMESTER-II (REGULATION –R20)
ACADEMIC YEAR: 2022-2023

Course Code &Name: R20MED3201 & Design of Machine Members-II
Year of study: 2022-2023

Course Name	Course outcomes
C321.1	Understanding of the uncertainties and remedial approach pertaining to material properties and engineering analysis as a real-world engineering application. (L6-Create)
C321.2	The Design includes a. bearings b. IC Engine Parts c. Pulleys, Gears (Spur and Helical) d. Design of Screws(L1-Remember)
C321.3	designs bearings, Pulleys, IC Engine Parts such as connecting rod, piston. Design of the belts and ropes their materials.(L2-Understand)
C321.4	Design of the belts and ropes their materials. (L6- Create)
C321.5	Study of different types of gears.(L6- Create)
C321.6	Study of the power screw and compound screw and differential screw(L2-Understand)

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO8**	**PO9**	**P1 0**	**P1 1**	**P1 2**	**PS O1**	**PS O2**	**PS O3**
C321.1	3	2	1	-	1	-	-	-	1	-	-	-	3	3	3
C321.2	3	1	1	3	-	-	1	-	-	-	-	-	3	2	3
C321.3	3	2	1	3	-	-	-	-	1	-	-	-	3	2	3
C321.4	3	2	1	-	-	1	-	-	-	-	-	-	3	-	2
C321.5	3	2	-	-	-	-	1	-	-	-	-	3	2	2	1
C321.6	3	-	-	-	-	-	-	1	-	-	1	3	2	1	3
C321	3	1.5	2	1	0.16	0.16	0.16	0.16	0.33	-	-	1	2.66	1.66	2.5

Course Code &Name: R20MED3202 & Heat Transfer
Year of study: 2022-2023

Course Name	Course outcomes
C322.1	Formulate and predict heat conductionproblems with and without heat generation in composite walls and extended surfaces subjected to convective boundaries also K4-Analyze 1D unsteady and 2D steady conduction problems.(L6- Create)
C322.2	Develop concept of boundary layer formation over heated surfaces duringforced and free convection, formulation of momentum and energyequations of the solution by approximate method..(L6- Create)
C322.3	Study of heat transfer with phasechange.(L1-Remember)
C322.4	Study of the heat exchangers.(L1-Remember)
C322.5	Explain the radiation heat transfer concepts and state the laws related toradiation.(L2-Understand)
C322.6	Calculate Nucleate boiling, criticalheat flux and film boiling also categorize types of condensation.(L3-Apply)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C322.1	3	2	1	-	1	-	-	-	3	-	-	3	3	3	3
C322.2	3	1	2	-	-	1	-	-	3	1	-	3	3	3	3
C322.3	3	-	-	1	-	-	-	1	-	-	-	3	3	3	3
C322.4	3	1	3	-	-	-	1	-	3	-	-	3	3	3	3
C322.5	3	-	-	-	-	-	-	-	-	-	-	3	3	3	3
C322.6	3	3	3	-	-	-	-	1	3	-	-	3	3	3	3
C322	3	1.66	3	1.66	1.66	0.66	0.66	0.33	3	0.33	-	3	3	3	3

Course Code &Name: R20MED3203 & CAD & CAM
Year of study: 2022-2023

Course Name	Course outcomes
C323.1	Model the 3-D geometric information of machine components including assemblies, and automatically generate 2-D production drawings,(L2-Understand)
C323.2	Understand the basic analytical fundamentals that are used to create and manipulate geometric models in a computer program,(L6- Create)
C323.3	Improve visualization ability of machine components and assemblies before their actual fabrication through modeling, animation, shading, rendering, lighting and coloring(L6- Create)
C323.4	Model complex shapes including freeform curves and surfaces,(L2-Understand)
C323.5	Implement CNC programs for milling and turning machining operations,(L6- Create)
C323.6	Integrate the CAD system and the CAM system by using the CAD system for modeling design information and converting the CAD model into a CAM model for modeling the manufacturing information,(L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C323.1	3	2	1	-	3	1	-	-	-	1	-	-	3	3	3
C323.2	3	2	2	-	3	-	1	-	-	-	-	-	3	3	3
C323.3	2	2	1	-	-	-	-	-	1	-	-	-	2	3	2
C323.4	2	1	-	-	-	-	-	-	1	-	-	-	3	2	3
C323.5	2	2	1	-	3	-	1	-	-	-	-	-	2	2	2
C323.6	2.4	2	1.6	-	2.4	-	-	1	-	-	1	-	2.6	2.6	2.6
C323	3	1.83	2	-	3	-	0.33	0.16	0.33	0.16	0.16	-	3	3	3

Course Code &Name: R20MED3213& Production Planning &Control
Year of study: 2022-2023

Course Name	Course outcomes
C324.1	Design of production/operatingsystem.(L6- Create)
C324.2	Develop forecasts using forecastingtechniques and choose a location.(L6- Create)
C324.3	Choose a facility layout and performwork measurement. (L5 –Evaluating)
C324.4	Explain capacity planning, materialsmanagement and inventory management. (L2-Understand)
C324.5	Explain the master production schedule, shop floor planning and control and material management. (L2-Understand)
C324.6	Explain advanced softwares relatedproduction planning & control (L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C324.1	3	-	2	-	1	-	-	-	-	-	2	2	3	3	-
C324.2	3	3	2	-	-	1	-	-	-	-	2	-	3	-	-
C324.3	3	2	2	-	-	-	1	-	-	-	3	1	1	2	-
C324.4	3	2	-	-	-	-	-	1	-	-	2	2	1	-	1
C324.5	3	-	-	-	-	-	-	-	-	-	-	2	1	-	-
C324.6	3	2.3	2	-	-	-	-	-	1	-	2.25	1.6	1.8	2.3	1
C324	3	-	2	-	-	-	-	-	-	-	2	2	3	3	-

Course Code &Name: R20MED3204 & Finite Element Methods
Year of study: 2022-2023

Course Name	Course outcomes
C325.1	To obtain an understanding of the fundamental theory of the FEA method; (L2-Understand)
C325.2	To develop the ability to generatethe governing FE equations for systems governed by partial differential equations; (L2-Understand)
C325.3	To understand the use of the basic finite elements for structural applications using truss, beam, frame, and plane elements; and(L6- Create)
C325.4	To understand the application and use of the FE method for heat transfer problems.(L3-Apply)
C325.5	To demonstrate the ability to createmodels for trusses, frames, plate structures, machine parts, and components using ANSYS general-purpose software;(L6-Create
C325.6	To model multi-dimensional heat transfer problems using ANSYS;(L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P11	P12	PSO1	PSO2	PSO3
C325.1	3	2	1	-	-	1	-	-	-	-	-	-	3	3	3
C325.2	3	2	1	3	-	-	-	1	-	-	-	-	3	2	3
C325.3	3	2	1	3	-	-	-	-	-	1	-	-	3	2	3
C325.4	3	2	1	-	-	-	-	-	1	-	-	-	3	-	2
C325.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C325.6	3	-	-	3	-	-	1	-	-	-	-	3	2	1	3
C325	3	2.33	0.66	1.5	-	0.166	0.166	0.166	0.166	0.166	-	1	2.66	1.66	2.5

Course Code &Name: R20MED32L1 & Heat Transfer Lab
Year of study: 2022-2023

Course Name	Course outcomes
C326.1	Perform experiment and calculate the thermal conductivity through metal, insulating powder and lagged pipe. (L5 –Evaluating)
C326.2	Determine the heat transfer coefficientand heat transfer rate in natural convection, forced convection inparallel and counter flow heat exchanger. (L2-Understand)
C326.3	Determine the emissivity, StefanBoltzmann constant to estimate heat transfer through radiation by conducting experiment. (L2-Understand)
C326.4	Solve the heat transfer in conduction process and to determine critical temperature of heat element.(L3-Apply)
C326.5	Learn the heat pipe principle and two phase flow principle.(L1-Remember)
C326.6	Study of heat transfer in pin-finapparatus.(L1-Remember)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C326.1	3	-	2	-	-	1	-	-	-	-	-	-	3	3	3
C326.2	3	-	2	1	-	-	-	1	-	-	-	-	3	2	3
C326.3	3	2	1	-	-	-	-	-	-	1	-	-	3	2	3
C326.4	2	1	3	-	-	-	1	-	-	-	-	-	3	-	2
C326.5	3	2	1	-	-	-	-	-	1	-	-	3	2	2	1
C326.6	2	1	-	3	1	-	-	-	-	-	-	3	2	1	3
C326	**2.66**	**1**	**1.5**	**0.66**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**-**	**1**	**2.66**	**1.66**	**2.5**

Course Code &Name: R20MED32L2 & CAD & CAM Lab
Year of study: 2022-2023

Course Name	Course outcomes
C327.1	To Create 2-D & 3-D drawings using AutoCAD.(L6- Create)
C327.2	Draw assembly drawings using PRO- E. (L4-Analysing)
C327.3	Determine deflections and stresses in various beams and structures by using ANSYS.(L3-Apply)
C327.4	Predict natural frequencies of 2Dbeams and perform study state heattransfer analysis of plane and axi- symmetric components.(L3-Apply)
C327.5	Develop NC code for Turning operations using CAM software andmachine simple components on NC lathe by transferring NC code from(L6- Create)
C327.6	Develop NC code for free form using CAM software and machinesimple components on NC Mill bytransferring NC code from CAM software.(L6-Create)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C327.1	3	2	1	-	-	1	-	-	-	-	-	-	3	3	3
C327.2	3	2	1	3	-	-	1	-	-	-	-	-	3	2	3
C327.3	3	2	1	2	-	-	-	1	-	-	-	-	3	2	3
C327.4	3	2	1	-	-	-	-	-	1	-	-	-	3	-	2
C327.5	3	2	-	-	-	-	-	-	-	-	-	3	2	2	1
C327.6	3	-	-	3	-	-	-	-	-			3	2	1	3
C327	3	1.66	2	1.5	-	0.16	0.16	0.16	0.16	-	-	1	2.66	1.66	2.5

Course Code &Name: R20HAS31L1 & Advanced CommunicationSkills lab
Year of study: 2022-2023

Course Name	Course outcomes
C328.1	Accomplishment of sound vocabularyand its proper use contextually.(L3-Apply)
C328.2	Develop Flair in Writing and felicityin written expression.(L6- Create)
C328.3	Generate Enhanced job prospects.(L6- Create)
C328.4	Develop the Effective SpeakingAbilities.(L6- Create)
C328.5	Develop the activities on groupdiscussion activities.(L6- Create)
C328.6	Create the interview skills (L6- Create)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C328.1	3	3	2	-	-	-	-	-	-	1	-	-	3	3	3
C328.2	3	2	1	3	-	1	-	-	-	-	-	-	3	2	3
C328.3	3	2	2	2	-	-	-	-	1	-	-	-	3	2	3
C328.4	3	2	2	-	-	-	-	1	-	-	-	-	3	-	2
C328.5	3	2	-	-	-	-	1	-	-	-	-	3	2	2	1
C328.6	3	-	-	2	-	-	-	-	-			3	2	1	3
C328	3	1.833	1.16	1.16	-	0.16	0.16	0.16	0.16	0.16	-	1	2.66	1.66	2.5

IV-I YEAR MECH SEMESTER-I (REGULATION –R20)
ACADEMIC YEAR: 2023-2024

Course Code &Name: R20MED4101 & Refrigeration & Air Conditioning
Year of study: 2023-2024

Course Name	Course outcomes
C411.1	Explain different types of Basic Refrigeration cycles and its applications in multi compressor andmulti evaporator systems. (L2-Understand)
C411.2	Describe the methods for lowtemperature refrigeration.(L1-Remember)
C411.3	Propose the selection and design of different components of Refrigerationsystems. (L5 –Evaluating)
C411.4	Describe functioning of different kindof heat energy operated vapour absorption systems. (L2-Understand)
C411.5	Recommend the selection and application of suitable/eco-friendlyrefrigerants. (L5 – Evaluating)
C411.6	Classify Air conditioning systems andstudy of heat pump. (L4-Analysing)

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO2**	**PSO 3**
C411.1	3	2	3	2	1	-	-	-	1	-	-	-	3	2	3
C411.2	3	2	3	2	1	2	-	-	-	2	-	-	3	2	3
C411.3	3	2	3	3	2	2	2	-	2	-	2	2	3	2	3
C411.4	3	2	3	2	1	-	-	-	2	-	2	-	3	2	3
C411.5	1	2	3	2	2	3	3	-	2	2	3	3	1	2	3
C411.6	3	2	3	2	1	2	-	-	-	2	-	-	3	2	3
C411	2.6	2	3	2.16	1.3	1.5	083	-	1.16	1	1.1	0.8	2.6	2	3

Course Code &Name: R20MED4122 & Automation in Manufacturing
Year of study: 2023-2024

Course Name	Course outcomes
C412.1	Understand the concept and types of automation(L2-Understand)
C412.2	Assessment of degree and level of automation, Automated flow lines(L1-Remember)
C412.3	To know the automation, Assembly system and line balancing(L1-Remember)
C412.4	Knowledge about various components of automation like sensors, actuators(L1-Remember)
C412.5	Understanding transfer lines and advanced industrial automation(L2-Understand)
C412.6	To know Automated material handling and Automated storage systems , Fundamentals of Industrial control(L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C412.1	3	2	1	1	-	-	1	-	-	-	-	2	3	3	-
C412.2	3	1	2	1	-	-	-	-	-	1	-	-	3	2	-
C412.3	3	2	1	2	-	-	-	-	-	-	2	2	3	3	-
C412.4	3	1	2	1	-	-	-	-	1	-	-	2	3	3	-
C412.5	3	2	1	2	-	-	-	1	-	-	-	2	3	2	-
C412.6	3	2	1	1	1	1	-	-	-	-	-	-	3	3	-
C412	3	1.66	1.33	1.33	0.16	0.16	0.16	-	0.16	0.16	0.33	1.3	3	2.6	-

Course Code &Name: R20MED4133 & Renewable Energy Sources
Year of study: 2023-2024

Course Name	Course outcomes
C413.1	Understand the various forms of conventional energy resources(L2-Understand)
C413.2	Learn the present energy scenario and the need for energy conservation(L2-Understand)
C413.3	Explain the concept of various forms of renewable energy (L4-Analysing)
C413.4	Outline division aspects and utilization of renewable energy sources for both domestics and industrial application (L4-Analysing)
C413.5	Analyze the environmental aspects of renewable energy resources(L2-Understand)
C413.6	Analysis of Direct energy conversion and their effects. (L4-Analysing)

CO	**PO 1**	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
C413.1	3	2	1	-	-	1	-	-	-	-	-	-	3	3	3
C413.2	3	1	2	1	-	-	-	1	-	-	-	-	3	2	3
C413.3	3	2	1	1	-	-	-	-	-	1	-	-	3	2	3
C413.4	3	2	1	-	1	-	-	-	-	-	-	-	3	-	2
C413.5	3	2	1	-	-	-	1	-	-	-	-	3	2	2	1
C413.6	3	1	2	1	-	-	-	-	1	-		3	2	1	3
C413	3	1.66	1.33	0.5	0.16	0.16	0.16	0.16	0.16	0.16	-	1	2.66	1.66	2.5

Course Code &Name: R20MED4143 & Fluid Power Systems
Year of study: 2023-2024

Course Name	Course outcomes
C414.1	To understand the basic concepts of Introduction to fluid power system-Hydraulic Components (L2-Understand)
C414.2	To know the basic working principles of Pneumatic Components(L2-Understand)
C414.3	To know the basic working principles of Fluid power systems.(L2-Understand)
C414.4	To understand the basic concepts of Electro - Pnuematics and Hydraulics(L2-Understand)
C414.5	To understand the basic concepts of Application, Maintenance And Trouble Shooting(L2-Understand)
C414.6	An ability to identify, formulate, and solve engineering problems(L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C414.1	3	2	1	1	-	1	-	-	-	-	-	2	3	3	-
C414.2	3	1	2	-	-	-	-	1	-	-	-	-	3	2	-
C414.3	3	2	1	-	1	-	-	-	-	-	-	2	3	3	-
C414.4	3	2	1	1	-	-	-	-	-	-	2	2	3	3	-
C414.5	3	1	2	-	-	-	1	-	-	-	-	2	3	2	-
C414.6	3	2	1	-	-	-	-	-	-	1	-	-	3	3	-
C414	3	1.6	1.3	0.33	0.16	0.16	0.16	0.16	-	0.16	0.3	1.3	3	2.6	-

Course Code &Name: R20MED4186 & Industrial Engineering & Ergonomics
Year of study: 2023-2024

Course Name	Course outcomes
C415.1	To understand the basic concepts of industrial design(L2-Understand)
C415.2	To know the basic concepts of ergonomics and production(L1-Remember)
C415.3	Explain the concept of various forms ergonomics(L1-Remember)
C415.4	To understand the basic concepts of Introduction to Aesthetics(L2-Understand)
C415.5	To understand the basic concepts Visual Effects of Line and Form(L2-Understand)
C415.6	To understand the basic concepts of industrial design(L2-Understand)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C415.1	3	1	2	-	1	-	-	-	-	-	2	2	3	3	-
C415.2	3	1	2	-	-	1	-	-	-	-	2	-	3	-	-
C415.3	3	2	1	-	-	-	-	1	-	-	3	1	1	2	-
C415.4	3	2	1	1	-	-	1	-	-	-	2	2	1	-	1
C415.5	3	1	2	-	-	-	-	-	1	-	-	2	1	-	-
C415.6	3	1	2	1	-	-	-	1	-	-	2	2	2	3	1
C415	3	1.33	1.6	0.33	0.16	0.16	0.16	0.33	0.16	-	1.83	1.5	1.83	1.33	0.33

IV-II YEAR MECH SEMESTER-II (REGULATION –R20)
ACADEMIC YEAR: 2023-2024

Course Code &Name: R20MED4253 & CompositeMaterials
Year of study: 2023-2024

Course Name	Course outcomes
C421.1	Some understanding of types, manufacturing processes, and applications of composite materials (L1-Remember)
C421.2	Ability to analyze problems on macromechanical behavior of lamina(L3-Apply)
C421.3	Ability to analyze problems on micromechanical behavior of lamina(L3-Apply)
C421.4	Ability to analyze problems onmacromechanical behavior of laminate(L3-Apply)
C421.5	Ability to analyze problems on bending, buckling, and vibration oflaminated plates and beams(L3-Apply)
C421.6	Ability to understand the failurebehavior of laminates(L3-Apply)

CO	**PO 1**	**PO 2**	**PO3**	**PO4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**P10**	**P 11**	**P12**	**PS O1**	**PSO2**	**P S O 3**
C421.1	3	2	1	1	-	1	-	-	-	-	-	2	3	3	-
C421.2	3	1	3	-	-	-	-	-	1	-	-	-	3	2	-
C421.3	3	2	1	-	1	-	-	-	-	-	-	2	3	3	-
C421.4	3	1	2	1	-	-	-	-	-	1	-	2	3	3	-
C421.5	3	2	1	-	-	1	-	-	-	-	-	2	3	2	-
C421.6	3	1	2	1	-	-	-	1	-	-	-	-	3	3	-
C421	3	1.5	1.66	0.5	0.16	0.33	-	0.33	0.33	0.33	-	1.33	3	2.66	-

Course Code &Name: R20MED4262 & Production Operation andManagement
Year of study: 2023-2024

Course Name	Course outcomes
C422.1	Concepts of production Operation andmanagement,(L3-Apply)
C422.2	Production planning and Control(L1-Remember)
C422.3	Managing of Work Environment –Automation —Technology Management - Waste Management(L1-Remember)
C422.4	Product & process design, analysis,(L1-Remember)
C422.5	Basic concepts of quality, dimensionsof quality (L2-Understand)
C422.6	Scheduling and materials management (L2-Understand)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C422.1	3	2	1	-	-	-	-	-	-	1	-	2	3	3	-
C422.2	2	1	3	-	-	-	-	1	-	-	-	-	3	2	-
C422.3	3	2	1	1	-	1	-	-	-	-	1	2	3	3	-
C422.4	3	1	2	1	-	-	-	-	-	-	-	2	3	3	-
C422.5	3	2	1	-	1	-	-	-	-	1	-	2	3	2	-
C422.6	3	1	2	-	-	-	1	-	1	-	-	-	3	3	-
C422	2.83	1.5	1.66	0.33	0.16	0.16	0.16	0.16	0.16	0.33	0.16	1.33	3	2.6	-

Course Code &Name: R20MED4296 & Total Engineering Quality Management
Year of study: 2023-2024

Course Name	Course outcomes
C423.1	To understand the fundamentals of quality (L2-Understand)
C423.2	To understand the role of TQM tools and techniques in elimination of wastages and reduction of defects (L2-Understand)
C423.3	To develop quality as a passion and habit(L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C423.1	3	2	1	1	-	-	-	-	-	-	-	2	3	3	-
C423.2	3	1	2	-	1	-	-	-	-	-	-	-	3	2	-
C423.3	2	1	3	1	-	-	-	-	-	-	-	2	3	3	-
C423	2.6	1.3	2	0.6	0.3	-	-	-	-	-	-	1.3	3	2.6	-

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

DEPARTMENT VISION

To develop competent engineers in the domain of Artificial Intelligence MachineLearning for noteworthy contributions to the society.

DEPARTMENT MISSION

DM1:To strengthen academic collaborations for better exposure.

DM2: Promote professional environment to imbibe ethical values and entrepreneurial skills

DM3: Encourage research & development by emphasizing on innovation

DM4: Facilitate Industry-Institute collaboration for mutual benefit

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Generate contributions towards advancements in Artificial Intelligence and Machine Learning

PEO2: Promote design, research and implementation of products through strong communication skills, leadership and entrepreneurial skills.

PEO3: Apply basic principles and practices of AIML to successfully complete software related projects to meet customer business objectives and/or productively engage in research.

PROGRAM SPECIFIC OUTCOMES (PSOS)

PSO1: Register mathematical methodology to crack problems using suitable data structures.

PSO2: Competence to design and develop software for web based and mobiles androids under real world environment

PSO3: Skill to design the algorithms for machine learning, data compression can be used in different applications.

PROGRAM OUTCOMES (POs)

PO	Description
PO 1	**Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological Change

II YEAR AIML, SEMESTER - I (REGULATION – R20)
ACADEMIC YEAR: 2020-2021

Course Code &Name: R20CSE2201,Discrete Mathematics

Upon completion of the course, students will be able to:

C211.1	Ability to understand and construct precise mathematical proofs
C211.2	Ability to use logic and set theory to formulate precise statements
C211.3	Ability to analyse and solve counting problems on finite and discrete structures
C211.4	Ability to describe and manipulate sequences
C211.5	Ability to apply graph theory in solving computing problems.
C211.6	Solve recurrence relation by using different methods.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C211.1	3	2	-	-	3	-	2	-	-	-	-	2	2	3	2
C211.2	3	3	-	2	2	-	-	-	-	-	-	-	3	3	2
C211.3	3	3	-	2	2	-	2	-	-	-	-	-	3	2	2
C211.4	3	2	3	2	-	-	2	-	-	-	-	-	3	-	1
C211.5	3	3	3	3	2	-	-	-	3	-	-	-	3	2	1
C211.6	3	2	1	1	2	-	2	-	1	-	-	-	1	2	-
C211	**3**	**2.5**	**1.16**	**1.6**	**1.83**	**-**	**1.3**	**-**	**0.6**	**-**	**-**	**0.3**	**2.5**	**2**	**1.3**

Course Code &Name: R20CSE2101, Data Structures

Upon completion of the course, students will be able to:

C212.1	Ability to select the data structures that efficiently model the information in a problem.
C212.2	Ability to assess efficiency trade-offs among different data structure implementations or combinations
C212.3	Implement and know the application of algorithms for sorting and searching
C212.4	Design programs using a variety of data structures including hash tables, binary and general tree structures ,search trees, tries, heaps, graphs and AVL –trees
C212.5	Demonstrate sound understanding of graph traversals and ability to implement algorithms on graphs.
C212.6	Illustrate the concept of Text pattern matching algorithm

Course Articulation Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**	**PSO1**	**PSO2**	**PSO3**
C212.1	1	2	2	-	3	-	-	-	1	-	-	-	2	1	-
C212.2	2	1	-	2	2	-	-	-	-	-	-	-	1	-	1
C212.3	3	-	2	-	-	-	-	-	-	-	1	-	2	-	-
C212.4	2	-	-	-	-	-	-	-	-	-	-	-	2	2	1
C212.5	1	2	2	-	3	-	-	-	1	-	-	-	2	1	-
C212.6	2	1	2	-	3	-	-	-	-	-	-	-	2	1	2
C212	**1.8**	**1.5**	**2**	**2**	**2.75**	**-**	**-**	**-**	**1**	**-**	**1**	**-**	**1.8**	**1**	**1.3**

Course Code &Name: R20MTH2104, Mathematical and Statistical Foundations
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C213.1	Apply the number theory concepts to cryptograph domain.
C213.2	Apply the concepts of probability and distributions to some case studies.
C213.3	Calculate the areas under the normal curve & applications of the normal distribution.
C213.4	Analyze the fundamental sampling distributions.
C213.5	Test the Hypothesis of single mean, double mean, single proportion, double proportion.
C213.6	Evaluate Transition Probability matrix.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C213.1	3	2	2	2	-	-	-	-	-	-	-	3	2	3	-
C213.2	3	3	2	2	-	-	-	-	-	-	-	3	3	3	-
C213.3	3	3	3	2	-	-	-	-	-	-	-	3	2	2	-
C213.4	3	3	3	3	-	-	-	-	-	-	-	3	3	3	-
C213.5	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C213.6	3	3	3	3	-	-	-	-	-	-	-	2	2	3	-
C213	**3**	**2.8**	**2.7**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.7**	**2.5**	**2.6**	**-**

Course Code &Name: R20CSE2102, Computer Organization & Architecture
Upon completion of the course, students will be able to:

Course Name	Course outcomes
C214.1	Understand the basics of instructions sets and their impact on processor design
C214.2	Demonstrate an understanding of the design of the functional units of a digital computer system
C214.3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor Including memory
C214.4	Design a pipeline for consisten execution of instructions with minimum hazards
C214.5	Recognize and manipulate representations of numbers stored in digital computers.
C214.6	Demonstrate the Characteristics of Multiprocessors.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C214.1	3	2	-	-	3	-	2	-	-	-	-	2	2	3	2
C214.2	3	3	-	2	2	-	-	-	-	-	-		3	3	2
C214.3	3	3	-	2	2	-	2	-	-	-	-		3	3	2
C214.4	3	2	3	2	-	-	2	-	-	-	-		3	2	1
C214.5	3	3	3	3	2	-	-	-	3	-	-		3	3	1
C214.6	3	3	3	3	-	-	2	-	3	-	-		3	3	1
C214	**3**	**2.6**	**3**	**2.6**	**2.2**	**-**	**2**	**-**	**3**	**-**	**-**	**2**	**2.8**	**2.8**	**1.5**

R20CSE2104 Python Programming

Course Name	Course outcomes
C215.1	Examine Python Syntax and Semantics and be fluent in the use of Python flow control and functions
C215.2	Demonstrate proficiency in handling Strings and File Systems.
C215.3	Create ,run and manipulate Python Programs using core data structure like List, Dictionaries and user Regular Expressions
C215.4	Interpret the concepts of Object-Oriented Programming as used in Python
C215.5	Implement exemplary applications related to Network Programming and Web Services in Python.
C215.6	Demonstrate about the database connections in python.

Course Articulation Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C215.1	2	-	-	-	2	-	-	-	-	-	-	-	2	1	1
C215.2	2	2	3	1	2	-	-	-	-	-	1	-	2	2	1
C215.3	2	2	2	1	2	-	-	-	-	-	1	2	2	2	1
C215.4	2	2	3	1	2	-	-	-	1	-	2	-	2	2	1
C215.5	2	2	-	2	2	1	-	-	1	-	2	2	2	1	2
C215.6	2	2	2	2	2	1	-	-	3	3	2	-	2	2	2
C215	**2**	**2**	**2**	**1.5**	**2**	**1**	**-**	**-**	**1.3**	**0.5**	**1.6**	**2**	**2**	**1.6**	**1.3**

R20MBA2201 Business Economics & Financial Analysis

Course Outcomes	Statements
C216.1	Understand the market dynamics namely, demand and supply, demand for e casting, elasticity of Demand and supply, pricing methods and pricing in market structures
C216.2	Gainandinsightintohowproductionfunctioniscarriedouttoachieveleastcost combination of inputs and cost analysis.
C216.3	Develop and understanding of
C216.4	Analyze how capital budgeting decisions are carried out.
C216.5	Understandingtheframeworkforbothmanualandcomputerizedaccountingprocess.
C216.6	Know how to analyze and interpret the financial statement through ratio analysis.

Course Articulation Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C216.1	-	3	-	-	-	-	-	3	2	-	3	3	-	-	-
C216.2	-	3	-	2	-	-	-	2	3	-	3	3	-	-	-
C216.3	-	3	-	2	-	-	-	2	1	-	-	3	-	-	-
C216.4	-	1	3	2	-	-	-	1	3	-	3	3	-	-	-
C216.5	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C216.6	-	3	3	3	-	-	-	3	3	-	3	3	-	-	-
C216	**-**	**2.6**	**1.5**	**2.6**	**-**	**-**	**-**	**2.3**	**2.5**	**-**	**2.5**	**3**	**-**	**-**	**-**

R20CSE21L1 Data Structures Lab

C217.1	Understand the concept of data structures, python and apply algorithm for solving problems like Sorting, searching, insertion and deletion of data.
C217.2	Understand linear data structures for processing of ordered or unordered data.
C217.3	Explore various operations on dynamic data structures like single linked list, circular linked list and doubly linked list.
C217.4	Explore the concept of non-linear data structures such as trees and graphs.
C217.5	Understand the binary search trees, hash function, and concepts of collision and its resolution methods.
C217.6	Identify suitable data structure to solve various computing problems.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L7.1	2	3	3	-	3	-	-	-	-	-	-	-	3	3	1
C21L7.2	1	2	2	2	3	-	-	-	-	-	-	-	1	3	3
C21L7.3	3	-	1	-	2	-	-	-	-	-	-	-	3	3	2
C21L7.4	3	-	-	-	2	-	-	-	-	-	-	-	2	3	3
C21L7.5	2	-	-	1	3	-	-	-	-	-	-	-	3	2	3
C21L7.6	3	-	-	-	2	-	-	-	-	-	-	-	2	2	3
C217	**2.33**	**2.5**	**2**	**1.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	2.3	2.6	2.5

R20CSE21L4 Python Programming Lab

C218.1	Write, Test and Debug Python Programs.
C218.2	Implement Conditionals and Loops for Python Programs.
C218.3	Use functions and represent Compound data using Lists,
C218.4	Tuples and Dictionaries.
C218.5	Read and write data from & to files in Python and develop
C218.6	Application using Pygame.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L8.1	2	3	3	-	3	-	-	-	-	-	-	-	2	3	2
C21L8.2	1	2	2	2	3	-	-	-	-	-	-	-	3	3	3
C21L8.3	3	-	1	-	2	-	-	-	-	-	-	-	1	2	1
C21L8.4	3	-	-	-	2	-	-	-	-	-	-	-	3	1	3
C21L8.5	2	-	-	1	3	-	-	-	-	-	-	-	1	3	3
C21L8.6	3	-	-	-	2	-	-	-	-	-	-	-	3	2	1
C218	**2.33**	**2.5**	**2**	**1.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	2.1	2.3	2.1

R20MAC2100 Gender Sensitization Lab (An Activity-based Course)

C219.1	Understanding the important issues related to gender in contemporary India.
C219.2	Sensitize to basic dimensions of the biological, sociological, psychological and legal aspects of gender.
C219.3	Grasp of how gender discrimination works in our society and how to counter it.
C219.4	Acquire insight into the gendered division of labour and its relation to politics and economics.
C219.5	To develop a sense of appreciation of women in all walks of life.
C219.6	Equip to work and live together as equals.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
C21L7.1	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L7.2	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L7.3	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L7.4	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L7.5	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L7.6	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C217	**2.33**	**2.5**	**2**	**1.5**	**2.5**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**

Year: III Yr Sem: I

R20CSE4143 CLOUD COMPUTING

C4143.1	Students will demonstrate knowledge of latest Technologies and how to create virtual machines in a single physical device
C4143.2	Ability to create virtual machines by using hypervisor software
C4143.3	Represent migration techniques and virtual machines can be migrated from one host to another host
C4143.4	The ability to understand the Cloud Services like IAAS,PAAS, SAAS and Distributed Data Storage in Cloud
C4143.5	Implements Monitoring and Management and Applications and SLA Management and Understand the AWS console create the S3 registration and creating buckets in the S3 Cloud
C4143.6	Evaluate different hardware components related with Distributed Cloud and best Practices in Architecting Cloud Applications in the AWS Cloud

Course Articulation Matrix

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
C4143.1	2	3	3	-	3	-	-	-	-	-	-	2	3	3	3
C4143.2	2	3	-	3	3	-	-	-	-	-	-	2	2	2	2
C4143.3	2	3	3	2	3	-	-	-	-	-	-	2	3	3	3
C4143.4	2	3	3	-	3	-	-	-	-	-	-	2	3	2	2
C4143.5	2	3	3	2	3	-	-	-	-	-	-	2	3	3	3
C4143.6	2	3	-	2	3	-	-	-	-	-	-	2	3	3	3
C4143	**2**	**3**	**3**	**2.3**	**3**	**--**	**-**		**-**	**-**	**-**	**2**	**2.8**	**2.6**	**2.6**

(R20CSE3122) ARTIFICIAL INTELLIGENCE

C3122.1	Formulateanefficientproblemspacefor aproblemexpressedinEnglish.
C3122.2	Select a search algorithm for a problem and characterize its time and space complexities.
C3122.3	Buildskillforrepresentingknowledgeusingtheappropriatetechnique.
C3122.4	Measure Uncertainty data using Probability Theory
C3122.5	ApplyA1techniquestosolveproblemsofGamePaying,ExpertSystems,MachineLearningand NaturalLanguageProcessing.
C3122.6	DefineMachineLearningparadigms.

Course Articulation Matrix

CO															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C3122.1	3	2	3	-	-	-	-	-	-	-	-	2	2	3	2
C3122.2	3	3	-	2	-	2	-	-	-	-	-	-	3	3	2
C3122.3	3	3	-	2	-	-	-	-	-	-	1-	-	3	3	2
C3122.4	3	2	1	-	-	2	-	-	-	-	-	-	3	2	1
C3122.5	3	2	2	1	-	-	-	-	-	-	1	1	2	2	1
C3122.6	**1**	**2**	**1**	**2**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**2**	**1**
	2.1	**2.3**	**1.1**	**1.1**	**0.1**	**1**	**-**	**-**	**-**	**-**	**-**	**0.5**	**2.8**	**2.8**	**1.5**

(R20CSE3203) DESIGN AND ANALYSIS OF ALGORITHMS

C311.1	Justify the performance of algorithms through performance analysis, Probabilistic analysis and Amortized analysis.
C311.2	Examines the general method of divide and conquer approach on various searching, sorting and general applications.
C311.3	Illustrate the various graph and tree traversal techniques.
C311.4	Justify the algorithm design method of greedy and dynamic programming approach on various applications.
C311.5	Analyze the Backtracking, Branch and Bound algorithm design methods on various applications.
C311.6	Differentiate the NP-Hard and NP-Complete Problems.

Course Articulation Matrix

CO	**PO**														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C323.1	2	3	2	2	-	-	-	-	-	-	1	1	2	1	1
C323.2	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C323.3	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C323.4	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C323.5	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C323.6	2	2	1	1	-	-	-	-	-	-	1	1	-	-	-
	2.0	**2.16**	**1.5**	**1.5**	**-**	**-**	**-**	**-**	**-**		**1.0**	**1.0**	**2**	**1**	**1**

R20CSM3102 – DATA MINING

C412.1	Study in detail about Data mining basic concepts and preprocessing techniques.
C412.2	Solve the Raw input data and preprocess it to provide suitable input for range of data mining Algorithm
C412.3	Apply association Rules and Classification Models.
C412.4	Identify the similar objects using clustering techniques.
C412.5	Explore the recent trend in data mining such as web mining, spatial-temporal mining
C412.6	Identify the business applications of Data mining.

Course Articulation Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO3**
C412.1	3	2	-	-	-	-	-	-	-	-	-	-	3	3	3
C412.2	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C412.3	2	3	3	3	-	-	-	-	-	-	-	-	3	3	3
C412.4	2	3	2	2	-	-	-	-	-	-	-	-	3	3	3
C412.5	2	3	3	2	-	-	-	-	-	-	-	-	3	3	3
C412.6	-	-	3	-	-	-	-	-	-	-	-	-	3	3	3
	2.33	**2.67**	**2.3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	3	3	3

(R20CSE 4101) CRYPTOGRAPHY AND NETWORKSECURITY

C411.1	Explain Security concepts, Security services, Security mechanisms, A model for Network Security. Identify and classify various Attacks.
C411.2	Compare and contrast Symmetric and Asymmetric encryption systems. Substitution techniques, Transposition techniques
C411.3	Explain the role of third-party agents in the provision of authentication services. AES, DES, BLOWFISH, RC5, IDEA algorithms.
C411.4	Comprehendandapplyauthentication,emailsecurity,websecurity,Message authentication, MAC, CMAC, Digital Signature, key management, Kerberos,X.509Authentication
C411.5	DistinguishandexplaindifferentprotocollikeSSL,TLSVis-à-vistheirapplications,IEEE802.11
C411.6	Discuss the effectiveness of passwords in access control. Explain firewall principles. Encapsulating security payload, PGP,S/MIME.

Course Articulation Matrix

CO	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS O3
C41 1.1	3	2	-	-	-	-	-	-	-	-	-	-	3	3	3
C41 1.2	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C41 1.3	2	3	3	3	-	-	-	-	-	-	-	-	3	3	3
C41 1.4	2	3	2	2	-	-	-	-	-	-	-	-	3	3	3
C41 1.5	2	3	3	2	-	-	-	-	-	-	-	-	3	3	3
C41 1.6	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
C41 1	**2.33**	**2.67**	**2.8**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	3	3	3

(R20CSM31L1) Artificial Intelligence Lab

CSM31L1.1	Elicit, analyze and specify software requirements.
CSM31L1.2	Simulate given problem scenario and analyze its performance.
CSM31L1.3	Develop programming solutions for given problem scenario.

Course Articulation Matrix

CO	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSM31 L1.1	3	2	-	-	2	-	-	-	-	-	-	-	1	2	-
CSM31 L1.2	2	3	3	-	-	-	-	-	-	-	-	-	2	2	2
CSM31 L1.3	2	3	3	3	1	-	-	-	2	-	-	-	3	3	3
CSM31 L1	**2.6**	**2.6**	**2**	**2.5**	**1**	**-**	**-**	**-**	**0.6**	**-**	**-**	**-**	**2**	**2.3**	**1.6**

(R20CSE41L1) Cryptography and Network Security Lab

C41L1.1	Explain security concepts, Ethics inNetworkSecurity.IdentifyandclassifyvariousAttacksandexplainthesame.
C41L1.2	Compareandcontrastsymmetricandasymmetricencryptionsystemsandtheirvulnerabilitytovariousattacks.
C41L1.3	Explaintheroleofthird-partyagentsintheprovisionofauthenticationservices.
C41L1.4	Comprehend and apply authentication, email security, web security services and mechanisms.
C41L1.5	Distinguish and explain different protocol like SSL, TLSV is-à-v is their applications
C41L1.6	Discuss the effectiveness of passwords in access control. Explain firewall principles.

Course Articulation Matrix

CO	PO 1	PO2	PO3	PO4	PO5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO 3
C41L1.1	3	2	-	-	-	-	-	-	-	-	-	-	3	3	3
C41L1.2	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
C41L1.3	2	3	3	3	-	-	-	-	-	-	-	-	3	3	3
C41L1.4	2	3	2	2	-	-	-	-	-	-	-	-	3	3	3
C41L1.5	2	3	3	2	-	-	-	-	-	-	-	-	3	3	3
C41L1.6	2	2	3	3	-	-	-	-	-	-	-	-	3	3	3
	2.33	**2.67**	**2.8**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	3	3	3

(R20CSE31L1) Software Engineering Lab

CSM31L1.1	To understand the software engineering methodologies involved in the phases for project development
CSM31L1.2	To gain knowledge about open source tools used for implementing software engineering methods
CSM31L1.3	To exercise developing products-start-ups implementing software engineering methods

Course Articulation Matrix

CO	PO1	PO2	PO3	PO 4	PO5	PO6	PO 7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSM31 L1.1	2	2	3	-	-	2	1	-	2	-	-	2	3	1	2
CSM31 L1.2	2	-	3	-	2	1	-	-	-	-	-	1	2	1	2
CSM31 L1.3	1	-	3	-	1	1	1	-	-	-	3	1	2	3	2
CSM31 L1	**1.6**	**0.6**	**3**	**-**	**1**	**1.3**	**.6**	**-**	**0.6**	**-**	**1**	**1.3**	**2.3**	**1.3**	**2**

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF DATA SCIENCE

VISION

To be a highly vying in nurturing collaborative, innovative and rational data science professionals with high ethics towards societal uplift

MISSION

DM1: To emerge as a competitive centre for breeding predictive data analysts and scientists

DM2: To produce highly accomplished professionals and Entrepreneurs through a Contemporary Industry Interactions

DM3: Futuristic infrastructure with modern tools for students to develop products for societal benefits

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	**Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological Change
Program Specific Outcomes	
PSO 1	To furnish data science solutions through effective and innovative tools
PSO 2	Fabricate use case-based models using data science with greater perspective
PSO 3	Exposure to emerging trends with high intensity Learning

Academic Year: 2022 – 23

Year: II **Sem: I**

Course Code & Name: R20CSE2201 & Discrete Mathematics

Upon completion of the course, students will be able to:

C211.1	To understand and construct precise mathematical proofs. (K5-Evaluate)
C211.2	To use logic and set theory to formulate precise statements. (K5-Evaluate)
C211.3	To analyse and solve counting problems on finite and discrete structures. (K3-Analysis)
C211.4	To describe and manipulate sequences. (K5-Evaluate)
C211.5	To apply graph theory in solving computing problems. (K5-Evaluate)
C211.6	Solve recurrence relation by using different methods. (K5-Evaluate)

Course Articulation Matrix

CO	**PO**												**PSO**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C211.1	3	1	-	3	3	1	-	-	-	-	-	1	-	2	-
C211.2	2	-	2	3	3	-	-	-	-	-	-	-	-	1	-
C211.3	2	3	3	1	1	1	-	-	-	-	-	1	-	1	-
C211.4	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
C211.5	1	1	-	3	3	-	-	-	-	-	-	-	-	1	-
C211.6	1	-	-	3	3	-	-	-	-	-	-	-	-	1	-
C211.1	3	1	-	3	3	1	-	-	-	-	-	1	-	2	-

Course Code & Name: R20CSE2101 & Data Structures

Upon completion of the course, students will be able to:

C212.1	Select the data structures that efficiently model the information in a problem. (K3-Apply)
C212.2	Ability to assess efficiency trade-offs among different data structure implementations or combinations. (K4-Analyze)
C212.3	Implement and know the application of algorithms for sorting and searching. (K4-Analyze)
C212.4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees (K3-Apply)
C212.5	Ability to select the data structures that efficiently model the information in a problem (K4-Analyze)
C212.6	Illustrate the concept of Text pattern matching algorithm (K5-Evaluate)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C212.1	3	3	1	1	1	-	-	1	-	3	-	3	2	-	-
C212.2	1	2	2	1	1	-	-	1	-	-	-	-	2	2	-
C212.3	3	3	3	3	1	-	-	1	3	1	-	1	3	-	-
C212.4	3	2	2	3	2	-	-	1	3	1	-	-	2	3	-
C212.5	2	3	3	2	-	-	-	1	2	3	-	2	3	1	1
C212.6	3	3	3	3	3	-	-	1	3	1	-	2	2	3	2
C212	**2.5**	**2.8**	**2.5**	**2.2**	**1.3**	**-**	**-**	**1**	**1.8**	**1.5**	**-**	**1.3**	**2.7**	**1.5**	**0.5**

Course Code & Name: R20MTH2104 & Mathematical and Statistical Foundations

Upon completion of the course, students will be able to:

CO'S	Statements
C213.1	Apply the number theory concepts to cryptography domain (K3-Apply)
C213.2	Apply the concepts of probability and distributions to some case studies (K3-Apply)
C213.3	Calculate the areas under the normal curve& applications of the normal distribution (K3-Apply)
C213.4	Analyze the fundamental sampling distributions (K4-Analyze)
C213.5	Test the Hypothesis of single mean, double mean , single proportion, double proportion (K2-Understand)
C213.6	Evaluate Transition Probability matrix (K5-Evaluate)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C213.1	3	2	2	2	-	-	-	-	-	-	-	3	2	2	-
C213.2	3	3	2	2	-	-	-	-	-	-	-	2	3	2	-
C213.3	3	3	3	2	-	-	-	-	-	-	-	3	2	3	-
C213.4	3	3	3	3	-	-	-	-	-	-	-	3	2	2	-
C213.5	3	3	3	3	-	-	-	-	-	-	-	2	3	2	-
C213.6	3	3	3	3	-	-	-	-	-	-	-	2	2	3	-
C213	**3**	**2.8**	**2.7**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.7**	**2.5**	**2.6**	**-**

Course Code & Name: R20CSE2102 & Computer Organization & Architecture

Upon completion of the course, students will be able to:

C214.1	Understand the basics of instructions sets and their impact on processor design. (K2-Understanding)
C214.2	Demonstrate an understanding of the design of the functional units of a digital computer system. (K2-Understanding)
C214.3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory. (K5-Evaluate)
C214.4	Design a pipeline for consistent execution of instructions with minimum hazards. (K2-Understanding)
C214.5	Recognize and manipulate representations of numbers stored in digital computers. (K4-Analysis)
C214.6	To analyse processor performance improvement using instruction level parallelism. (K4-Analysis)

Course Articulation Matrix

CO	**PO**												**PSO**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C214.1	3	2	2	2	2	-	-	-	-	-	3	2	2	2	-
C214.2	3	2	2	2	2	-	-	-	-	-	2	2	1	3	-
C214.3	1	1	1	3	3	-	-	2	-	-	1	3	3	2	-
C214.4	1	2	2	-	2	-	-	-	-	-	-	2	1	2	-
C214.5	1	3	3	2	-	-	-	-	-	-	2	2	2	3	1
C214.6	3	1	1	2	3	-	-	-	-	-	2	3	3	3	2
C214	**2.5**	**2.8**	**2.5**	**2.2**	**1.3**	**-**	**-**	**2**	**-**	**-**	**2.3**	**2.7**	**1.5**	**2.8**	**0.5**

Course Code & Name: R20CSE2104 & Python Programming

Upon completion of the course, students will be able to:

C215.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions. (K2-Understanding)
C215.2	Demonstrate proficiency in handling Strings and File Systems. (K5-Evaluate)
C215.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions. (K5-Evaluate)
C215.4	Interpret the concepts of Object-Oriented Programming as used in Python. (K4-Analyze)
C215.5	Implement exemplary applications related to Network Programming and Web Services in Python. (K5-Evaluate)
C215.6	Demonstrate about the database connections in Python. (K5-Evaluate)

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C215.1	2	-	-	-	2	-	-	-	-	-	-	-	2	1	1
C215.2	2	2	3	1	2	-	-	-	-	-	1	-	2	2	1
C215.3	2	2	2	1	2	-	-	-	-	-	1	2	2	2	1
C215.4	2	2	3	1	2	-	-	-	1	-	2	-	2	2	1
C215.5	2	2	-	2	2	1	-	-	1	-	2	2	2	1	2
C215.6	2	2	2	2	2	1	-	-	3	3	2	-	2	2	2
C215	**2**	**2**	**2**	**1.5**	**2**	**1**	**-**	**-**	**1.3**	**3**	**1.6**	**2**	**2**	**1.6**	**1.3**

Course Code & Name: R20MBA2201 & Business Economics & Financial Analysis

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C216.1	Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in market structures (K2-Understanding)
C216.2	Gain and insight into how production function is carried out to achieve least cost combination of inputs and cost analysis. (K2-Understanding)
C216.3	Develop and understanding of cost analysis and its impacts. (K4-Analyze)
C216.4	Analyze how capital budgeting decisions are carried out. (K4-Analyze)
C216.5	Understanding the framework for both manual and computerized accounting process.(K2-Understanding)
C216.6	Know how to analyze and interpret the financial statement through ratio analysis. (K4-Analyze)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C216.1	-	3	-	-	-	-	-	3	2	-	2	2	-	-	-
C216.2	-	3	-	2	-	-	-	2	3	-	3	3	-	-	-
C216.3	-	3	-	2	-	-	-	2	1	-	-	2	-	-	-
C216.4	-	1	3	2	-	-	-	1	3	-	2	3	-	-	-
C216.5	-	3	3	3	-	-	-	3	2	-	2	2	-	-	-
C216.6	-	3	3	3	-	-	-	3	2	-	3	3	-	-	-
C216	**-**	**2.6**	**3**	**2.6**	**-**	**-**	**-**	**2.3**	**2.5**	**-**	**2.5**	**2.8**	**-**	**-**	**-**

Course Code & Name: R20CSE21L1 & Data Structures Lab

Upon completion of the course, students will be able to:

C217.1	Understand the concept of data structures, python and apply algorithm for solving problems like Sorting, searching, insertion and deletion of data. (K5-Evaluate)
C217.2	Understand linear data structures for processing of ordered or unordered data. (K5-Evaluate)
C217.3	Explore various operations on dynamic data structures like single linked list, circular linked list and doubly linked list. (K5-Evaluate)
C217.4	Explore the concept of non-linear data structures such as trees and graphs. (K5-Evaluate)
C217.5	Understand the binary search trees, hash function, and concepts of collision and its resolution methods. (K5-Evaluate)
C217.6	Identify suitable data structure to solve various computing problems. (K5-Evaluate)

Course Articulation Matrix

CO	**PO**												**PSO**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C21L1.1	2	3	3	-	3	-	-	-	-	-	-	-	3	3	3
C21L1.2	1	2	2	2	3	-	-	-	-	-	-	-	3	3	3
C21L1.3	3	-	1	-	2	-	-	-	-	-	-	-	3	3	3
C21L1.4	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C21L1.5	2	-	-	1	3	-	-	-	-	-	-	-	3	3	3
C21L1.6	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C21L1	**2.33**	**2.5**	**2**	**1.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	3	3	3

Course Code & Name: R20CSE21L4 & Python Programming Lab

Upon completion of the course, students will be able to:

C218.1	Write, Test and Debug Python Programs. (K5-Evaluate)
C218.2	Implement Conditionals and Loops for Python Programs. (K5-Evaluate)
C218.3	Use functions and represent Compound data using Lists (K5-Evaluate)
C218.4	Tuples and Dictionaries. (K5-Evaluate)
C218.5	Read and write data from & to files in Python and develop (K5-Evaluate)
C218.6	Application using Pygame. (K5-Evaluate)

Course Articulation Matrix

CO	PO												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C21L2.1	2	3	3	-	3	-	-	-	-	-	-	-	3	3	3
C21L2.2	1	2	2	2	3	-	-	-	-	-	-	-	3	3	3
C21L2.3	3	-	1	-	2	-	-	-	-	-	-	-	3	3	3
C21L2.4	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C21L2.5	2	-	-	1	3	-	-	-	-	-	-	-	3	3	3
C21L2.6	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C21L2	**2.33**	**2.5**	**2**	**1.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	3	3	3

Course Code & Name: R20MAC2100 & Gender Sensitization Lab

(An Activity-based Course)

Upon completion of the course, students will be able to:

C219.1	Understanding the important issues related to gender in contemporary India. (K4-Analysis)
C219.2	Sensitize to basic dimensions of the biological, sociological, psychological and legal aspects of gender. (K4-Analysis)
C219.3	Grasp of how gender discrimination works in our society and how to counter it. (K4-Analysis)
C219.4	Acquire insight into the gendered division of labour and its relation to politics and economics. (K4-Analysis)
C219.5	To develop a sense of appreciation of women in all walks of life. (K4-Analysis)
C219.6	Equip to work and live together as equals. (K4-Analysis)

Course Articulation Matrix

CO	PO												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C21L3.1	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L3.2	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L3.3	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L3.4	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L3.5	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L3.6	-	-	-	-	-	3	3	3	3	3	3	3	-	-	3
C21L3	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**

Academic Year: 2022 – 23

Year: II **Sem: II**

Course Code & Name: R20CSE2206 & Formal Language and Automata Theory

Upon completion of the course, students will be able to:

Course Outcomes	Statements
C221.1	Understand basic properties of formal languages and formal grammars.
C221.2	Understand basic properties of deterministic and nondeterministic finite automata, Understand the relation between types of languages and types of finite automata
C221.3	Understanding the Context free languages and grammars, and also Normalising CFG.
C221.4	Understanding the minimization of deterministic and nondeterministic finite automata. Understand basic properties of Turing machines and computing with Turing machines.
C221.5	To understand deterministic and non-deterministic machines. Understand the concept of Pushdown automata and its application.
C221.6	Know the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problem.

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C221.1	2	2	1	-	-	-	-	-	-	1	-	1	2	2	2
C226.2	3	3	2	2	1	-	-	-	-	1	-	2	3	2	2
C226.3	3	3	3	1	1	-	-	-	-	1	-	2	3	1	1
C226.4	3	3	2	2	1	-	-	-	-	1	-	2	3	2	2
C226.5	3	3	2	2	1	-	-	-	-	1	-	2	3	2	2
C226.6	3	3	2	2	1	-	-	-	-	1	-	2	3	2	2
C226	**2.8**	**2.8**	**2**	**1.75**	**1**	**-**	**-**	**-**	**-**	**1**		**1.8**	**2.8**	**1.8**	**1.8**

Course Code & Name: R20CSE2207 & Software Engineering

Upon completion of the course, students will be able to:

Course Outcomes	Statements
C222.1	Define the key software engineering tasks and software engineering process.
C222.2	explain requirement engineering process and design concepts
C222.3	describe object oriented design process and design evolution
C222.4	explain strategic approach to software testing
C222.5	explain risk strategies and refinement and quality concepts
C222.6	Evaluate Quality control and ensures good quality software, risk management(evaluate)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C222.1	2	3	3	-	3	-	-	-	-	-	-	2	3	3	3
C222.2	2	3	-	3	3	-	-	-	-	-	-	2	2	2	2
C222.3	2	3	3	2	3	-	-	-	-	-	-	2	3	3	3
C222.4	2	3	3	-	3	-	-	-	-	-	-	2	3	2	2
C222.5	2	3	3	2	3	-	-	-	-	-	-	2	3	3	3
C222.6	2	3	-	2	3	-	-	-	-	-	-	2	3	3	3
C222	**2.0**	**3.0**	**3.0**	**2.33**	**3.0**	**--**	**-**		**-**	**-**	**-**	**2.0**	**2.8**	**2.6**	**2.6**

Course Code & Name: R20CSE2202 & Operating Systems

Upon completion of the course, students will be able to:

Course Outcomes	
C223.1	Define the functions, structures and history of operating systems and able to analyze the design issues associated with operating systems. (Remember)
C223.2	Demonstrate various process management concepts, evaluates various CPU scheduling algorithms and illustrate the process synchronization concepts with various examples. (Apply)
C223.3	Evaluate the problems related to deadlocks, classify resources sharing among the users to avoid deadlocks, design the Deadlock detection and Prevention Algorithms. (Evaluate)
C223.4	Describe the concepts of memory management including virtual memory, can compare various page replacement algorithms(Understand)
C223.5	Illustrate File Management, analyses different File Allocation Strategies, develop disk Scheduling Algorithms.(Apply)
C223.6	Using system protection and Revocation of access rights.(Analyze)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C223.1	3	3	-	-	-	-	-	-	-	-	-	2	3	3	-
C223.2	3	3	3	-	-	-	-	-	-	-	-	-	3	2	-
C223.3	3	-	3	-	-	-	-	-	-	-	-	2	3	2	-
C223.4	3	-	3	3	-	-	-	-	-	-	-	2	3	3	-
C223.5	3	2	-	2	3	-	-	-	-	-	-	2	3	3	-
C223.6	3	-	-	-	-	-	-	-	-	-	-	-	3	3	-
C223	**3**	**2.6**	**3**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**2.7**	**-**

Course Code & Name: R20CSE2203 & Database Management Systems

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C224.1	Understand the basics of instructions sets and their impact on processor design
C224.2	Demonstrate an understanding of the design of the functional units of a digital computer system
C224.3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor Including memory
C224.4	Design a pipeline for consistent execution of instructions with minimum hazards
C224.5	Recognize and manipulate representations of numbers stored in digital computers.
C224.6	Demonstrate the Characteristics of Multiprocessors.

Course Articulation Matrix

CO	PO												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C224.1	3	2	-	-	3	-	2	-	-	-	-	2	2	3	2
C224.2	3	3	-	2	2	-	-	-	-	-	-		3	3	2
C224.3	3	3	-	2	2	-	2	-	-	-	-		3	3	2
C224.4	3	2	3	2	-	-	2	-	-	-	-		3	2	1
C224.5	3	3	3	3	2	-	-	-	3	-	-		3	3	1
C224.6	3	3	3	3	-	-	2	-	3	-	-		3	3	1
C224	**3**	**2.6**	**3**	**2.6**	**2.2**	**-**	**2**	**-**	**3**	**-**	**-**	**2**	**2.8**	**2.8**	**1.5**

Course Code & Name: R20CSE2204 & Java Programming

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C225.1	Describe the OOPS concepts and primary concepts of java.(Understand)
C225.2	Illustrate the types of inheritance, polymorphism, inner classes andpackages(Apply)
C225.3	Justify the solutions to the given problem by applying the multithreading and exception handling mechanism. (Evaluate)
C225.4	Describe various collection framework concepts and file operations(Understand)
C225.5	Design java applications by applying database operations through JDBC drivers (Create)
C225.6	Analyze & Design the concept of Event Handling and Abstract Window Toolkit.(Create)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C225.1	2	2	2	2	-	-	-	-	2	-	-	2	2	2	2
C225.2	2	3	3	3	-	-	-	-	2	-	-	2	3	2	2
C225.3	2	3	3	3	-	-	-	-	2	-	-	2	3	1	1
C225.4	2	2	2	-	-	-	-	-	-	-	-	-	3	2	2
C225.5	2	3	3	3	-	-	-	-	2	-	-	2	3	2	2
C225.6	2	3	3	3	-	-	-	-	2	-	-	2	3	2	2
C225	**2**	**2.6**	**2.6**	**2.3**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**2**	**2.8**	**1.8**	**1.8**

Course Code & Name: R20CSE22L1 & Operating Systems Lab

Upon completion of the course, students will be able to:

Course Outcomes	Statements
C22L1.1	To provide an understanding of the design aspects of operating system concepts through simulation
C22L1.2	Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
C22L1.3	Understand scheduling algorithms
C22L1.4	Understand the significance of Banker’s algorithm on Deadlocks
C22L1.5	Explore about IPC techniques
C22L1.6	Explore about memory management techniques

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C22L1.1	2	3	3	-	3	-	-	-	-	-	-	-	3	3	3
C22L1.2	1	2	2	2	3	-	-	-	-	-	-	-	3	3	3
C22L1.3	3	-	1	-	2	-	-	-	-	-	-	-	3	3	3
C22L1.4	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C22L1.5	2	-	-	1	3	-	-	-	-	-	-	-	3	3	3
C22L1.6	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C22L1	2.33	2.5	2	1.5	2.5	-	-	-	-	-	-	-	3	3	3

Course Code & Name: R20CSE22L2 & Database Management Systems Lab

Upon completion of the course, students will be able to:

Course Outcomes	Statements
C22L2.1	Introduce ER data model, database design and normalization
C22L2.2	Learn SQL basics for data definition and data manipulation
C22L2.3	Design database schema for a given application and apply normalization.
C22L2.4	Acquire skills in using SQL commands for data definition and data manipulation.
C22L2.5	Develop solutions for database applications using procedures ,cursors and triggers
C22L2.6	Develop a simple database to maintain an application

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C22L2.1	2	3	3	-	3	-	-	-	-	-	-	-	3	3	3
C22L2.2	1	2	2	2	3	-	-	-	-	-	-	-	3	3	3
C22L2.3	3	-	1	-	2	-	-	-	-	-	-	-	3	3	3
C22L2.4	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C22L2.5	2	-	-	1	3	-	-	-	-	-	-	-	3	3	3
C22L2.6	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C22L2	2.33	2.5	2	1.5	2.5	-	-	-	-	-	-	-	3	3	3

Course Code & Name: R20CSE22L3 & Java Programming Lab

Upon completion of the course, students will be able to:

Course Outcomes	Statements
C22L3.1	To write programs using abstract classes.
C22L3.2	To write programs for solving real world problems using java collection frame work.
C22L3.3	To write multithreaded programs.
C22L3.4	To write GUI programs using swing controls in Java.
C22L3.5	To introduce java compiler and eclipse platform.
C22L3.6	To impart hands on experience with java programming

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C22L3.1	2	3	3	-	3	-	-	-	-	-	-	-	3	3	3
C22L3.2	1	2	2	2	3	-	-	-	-	-	-	-	3	3	3
C22L3.3	3	-	1	-	2	-	-	-	-	-	-	-	3	3	3
C22L3.4	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C22L3.5	2	-	-	1	3	-	-	-	-	-	-	-	3	3	3
C22L3.6	3	-	-	-	2	-	-	-	-	-	-	-	3	3	3
C22L3	2.33	2.5	2	1.5	2.5	-	-	-	-	-	-	-	3	3	3

Academic Year: 2022 – 23

Year: III **Sem: I**

Course Code & Name: R20CSE3231 & Software Testing Methodologies

Upon completion of the course, students will be able to:

C311.1	Summarize a range of different software testing techniques and strategies for testing projects. (K2-Understand)
C311.2	List the characteristics of Dataflow and transaction flow testing methods. (K3-Remember)
C311.3	Illustrate appropriate software testing tools and techniques (K1-Apply)
C311.4	Categorize path products, expressions. (K4-Analyze).
C311.5	Evaluate various test cases for control flow and transaction flow graphs (K5-Evaluate).
C311.6	Develop and apply testing strategies for software applications (K5-Evaluate).

Course Articulation Matrix

CO	**PO**												**PSO**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C311.1	3	3	-	-	-	-	-	-	-	-	3	2	2	3	-
C311.2	2	3	-	2	-	-	-	-	-	-	2	2	1	3	-
C311.3	2	2	2	3	3	-	-	2	-	-	3	3	3	3	-
C311.4	3	3	-	-	-	-	-	-	-	-	2	2	1	2	-
C311.5	2	2	-	2	-	-	-	-	-	-	3	2	2	3	-
C311.6	3	3	3	2	3	-	-	-	-	-	2	3	3	2	-
C311	**3**	**2.8**	**2.5**	**2.2**	**3**			**2**			**2.7**	**2.3**	**2**	**2.8**	**-**

Course Code & Name: R20CSD3101 & Introduction to Data Science

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C312.1	Apply the skills of data inspecting and cleansing. (K1-Apply)
C312.2	Determine the relationship between data dependencies using statistics. (K2-Understand)
C312.3	Understand data the primary tools used for data science in Python (K2-Understand)
C312.4	Represent the useful information using mathematical skills
C312.5	Apply the knowledge for data describing and visualization using tools (K1-Apply)
C312.6	Apply the knowledge of Normal distribution in data science. (K1-Apply)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C312.1	3	1	2	3	-	-	-	-	-	-	3	-	2	3	2
C312.2	3	3	2	1	-	-	-	-	-	-	2	-	3	2	2
C312.3	2	3	2	2	-	-	-	-	-	-	2	-	2	3	2
C312.4	3	2	2	2	-	-	-	-	-	-	1	-	3	2	1
C312.5	3	3	2	2	-	-	-	-	-	-	1	-	2	3	1
C312.6	2	2	2	2							2		3	2	1
C312	**2.6**	**2.5**	**2.0**	**2.0**	**-**	**-**	**-**	**-**	**-**	**-**	**1.8**	**-**	**2.8**	**2.8**	**1.5**

Course Code & Name: R20CSC2201 & Fundamentals of Networking

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C313.1	Gain the knowledge of the basic computer network technology. (K2-Understanding)
C313.2	Gain the knowledge of the functions of each layer in the OSI and TCP/IPreference model. (K2-Understanding)
C313.3	Obtain the skills of sub netting and routing mechanisms. (K1-Applying)
C313.4	Gain the knowledge of routing algorithms and packet switching. (K2-Understanding)
C313.5	Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation. (K1-Applying)
C313.6	Gain the knowledge of Multimedia and Network security. (K2-Understanding)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C313.1	3	1	2	3	-	-	-	-	-	-	3	-	2	3	2
C313.2	3	3	2	1	-	-	-	-	-	-	2	-	2	2	2
C313.3	2	3	2	2	-	-	-	-	-	-	2	-	3	3	2
C313.4	3	3	2	2	-	-	-	-	-	-	1	-	2	2	1
C313.5	3	3	2	2	-	-	-	-	-	-	1	-	3	2	1
C313.6	2	2	2	2							2		2	3	1
C313	**2.6**	**2.5**	**2.0**	**2.0**	**-**	**-**	**-**	**-**	**-**	**-**	**1.8**	**-**	**2.8**	**2.8**	**1.5**

Course Code & Name: R20CSD3102 & Data Warehousing and Data Mining

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C314.1	To understand why the data warehouse in addition to database systems. (K2-Understanding)
C314.2	To perform the preprocessing of data and apply mining techniques (K1-Applying)
C314.3	Apply and analysis an Apriori algorithm using market datasets. (K4-Analysing)
C314.4	Apply association Rules ,Classification Models and clusters in large data sets (K1-Applying)
C314.5	Explore the recent trend in data mining such as web mining, spatial-temporal mining (K2-Understanding)
C314.6	Identify and solve the real world problems in the business and scientific information using data mining (K1-Applying)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C314.1	3	2	-	-	-	-	-	-	-	-	-	-	3	2	2
C314.2	3	3	2	-	-	-	-	-	-	-	-	-	2	3	2
C314.3	2	2	3	3	-	-	-	-	-	-	-	-	3	2	3
C314.4	2	3	2	2	-	-	-	-	-	-	-	-	2	2	2
C314.5	2	2	3	2	-	-	-	-	-	-	-	-	3	2	3
C314.6	2	3	2	2	-	-	-	-	-	-	-	-	2	3	2
C314	2.33	2.67	2.3	2.5	-	-	-	-	-	-	-	-	2.8	2.6	2.6

Course Code & Name: R20CSE3113 & Principles of Programming Languages

Upon completion of the course, students will be able to:

C315.1	Define the syntax-related concepts including context-free grammars, parse trees, recursive- descent parsing, and interpretation. (K2-Understanding)
C315.2	Illustrate the semantic issues associated with implementations, including variable binding, scoping rules, Expression and Assignment statement and control structures. (K3-Apply)
C315.3	Justify the language abstraction constructs of functions, parameter passing and co- routines. (K5-Evaluate)
C315.4	Classify the Abstract Data Types, concurrency and Exception handling in various programming languages. (K4-Analyse)
C315.5	Describe the implementation of Functional programming languages and scripting languages. (K2-Understand)
C315.6	Describe the implementation model of logic programming language. (K2-Understand)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C315.1	2	2	3	-	2	-	-	-	-	-	-	2	2	2	2
C315.2	2	3	-	3	3	-	-	-	-	-	-	2	3	2	2
C315.3	2	2	3	2	2	-	-	-	-	-	-	2	2	3	2
C315.4	2	3	3	-	3	-	-	-	-	-	-	2	3	2	2
C315.5	2	2	3	2	2	-	-	-	-	-	-	2	2	3	2
C315.6	2	3	-	2	3	-	-	-	-	-	-	2	3	2	2
C315	**2**	**2.5**	**3**	**2.33**	**3**	-	-	-	-	-	-	**2**	**2.5**	**2.6**	**2**

Course Code & Name: R20CSE4143 & Cloud Computing

Upon completion of the course, students will be able to:

Course Name	Course Outcome
C316.1	Students will demonstrate knowledge of latest Technologies and how to create virtual machines in a single physical device. (K6-Create)
C316.2	Ability to create virtual machines by using hypervisor software. (K6-Create)
C316.3	Represent migration techniques and virtual machines can be migrated from one host to another host (K5-Evaluate)
C316.4	The ability to understand the Cloud Services like IAAS, PAAS, SAAS and Distributed Data Storage in Cloud (K3-Apply)
C316.5	Implements Monitoring and Management and Applications and SLA Management and Understand the AWS console create the S3 registration and creating buckets in the S3Cloud. (K6-Create)
C316.6	Evaluate different hardware components related with Distributed Cloud and best Practices in Architecting Cloud Applications in the AWS Cloud (K5-Evaluate)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C316.1	2	3	3	-	3	-	-	-	-	-	-	2	3	3	3
C316.2	2	3	-	3	3	-	-	-	-	-	-	2	2	2	2
C316.3	2	3	3	2	3	-	-	-	-	-	-	2	3	3	3
C316.4	2	3	3	-	3	-	-	-	-	-	-	2	2	2	2
C316.5	2	3	3	2	3	-	-	-	-	-	-	2	3	3	3
C316.6	2	3	-	2	3	-	-	-	-	-	-	2	2	2	2
C316	**2.0**	**3.0**	**3.0**	**2.3**	**3.0**	**--**	**-**		**-**	**-**	**-**	**2.0**	**2.8**	**2.6**	**2.6**

Course Code & Name: R20CSE22L4 & Computer Networks Lab

Upon completion of the course, students will be able to:

Course Name	Course Outcome
C317L1.1	Implement data link layer farming methods. (K6-Create)
C317 L1.2	Analyze error detection and error correction codes. (K4-Analyse)
C317 L1.3	Implement and analyze routing and congestion issues in network design. (K6-Create)
C317 L1.4	Implement Encoding and Decoding techniques used in presentation layer. (K6-Create)
C317 L1.5	To be able to work with different network tools. (K5-Evaluate)
C317 L1.6	Analyze the traffic flow and the contents of protocol frames. (K4-Analyse)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C317L1.1	2	3	3	-	3	-	-	-	3	-	1	2	3	-	2
C317L1.2	2	3	3	-	3	-	-	-	3	-	1	2	2	-	2
C317L1.3	2	3	3	-	3	-	-	-	3	-	1	2	3	-	3
C317L1.4	2	3	3	-	3	-	-	-	3	-	1	2	2	-	2
C317L1.5	2	3	3	-	3	-	-	-	3	-	1	2	2	-	3
C317L1.6	2	3	3	-	3	-	-	-	3	-	1	2	3	-	2
C317L1	2.0	3.0	3.0	-	3.0	-	-	-	3.0	-	1.0	2.0	3.0	-	2.4

Course Code & Name: R20CSD31L1 & Data Warehousing and Data Mining Lab

Course Name	Course Outcome
C318L2.1	Ability to understand the various kinds of tools. (K2-Understand)
C318L2.2	Build Data Warehouse and Explore WEKA. (K6-Create)
C318L2.3	Perform data pre-processing tasks and demonstrate performing association rule mining on data sets. (K6-Create)
C318L2.4	Demonstrate performing classification on data sets (K6-Create)
C318L2.5	Demonstrate performing clustering on data sets. (K6-Create)
C318L2.6	Obtain practical experience using data mining techniques on real world data sets. (K6-Create)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C318L2.1	2	3	2	-	3	-	-	-	3	-	1	2	3	-	3
C318L2.2	2	2	3	-	2	-	-	-	2	-	1	2	2	-	2
C318L2.3	2	3	2	-	3	-	-	-	3	-	1	2	3	-	3
C318L2.4	2	2	3	-	2	-	-	-	2	-	1	2	2	-	2
C318L2.5	2	3	2	-	3	-	-	-	3	-	1	2	3	-	3
C318L2.6	2	2	2	-	2	-	-	-	2	-	1	2	2	-	2
C318L2	2.0	2.8	2.6	-	2.6	--	-		2.6	-	1.0	2.0	2.6	-	2.8

Course Code & Name: R20CSD31L2 & Software Testing & CASE Tools Lab

Upon completion of the course, students will be able to:

Course Name	Course Outcome
C319L3.1	Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. (K6-Create)
C319L3.2	Discuss about the functional and system testing methods. (K4-Analysis)
C319L3.3	Demonstrate various issues for object-oriented testing. (K6-Create)
C319L3.4	Develop models using UML tools. (K6-Create)
C319L3.5	Draw different UML diagrams. (K4-Analysis)
C319L3.6	Implement Automation Testing (K6-Create)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C319.1	3	2	3	-	-	-	-	-	-	-	3	2	3	3	3
C319.2	2	3	-	3	2	-	-	-	-	-	-	2	2	2	2
C319.3	2	2	3	2	3	-	-	-	-	-	-	2	3	3	3
C319.4	2	3	3	-	2	-	-	-	-	-	-	2	2	2	2
C319.5	2	2	3	2	3	-	-	-	-	-	-	2	3	3	3
C319.6	2	3	-	2	2	-	-	-	-	-	-	2	2	2	2
C319	2.0	2.8	3.0	2.3	2.6	--	-		-	-	-	2.0	2.8	2.6	2.6

Academic Year: 2022 – 23

Year: III **Sem: II**

Course Code & Name: R20CSE3203 & Design and Analysis of Algorithm

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C321.1	Justify the performance of algorithms through performance analysis, Probabilistic analysis and Amortized analysis.(Evaluate)
C321.2	Examines the general method of divide and conquer approach on various searching, sorting and general applications.(Apply)
C321.3	Illustrate the various graph and tree traversal techniques.(Analyse)
C321.4	Justify the algorithm design method of greedy and dynamic programming approach on various applications.(Evaluate)
C321.5	Analyze the Backtracking, Branch and Bound algorithm design methods on various applications. (Analyze)
C321.6	Differentiate the NP-Hard and NP-Complete Problems. (Understand)

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C321.1	2	3	2	2	-	-	-	-	-	-	1	1	2	1	1
C321.2	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C321.3	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C321.4	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C321.5	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C321.6	2	2	1	1	-	-	-	-	-	-	1	1	-	-	-
C321	**2.0**	**2.16**	**1.5**	**1.5**	**-**	**-**	**-**	**-**	**-**		**1.0**	**1.0**	**2**	**1**	**1**

Course Code & Name: R20CSE3201 & Machine Learning

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C322.1	To be able to formulate machine learning problems corresponding to different applications.
C322.2	To understand a range of machine learning algorithms along with their strengths and weaknesses.
C322.3	To understand the basic theory underlying machine learning.
C322.4	To be able to apply machine learning algorithms to solve problems of moderate complexity.
C322.5	To be able to read current research papers and understands the issues raised by current research.
C322.6	To be able to know the reinforcement learning techniques

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C322.1	2	3	2	2	-	-	-	-	-	-	1	1	2	1	1
C322.2	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C322.3	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C322.4	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C322.5	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C322.6	2	2	1	1	-	-	-	-	-	-	1	1	-	-	-
C322	**2.0**	**2.16**	**1.5**	**1.5**	**-**	**-**	**-**	**-**	**-**		**1.0**	**1.0**	**2**	**1**	**1**

Course Code & Name: R20CSE4152 & Internet of Things

Upon completion of the course, students will be able to:

Course Outcomes (COs)	
C323.1	To introduce the terminology, technology and its applications
C323.2	To introduce the concept of M2M (machine to machine) with necessary protocols
C323.3	To introduce the Python Scripting Language which is used in many IoT devices
C323.4	To introduce the Raspberry PI platform, that is widely used in IoT applications
C323.5	To introduce the implementation of web based services on IoT devices
C323.6	To introduce the use of cloud in IOT

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C323.1	2	3	2	2	-	-	-	-	-	-	1	1	2	1	1
C323.2	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C323.3	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C323.4	2	2	2	1	-	-	-	-	-	-	1	1	2	1	1
C323.5	2	2	1	2	-	-	-	-	-	-	1	1	2	1	1
C323.6	2	2	1	1	-	-	-	-	-	-	1	1	-	-	-
C323	**2.0**	**2.16**	**1.5**	**1.5**	**-**	**-**	**-**	**-**	**-**		**1.0**	**1.0**	**2**	**1**	**1**

Course Code & Name: R20CSE3232 & Scripting Languages

C324.1	Ability to understand the differences between scripting languages and to learn PERL (K2-Undestand)
C324.2	Ability to apply knowledge of the advancement of PERL scripting languages. (K4-Apply)
C324.3	Understanding the basics of PHP and object-oriented concepts. (K2-Undestand)
C324.4	Able to gain some fluency in programming with advanced PHP, Perl and TCL. (K2-Undestand)
C324.5	Understand about the syntax of TCL and visual toolkits of TCL (K2-Undestand)
C324.6	Able to gain in depth understanding in Python (K2-Undestand)

Course Articulation Matrix

CO	**PO**												**PSO**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
C324.1	3	3	-	-	-	-	-	1	-	-	-	2	3	3	3
C324.2	3	3	3	-	-	-	-	1	-	-	-	-	3	2	2
C324.3	3	2	3	2	3	-	-	1	1	-	-	2	3	3	3
C324.4	3	-	3	3	-	-	-	1	-	-	-	2	3	3	3
C324.5	3	-	-	-	-	-	-	1	1	-	-	2	3	2	2
C324.6	3	-	-	-	-	-	-	1	1	-	1	-	3	3	3
C324	**3**	**2.6**	**3**	**2.5**	**3**	**-**	**-**	**1**	**1**	**-**	**1**	**2**	**3**	**2.7**	**2.7**

Course Code & Name: R20HMS3277 & Fundamentals of Entrepreneurship

Upon completion of the course, students will be able to:

C325.1	To provide awareness about entrepreneurship
C325.2	To develop idea generation, creative and innovative skills
C325.3	To self-motivate the students by making aware of different opportunities and successful growth stories
C325.4	To learn how to start an enterprise and design business plans those are suitable for funding by considering all dimensions of business.
C325.5	To understand entrepreneurial process by way of studying different case studies and find exceptions to the process model of entrepreneurship.
C325.6	To run a small enterprise with small capital for a short period and experience the science and art of doing business

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C325.1	-	3	-	-	-	-	-	1	-	-	-	2	3	3	3
C325.2	-	3	3	-	-	-	-	1	-	-	-	-	3	2	2
C325.3	-	2	3	2	3	-	-	1	1	-	-	2	3	3	3
C325.4	-	-	3	3	-	-	-	1	-	-	-	2	3	3	3
C325.5	-	-	-	-	-	-	-	1	1	-	-	2	3	2	2
C325.6	-	-	-	-	-	-	-	1	1	-	1	-	3	3	3
C325	**-**	**2.6**	**3**	**2.5**	**3**	**-**	**-**	**1**	**1**	**-**	**1**	**2**	**3**	**2.7**	**2.7**

Course Code & Name: R20CSE32L1 & Machine Learning Lab

Upon completion of the course, students will be able to:

C32L1.1	Make use of Data sets in implementing the machine learning algorithms
C32L1.2	Implement the machine learning concepts and algorithms in any suitable language of choice
C32L1.3	Learn to classify the data in large datasets
C32L1.4	Study clustering concepts and its implementations
C32L1.5	Learn to calculate accuracy, prediction and recall in a large dataset
C32L1.6	Learn to find a data in a specific hypothesis

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C32L1.1	3	2	3	-	-	-	-	-	-	-	3	2	3	3	3
C32L1.2	2	3	-	3	2	-	-	-	-	-	-	2	2	2	2
C32L1.3	2	2	3	2	3	-	-	-	-	-	-	2	3	3	3
C32L1.4	2	3	3	-	2	-	-	-	-	-	-	2	2	2	2
C32L1.5	2	2	3	2	3	-	-	-	-	-	-	2	3	3	3
C32L1.6	2	3	-	2	2	-	-	-	-	-	-	2	2	2	2
C32L1	2.0	2.8	3.0	2.3	2.6	--	-		-	-	-	2.0	2.8	2.6	2.6

Course Code & Name: R20CSO32L1 & Internet of Things Lab

Upon completion of the course, students will be able to:

C32L2.1	Use microcontroller based embedded platforms in IOT
C32L2.2	Use microprocessor based embedded platforms in IOT
C32L2.3	Use wireless peripherals for exchange of data.
C32L2.4	Make use of Cloud platform to upload and analyse any sensor data
C32L2.5	Use of Devices, Gateways and Data Management in IoT.
C32L2.6	Use the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis.

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C32L2.1	3	2	3	-	-	-	-	-	-	-	3	2	3	3	3
C32L2.2	2	3	-	3	2	-	-	-	-	-	-	2	2	2	2
C32L2.3	2	2	3	2	3	-	-	-	-	-	-	2	3	3	3
C32L2.4	2	3	3	-	2	-	-	-	-	-	-	2	2	2	2
C32L2.5	2	2	3	2	3	-	-	-	-	-	-	2	3	3	3
C32L2.6	2	3	-	2	2	-	-	-	-	-	-	2	2	2	2
C32L2	2.0	2.8	3.0	2.3	2.6	-	-	-	-	-	-	2.0	2.8	2.6	2.6

Course Code & Name: R20HAS31L1 & Advanced Communication Skills Lab

Upon completion of the course, students will be able to:

C32L3.1	To improve the students‘ fluency in English, through a well-developed vocabulary
C32L3.2	To enable them to listen to English spoken at normal conversational speed by educated English speakers
C32L3.3	To respond appropriately in different socio-cultural and professional contexts.
C32L3.4	To make the students familiar and master in writing skills
C32L3.5	Students able to communicate their ideas relevantly and coherently in writing.
C32L3.6	To prepare all the students for their placements.

Course Articulation Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C32L3.1	-	2	-	-	1	-	-	2	2	3	1	2	3	3	3
C32L3.2	-	1	-	-	1	-	-	2	2	3	2	2	2	2	2
C32L3.3	-	2	-	-	2	-	-	1	2	3	1	2	3	3	3
C32L3.4	-	1	-	-	2	-	-	2	2	3	2	2	2	2	2
C32L3.5	-	2	-	-	2	-	-	2	2	3	1	2	3	3	3
C32L3.6	-	1	-	-	2	-	-	2	2	3	1	2	2	2	2
C32L3	-	1.8	-	-	2.2	-	-	2	2	3	1.6	2.0	2.8	2.6	2.6