

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM-630612
(An Autonomous Institution, Affiliated to Anna University, Chennai)
REGULATIONS 2020
SEMESTER I

(Common to all B.E/B.Tech Programmes)

S. No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	20HS101	English for Technical Communication	HS	3	3	0	0	3
2	20BS101	Fundamentals of Engineering Mathematics	BS	4	3	1	0	4
3	20BS102	Engineering Physics	BS	3	3	0	0	3
4	20BS103	Engineering Chemistry	BS	3	3	0	0	3
5	20GE101	Problem Solving using Python Programming	ES	3	3	0	0	3
PRACTICAL								
6	20BS1L1	Basic Science Laboratory	BS	3	0	0	3	1.5
7	20GE1L1	Python Programming Laboratory	ES	4	0	0	4	2
8	20GE1L2	Industrial Practices Workshop	ES	3	0	0	3	1.5
TOTAL				26	15	1	10	21

Course Name : English for Technical Communication		Course Code : 20HS101			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C101.1	Listen, Comprehend and Correspond with others at various contexts	1-5	-	9,10,12	-
C101.2	Speak legibly and fluently under various life-time situations by applying proper communication modules	1-5	-	9,10,12	-
C101.3	Read and understand a variety of writings and technical text by analyzing the meaning and language	1-5	-	9,10,12	-
C101.4	Apply clear and legible writing skills in error free style in coherent manner	1-5	-	9,10,12	-
C101.5	Remember and use various communicative skills in precise and efficient way on technological contexts	1-5	-	9,10,12	-
C101.6	Form situational conversations and technical writing styles for interpersonal and effective communication	1-5	-	9,10,12	-

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C101.1	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C101.2	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C101.3	-	-	-	-	-	-	-	-	2	3	-	2	-	-
C101.4	-	-	-	-	-	-	-	-	2	3	-	2	-	-
C101.5	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C101.6	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C101	-	-	-	-	-	-	-	-	3	3	-	2	-	-

Course Name : Fundamentals of Engineering Mathematics		Course Code : 20BS101			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C102.1	Determine the Eigen values, Eigen vectors to diagonalize a matrix and reduce quadratic form to canonical form.	1	K3	1, 2, 3, 8&9	1
C102.2	Apply the concept of limits, continuity, rules of differentiation, techniques of differentiation to differentiate standard functions.	2	K3	1, 2, 3, 8&9	1
C102.3	Apply the concepts of Concavity, Convexity to determine the critical points, point of Inflection, Maxima and Minima of Single variable functions.	2	K3	1, 2, 3, 8&9	1
C102.4	Compute the derivatives of functions of two variables and apply them to calculate the maxima and minima.	3	K3	1, 2, 3, 8&9	1
C102.5	Determine integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	4	K3	1, 2, 3, 8&9	1
C102.6	Apply various techniques to solve higher order differential equations with constant and variable Coefficients.	5	K3	1, 2, 3, 8&9	1

K Level Note: Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C102.1	3	2	1	-	-	-	-	1	1	-	-	-	2	-
C102.2	3	2	1	-	-	-	-	1	1	-	-	-	2	-
C102.3	3	2	1	-	-	-	-	1	1	-	-	-	2	-
C102.4	3	2	1	-	-	-	-	1	1	-	-	-	2	-
C102.5	3	2	1	-	-	-	-	1	1	-	-	-	2	-
C102.6	3	2	1	-	-	-	-	1	1	-	-	-	2	-
C102	3	2	1	-	-	-	-	1	1	-	-	-	2	-

Course Name : Engineering Physics		Course Code: 20BS102			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C103.1	Demonstrate the properties of elasticity and measure the different moduli of elasticity	1	K3	1, 2, 3	1
C103.2	Discuss the characteristics of laser and optical fiber	2	K2	1, 2, 8,9,10	1
C103.3	Explain the concepts of ultrasonics in engineering	3	K2	1, 2, 8,9,10	1
C103.4	Explain black body radiation, properties of matter waves and Schrodinger equation	4	K2	1, 2, 8,9,10	1
C103.5	Classify the Bravais lattices and different types of crystal structures	5	K3	1, 2, 3	1
C103.6	Summarize the information on growth of crystals and deformations	5	K2	1, 2, 8,9,10	1

K Level Apply (PO1- K3), Analyze (PO2 – K4), Evaluate (PO3 – K5), Create (PO4 – KK6)														
K Level	K3	K4	K5	K6										
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C103.1	3	2	1	-	-	-	-	-	-	-	-	-	1	-
C103.2	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C103.3	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C103.4	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C103.5	3	2	1	-	-	-	-	-	-	-	-	-	1	-
C103.6	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C103	2	1	1	-	-	-	-	1	1	1	-	-	1	-

Course Name: Engineering Chemistry		Course Code: 20BS103			
CO	COURSE OUTCOMES	Unit	K - CO	POs	PSOs
C104.1	Determine the hardness of water and explain the water treatment methods.	I	K2	1,2,6,7	-
C104.2	Apply Nernst equation to determine the EMF of the cell and explain various corrosion control methods.	II	K3	1,2,3,6,7	1
C104.3	Describe the phase diagram of one component and two component system and various methods of heat treatment of steel.	III	K2	1,2,6,7	-
C104.4	Classify the various types of fuels by their characteristics and explain the flue gas analysis by Orsat method.	IV	K2	1,2,6,7	1
C104.5	Illustrate the working of Lead acid battery, lithium ion battery and fuel cell.	IV	K2	1,2,6,7	1
C104.6	Describe the instrumentation and working of UV, IR, 1HNMR, HPLC and flame photometry.	V	K2	1,2,6,7	1

K Level	Apply (PO1- K3), Analyze (PO2 – K4), Evaluate (PO3 – K5), Create (PO4 – KK6)													
K Level	K3	K4	K5	K6										
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C104.1	2	2	-	-	-	1	1	-	-	-	-	-	-	-
C104.2	3	2	1	-	-	1	1	-	-	-	-	-	1	-
C104.3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
C104.4	2	1	-	-	-	1	1	-	-	-	-	-	1	-
C104.5	2	1	-	-	-	1	1	-	-	-	-	-	1	-
C104.6	2	1	1	-	-	1	1	-	-	-	-	-	1	-
C104	2	1	1	-	-	1	1	-	-	-	-	-	1	-

Course Name: Problem Solving using Python Programming		Course Code: 20GE101			
CO	Course Outcomes	Unit	K –CO	POs	PSOs
C105.1	Explain Components of a Computer System, types of programming languages, types of software with examples and purpose.	I	K3	1,2	1,2
C105.2	Perform problem analysis, use algorithms and prepare flow charts, pseudo code for solving simple problems.	I	K3	1,2	1,2
C105.3	Use Conditional, iteration constructs of python programming and apply to solve simple problems	II	K3	1,2,3	1,2
C105.4	Use Functions, recursive function, String functions in python programming and apply to perform linear and binary search	III	K3	1,2,3	1,2
C105.5	Explain the various operations for manipulating Tuples, Dictionaries and Use List to perform simple and sorting operations	IV	K3	1,2,3	1,2
C105.6	Explain file handling operations, exception handling, modules and packages and illustrate programs for word count, file copy, merge operations and exception handling.	V	K3	1,2,3	1,2

K Level	Apply (PO1- K3), Analyze (PO2 – K4), Evaluate (PO3 – K5), Create (PO4 – KK6)													
K Level	K3	K4	K5	K6										
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C105.1	2	1	-	-	-	-	-	1	1	-	-	2	2	1

C105.2	2	1	-	-	-	-	-	1	1	-	-	2	2	1
C105.3	3	2	1	-	-	-	-	1	1	-	-	2	2	1
C105.4	3	2	1	-	-	-	-	1	1	-	-	2	2	1
C105.5	3	2	1	-	-	-	-	1	1	-	-	2	2	1
C105.6	3	2	1	-	-	-	-	1	1	-	-	2	2	1
C105	3	2	1	-	-	-	-	1	1	-	-	2	2	1

Course Name: BASIC SCIENCE LABORATORY										Course Code:20BS1L1				
CO	Course Outcomes								Exp	K	POs	PSOs		
PHYSICS														
C106.1	Calculate rigidity modulus and Young's modulus of a given material.								1,2	K3	1,2,8,9,10	1		
C106.2	Examine the size of a given particle, parameters of optical fiber and compute the thickness of a given thin wire.								3,6	K3	1,2,8,9,10	1		
C106.3	Discover the velocity of ultrasound, compressibility of a given liquid and band gap of a given semiconductor diode.								4,5	K3	1,2,8,9,10	1		
C106.4	Predict dispersive power of prism and wavelength of mercury spectrum.								7,8	K2	1,2,8,9,10	1		
CHEMISTRY														
C106.5	Estimate the Chemical quality parameter of a water sample.								1,2,3	K3	1,2,3,8,9,10	-		
C106.6	Estimate the strength of acid by conductometric and pH metric titration.								4,6,7	K3	1,2,3,8,9,10	-		
C106.7	Estimate the amount of iron content in a given solution using potentiometer and the amount of sodium in water using flame photometer.								5,10	K3	1,2,3,8,9,10	-		
C106.8	Determine the molecular weight of polyvinyl alcohol using Ostwald viscometer and rate of corrosion by weight loss method. (Demo)								8,9	K2	1,2,3,8,9,10	1		

K Level	Apply (PO1- K3), Analyze (PO2 – K4), Evaluate (PO3 – K5), Create (PO4 – KK6)													
K Level	K3	K4	K5	K6										
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C106.1	3	2	1	-	-	-	-	1	1	1	-	-	1	-
C106.2	3	2	1	-	-	-	-	1	1	1	-	-	1	-
C106.3	3	2	1	-	-	-	-	1	1	1	-	-	1	-
C106.4	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C106.5	3	2	1	-	-	-	-	1	1	1	-	-	-	-
C106.6	3	2	1	-	-	-	-	1	1	1	-	-	-	-
C106.7	3	2	1	-	-	-	-	1	1	1	-	-	-	-
C106.8	2	1	-	-	-	-	-	-	-	-	-	-	1	-
C106	3	2	1	-	-	-	-	1	1	1	-	-	1	-

Course Name: Python Programming Laboratory										Course Code: 20GE1L1				
CO	Course Outcomes								EXP	K –CO	POs	PSOs		
C107.1	Develop simple Python programs using conditional and iterative constructs								1,2,7	K3	1,2,3,5	1,2		
C107.2	Develop simple Python programs using built-in functions and user-defined functions								3	K3	1,2,3,5	1,2		
C107.3	Develop a Python program using recursion to implement linear and binary search								4	K3	1,2,3,5	1,2		
C107.4	Develop a Python program using list to implement selection and insertion sort								5,6	K3	1,2,3,5	1,2		
C107.5	Develop Python programs to implement matrix operations								8,9	K3	1,2,3,5	1,2		
C107.6	Develop a Python program to implement file handling								10,11,12	K3	1,2,3,5	1,2		

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C107.1	3	2	1	-	1	-	-	2	2	2	-	2	2	1
C107.2	3	2	1	-	1	-	-	2	2	2	-	2	2	1
C107.3	3	2	1	-	1	-	-	2	2	2	-	2	2	1
C107.4	3	2	1	-	1	-	-	2	2	2	-	2	2	1
C107.5	3	2	1	-	1	-	-	2	2	2	-	2	2	1
C107.6	3	2	1	-	1	-	-	2	2	2	-	2	2	1
C107	3	2	1	-	1	-	-	2	2	2	-	2	2	1

C108	Course Name :	INDUSTRIAL PRACTICES LABORATORY	Course Code : 20GE1L2			
CO	Course Outcomes		EXP	K –CO	POs	PSOs
C108.1	Prepare different carpentry joints and pipe connections with different joints.			K3	1,2,3,4	-
C108.2	Make the models using sheet metal.			K3	1,2,3,4	-
C108.3	Carry out the basic machining operations.			K3	1,2,3,4	-
C108.4	Prepare arc welded joints using welding equipment			K3	1,2,3,4	-
C108.5	Demonstrate wiring for a simple residential house; identify the ratings of tube lamp, and calculate the different Electrical quantities			K3	1,2,3,4	-
C108.6	Measure the electronics equipment using LCR meter, Transistor & Diode – Terminal identification using Multimeter.			K3	1,2,3,4	-
C108.7	Experimentally to analyze AC signal parameters using CRO and AFO and to verify the Truth tables of Logic gates.			K3	1,2,3,4	-
C108.8	Experimentally to design a Simple circuit using soldering in a PCB ,measure ripple factor of Half Wave Rectifier and Full Wave Rectifier.			K3	1,2,3,4	-

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Design (PO3-K5), synthesis (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C108.1	3	1	1	1	-	-	-	-	-	-	-	-	-	-
C108.2	3	1	1	1	-	-	-	-	-	-	-	-	-	-
C108.3	3	1	1	1	-	-	-	-	-	-	-	-	-	-
C108.4	3	2	1	1	-	-	-	-	-	-	-	-	-	-
C108.5	3	2	1	1	-	-	2	-	2	2	-	-	-	-
C108.6	3	2	1	1	-	-	2	-	2	2	-	-	-	-
C108.7	3	2	1	1	-	-	2	-	2	2	-	-	-	-
C108.8	3	2	1	1	-	-	2	-	2	2	-	-	-	-
C108	3	2	1	1	-	-	2	-	2	2	-	-	-	-

SEMESTER II

S. No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1	20HS201	Advanced Technical Communication (Common to all B.E./B.Tech programmes)	HS	3	3	0	0	3
2	20BS201	Laplace Transform and Advanced Calculus (Common to all B.E./B.Tech programmes)	BS	4	3	1	0	4
3	20BS203	Physics For Information Science (Common to B.E. CSE and B. Tech IT Programmes)	BS	3	3	0	0	3
4	20GE205	Basic Electrical and Electronics Engineering (Common to B.E. CSE and B. Tech IT Programmes)	ES	3	3	0	0	3
5	20CS201	Programming in C (Common to B.E. EEE, B.E. EIE, B.E. CSE and B.Tech. IT programmes)	ES	3	3	0	0	3
6	20GE201	Engineering Graphics (Common to all B.E./B.Tech programmes)	ES	4	2	0	2	3
PRACTICAL								
7	20HS2L1	Communication Skills Laboratory	HS	2	0	0	2	1
8	20CS2L1	C Programming Laboratory (Common to B.E. EEE, B.E. EIE, B.E. CSE and B.Tech. IT programmes)	ES	4	0	0	4	2
TOTAL				29	17	2	10	24

Course Name : ADVANCED TECHNICAL COMMUNICATION		Course Code : 20HS201			
Course	Course Outcomes	Unit	K-CO	POs	PSOs
C109.1	Listen, Understand and create technical correspondence at advanced level.	1-5	-	9,10,12	-
C109.2	Respond or answer to the contextual questions, interview questions, form instructions, draft reports	1-5	-	9,10,12	-
C109.3	Speak and analyze social issues, come out with effective ideas for discussion, understand the passages for meaning and vocabulary	1-5	-	9,10,12	-
C109.4	Assess error free technical writings, create legible and coherent technical papers, derive ideas of the given texts in a precise form	1-5	-	9,10,12	-
C109.5	Remember the updated elements of communication skills, nuances of non-verbal communication, business communication	1-5	-	9,10,12	-
C109.6	Create technical instructions, process instructions, self-appraisals, Resumes, reports on various situations	1-5	-	9,10,12	-

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C109.1	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C109.2	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C109.3	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C109.4	-	-	-	-	-	-	-	-	2	3	-	2	-	-
C109.5	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C109.6	-	-	-	-	-	-	-	-	3	3	-	2	-	-
C109	-	-	-	-	-	-	-	-	3	3	-	2	-	-

Course Name : Laplace Transform and Advanced Calculus		Course Code : 20BS201			
CO	Course Outcomes	Unit	K	POs	PSOs
C110.1	Determine the Laplace transform of standard functions using properties	1	K3	1, 2, 3, 8&9	-
C110.2	Apply Laplace transform and inverse transform to solve the initial value problems	1	K3	1, 2, 3, 8&9	-
C110.3	Solve the multiple integrals and apply the concept to find areas, volumes	2	K3	1, 2, 3, 8&9	-
C110.4	Determine the line, surface and volume integrals using Green's, Gauss and Stokes theorems	3	K3	1, 2, 3, 8&9	1
C110.5	Determine Analytic functions, Bilinear Transformations and apply the concept of conformal mapping to find the images of given curves.	4	K3	1, 2, 3, 8&9	1
C110.6	Determine the Contour Integrals using Cauchy's Integral and Residue theorems.	5	K3	1, 2, 3, 8&9	1

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C110.1	3	2	1	-	-	-	-	1	1	-	-	-	-	-
C110.2	3	2	1	-	-	-	-	1	1	-	-	-	-	-
C110.3	3	2	1	-	-	-	-	1	1	-	-	-	-	-
C110.4	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C110.5	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C110.6	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C110	3	2	1	-	-	-	-	1	1	-	-	-	1	-

Course Name : Physics for Information Science		Course Code: 20BS201			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C111.1	Distinguish classical, quantum electron theories and energy band theory	1	K2	1,2	-
C111.2	Demonstrate the semiconductors and Hall effect devices	2	K3	1,2,3,8,9,10	-
C111.3	Explain magnetic properties of materials	3	K2	1,2,8,9,10	-
C111.4	Explain the optical properties of materials to Opto – electronic applications	4	K2	1,2,8,9,10	-
C111.5	Summarize the basic operations of p - n junction devices like solar cell, LED etc	4	K2	1,2	1
C111.6	Discuss different quantum structures, size effect and carbon nanotubes	5	K2	1,2,8,9,10	1

K Level	Apply (PO1- K3), Analyze (PO2 – K4), Evaluate (PO3 – K5), Create (PO4 – KK6)													
K Level	K3	K4	K5	K6										
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C111.1	2	1	-	-	-	-	-		-	-	-	-	-	-
C111.2	3	2	1	-	-	-	-	1	1	1	-	-	-	-
C111.3	2	1	-	-	-	-	-	1	1	1	-	-	-	-
C111.4	2	1	-	-	-	-	-	1	1	1	-	-	-	-
C111.5	2	1	-	-	-	-	-		-	-	-	-	1	-
C111.6	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C111	2	1	-	-	-	-	-	1	1	1	-	-	1	-

Course Name : Basic Electrical and Electronics Engineering		Course Code : 20EE201			
CO	Course Outcomes	Unit	K	POs	PSOs
C112.1	Discuss the essentials of electric circuits and analysis.	1	K2	1, 2, 3, 8&9	-
C112.2	Analyze Electrical circuits and apply various network theorems to solve loop currents and branch voltages.	1	K3	1, 2, 3, 8&9	-
C112.3	Discuss the basic operation of electric machines and transformers.	2	K2	1, 2, 3, 8&9	-
C112.4	Explain the renewable sources and common domestic loads.	3	K2	1, 2, 3, 8&9	-
C112.5	Discuss the basics of semiconductor devices and applications.	4	K2	1, 2, 3, 8&9	-
C112.6	Discuss about applications of Op-amps and basics of digital circuits.	5	K2	1, 2, 3, 8&9	-

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C112.1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
C112.2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
C112.3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
C112.4	2	1	-	-	-	-	-	-	-	-	-	-	-	-
C112.5	2	1	-	-	-	-	-	-	-	-	-	-	-	-
C112.6	2	1	-	-	-	-	-	-	-	-	-	-	-	-
C112	2	1	-	-	-	-	-	-	-	-	-	-	-	-

Course Name : Programming in C		Course Code : 20CS201			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C113.1	Use basic constructs of C programming to develop simple programs.	I	K3	1-3, 8-9, 12	1
C113.2	Apply one dimensional and two dimensional arrays for implementing matrix operations and string operations.	II	K3	1-3, 8-9, 12	1
C113.3	Make use of function concept for solving simple mathematical problems.	III	K3	1-3, 8-9, 12	1
C113.4	Develop programs to implement pointer arithmetic and arrays with pointers.	III	K3	1-3, 8-9, 12	1
C113.5	Illustrate simple programs for structures and unions and develop real time application programs	IV	K4	1-4, 8-9, 12	1,2

C113.6	Apply various file operations and develop programs to implement file access procedures.	V	K3	1-3, 8-9, 12	1,2
--------	---	---	----	--------------	-----

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C113.1	3	2	1	-	-	-	-	1	1	-	-	2	3	-
C113.2	3	2	1	-	-	-	-	1	1	-	-	2	3	-
C113.3	3	2	1	-	-	-	-	1	1	-	-	2	3	-
C113.4	3	2	1	-	-	-	-	1	1	-	-	2	3	-
C113.5	3	3	2	1	-	-	-	2	2	-	-	2	3	1
C113.6	3	2	1	-	-	-	-	1	1	-	-	2	3	1
C113	3	2	1	-	-	-	-	1	1	-	-	2	3	1

Course Name :Engineering Graphics		Course Code : 20GE201			
Course	Course Outcome	EXP	K-CO	POs	PSOs
C114.1	Familiarize with the fundamentals and standards of engineering graphics.		K2	1,2,8	-
C114.2	Draw the orthographic projections of points and lines.		K3	1,2,3,8	-
C114.3	Draw the orthographic projections of plane surfaces.		K3	1,2,3,8	-
C114.4	Draw the projections of simple solids like prisms, pyramids, cylinder and cone.		K3	1,2,3,8	-
C114.5	Draw the projections of sectional views of solids and develop its lateral surfaces.		K3	1,2,3,8	-
C114.6	Draw the isometric projection and free hand sketching of simple objects.		K3	1,2,3,8	-

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C114.1	2	1	-	-	-	-	-	1	-	-	-	-	-	-
C114.2	3	2	1	-	-	-	-	1	-	-	-	-	-	-
C114.3	3	2	1	-	-	-	-	1	-	-	-	-	-	-
C114.4	3	2	1	-	-	-	-	1	-	-	-	-	-	-
C114.5	3	2	1	-	-	-	-	1	-	-	-	-	-	-
C114.6	3	2	1	-	-	-	-	1	-	-	-	-	-	-
C114	3	2	1	-	-	-	-	1	-	-	-	-	-	-

Course Name : Communication Skills Laboratory		Course Code : 20HS2L1			
CO	Course Outcomes	Exp	K	POs	PSOs
C115.1	Express ideas and concepts on par global communication	1,2	-	9,10,12	-
C115.2	Involve inter-personal communication with flair and error-free verbatim	3,4	-	9,10,12	-

C115.3	Face interviews confidently and respond in proper language ability	5,6	-	9,10,12	-
C115.4	Participate in group discussion and share innovative ideas in technical environments	7,8	-	9,10,12	-
C115.5	Adapt multi-national exposure on employment	9,10	-	9,10,12	-
C115.6	Master all-round competency in delivering apt communication for employability	1-10	-	9,10,12	-

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C115.1	-	-	-	-	-	-	-	-	2	3	-	3	-	-
C115.2	-	-	-	-	-	-	-	-	2	3	-	3	-	-
C115.3	-	-	-	-	-	-	-	-	3	3	-	3	-	-
C115.4	-	-	-	-	-	-	-	-	2	3	-	3	-	-
C115.5	-	-	-	-	-	-	-	-	3	3	-	3	-	-
C115.6	-	-	-	-	-	-	-	-	2	3	-	3	-	-
C115	-	-	-	-	-	-	-	-	2	3	-	3	-	-

Course Name : C Programming Laboratory		Course Code : 20CS2L1			
CO	Course Outcomes	Exp	K-CO	POs	PSOs
C116.1	Develop simple programs using decision making and looping statements.	1-5	K3	1-3, 8-10, 12	1,2
C116.2	Utilize array concepts to perform matrix addition, subtraction and multiplication.	6-7	K3	1-3, 8-10, 12	1,2
C116.3	Utilize string operations and develop programs to show string copy and reverse.	8	K3	1-3, 8-10, 12	1,2
C116.4	Develop programs using user defined functions, built-in functions and recursion.	9-12	K3	1-3, 8-10, 12	1,2
C116.5	Develop applications using sequential and random access files.	14-15	K3	1-3, 8-10, 12	1,2
C116.6	Develop simple real time projects using the concepts of structures and union.	13,16	K3	1-3, 8-10, 12	1,2

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C116.1	3	2	1	-	-	-	-	2	2	1	-	2	3	1
C116.2	3	2	1	-	-	-	-	2	2	1	-	2	3	1
C116.3	3	2	1	-	-	-	-	2	2	1	-	2	3	1
C116.4	3	2	1	-	-	-	-	2	2	1	-	2	3	1
C116.5	3	2	1	-	-	-	-	2	2	1	-	2	3	2
C116.6	3	2	1	-	-	-	-	2	2	1	-	2	3	2
C116	3	2	1	-	-	-	-	2	2	1	-	2	3	2

SEMESTER III

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	20BS303	Discrete Mathematics	BS	4	3	1	0	4
2	20CS301	Digital Principles and System Design (Common to B.Tech IT programme)	ES	4	3	1	0	4
3	20CS302	Data Structures and Algorithms (Common to B.Tech IT programme)	PC	3	3	0	0	3
4	20EC304	Analog and Digital Communication	ES	3	3	0	0	3
5	20HS301	Universal Human Values	MC	3	2	1	0	3
PRACTICALS								
6	20CS3L1	Digital Systems Laboratory (Common to B.Tech IT programme)	ES	4	0	0	4	2
7	20CS3L2	Data Structures and Algorithms Laboratory (Common to B.Tech IT programme)	PC	4	0	0	4	2
8	20CS3L3	Object Oriented Programming Laboratory	PC	4	0	0	4	2
TOTAL				29	14	3	12	23

Course Name : DISCRETE MATHEMATICS		Course Code : 20BS303			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C201.1	Apply the basic formula to formulate the normal forms and Predicate calculus.	1	K3	1, 2, 3, 8&9	1
C201.2	Solve combinatorial problems using the basic counting techniques	2	K3	1, 2, 3, 8&9	1
C201.3	Solve recurrence relations using generating functions.	2	K3	1, 2, 3, 8&9	1
C201.4	Apply the concepts of graph theory in the computer science and technologies field.	3	K3	1, 2, 3, 8&9	1
C201.5	Apply the concepts and properties of algebraic structures such as groups, rings and fields.	4	K3	1, 2, 3, 8&9	1
C201.6	Determine the partial ordering, lattices as posets and Boolean algebra using logical relation.	5	K3	1, 2, 3, 8&9	1

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C201.1	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C201.2	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C201.3	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C201.4	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C201.5	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C201.6	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C201	3	2	1	-	-	-	-	1	1	-	-	-	1	-

Course Name : Digital Principles and System Design		Course Code : 20CS301			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C202.1	Apply Arithmetic operations in any number system and various techniques to simplify the Boolean function.	I	K3	1-3, 8-9, 12	1
C202.2	Build combinational circuits that perform arithmetic operations.	II	K3	1-3, 8-9, 12	1
C202.3	Construct and Analyze Synchronous sequential circuits such as counters and registers.	III	K4	1-3, 8-9, 12	1
C202.4	Construct and simulate various combinational and sequential circuits using HDL.	III	K3	1-4, 8-9, 12	1
C202.5	Analyze Asynchronous sequential circuits to find out the impact of Hazards and Races.	IV	K4	1-4, 6, 8-9, 12	1
C202.6	Model memory arrays for any Boolean function with the help of PLA, PAL and PROM.	V	K3	1-3, 8-9, 12	1

CO-PO Mapping

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C202.1	3	2	1	-	-	-	-	1	1	-	-	1	3	-
C202.2	3	2	1	-	-	-	-	1	1	-	-	1	3	-
C202.3	3	3	2	1	-	-	-	1	1	-	-	1	3	-
C202.4	3	2	1	-	-	-	-	1	1	-	-	1	3	-
C202.5	3	3	2	1	-	1	-	1	1	-	-	1	3	-
C202.6	3	2	1	-	-	-	-	1	1	-	-	1	3	-
C202	3	2	1	1	-	1	-	1	1	-	-	1	3	-

Course Name : DATA STRUCTURES AND ALGORITHMS		Course Code : 20CS302			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C203.1	Explain the concept of asymptotic notations and algorithmic efficiency with properties.	I	K2	1-2, 8-9, 12	1
C203.2	Describe abstract data types and implement various algorithmic problems using arrays and linked list.	I	K2	1-2, 8-9, 12	1
C203.3	Apply the different linear data structures like stack and queue to various computing problems.	II	K3	1-3, 8-9, 12	1
C203.4	Build different types of trees and graphs and apply various operations and their applications.	III, IV	K3	1-3, 8-10, 12	1
C203.5	Analyze different sorting and searching techniques based on time and space complexity of the algorithms designed using divide and conquer methods.	V	K4	1-4, 8-10, 12	1
C203.6	Develop suitable hashing algorithm for indexing data items into specific locations in a hash table considering collision resolution techniques.	V	K3	1-3, 8-10, 12	1

CO-PO Mapping

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C203.1	2	1	-	-	-	-	-	1	1	-	-	2	2	-
C203.2	2	1	-	-	-	-	-	1	1	-	-	2	3	-
C203.3	3	2	1	-	-	-	-	1	1	-	-	2	3	-
C203.4	3	2	1	-	-	-	-	1	1	1	-	2	3	-
C203.5	3	3	2	1	-	-	-	1	1	1	-	2	3	-
C203.6	3	2	1	-	-	-	-	1	1	1	-	2	3	-
C203	3	2	1	1	-	-	-	1	1	1	-	2	3	-

Course Name : ANALOG & DIGITAL COMMUNICATION		Course Code : 20EC304			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C204.1	Apply different analog modulation schemes in time and frequency domain.	1	K3	PO1,PO2,PO3	PSO1
C204.2	Illustrate the principle of pulse modulation techniques.	2	K3	PO1,PO2,PO3	PSO1
C204.3	Illustrate the principle of data communication techniques.	2	K3	PO1,PO2,PO3	PSO1
C204.4	Make use of performance metric of different digital Modulation schemes.	3	K3	PO1,PO2,PO3	PSO1
C204.5	Make use of various error control coding techniques to identify/correct errors	4	K3	PO1,PO2,PO3	PSO1
C204.6	Outline the concepts of Mobile & Satellite Communications	5	K2	PO1,PO2	PSO1

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C204.1	3	2	1	-	-	-	-	-	2	-	-	-	2	-
C204.2	3	2	1	-	-	-	-	-	2	-	-	-	2	-
C204.3	3	2	1	-	-	-	-	-	2	-	-	-	2	-
C204.4	3	2	1	-	-	-	-	-	2	-	-	-	2	-
C204.5	3	2	1	-	-	-	-	-	2	-	-	-	2	-
C204.6	2	1	-	-	-	-	-	-	2	2	-	-	1	-
C204	3	2	1	-	-	-	-	-	2	2	-	-	2	-

Course Name : Universal Human Values		Course Code : 20HS301			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C205.1	Explain the significance of value inputs in a classroom and summarize human aspirations.	1	AD	6, 7, 8, 9,10,12	-
C205.2	Distinguish between Values & Skills to ensure happiness and prosperity.	1	AD	6, 7, 8, 9,10,12	-
C205.3	Identify the synchronization between Thyself & the Body to ensure competency of an individual	2	AD	6, 7, 8, 9,10,12	-
C205.4	Generalize the role of a human being in ensuring harmony in society and nature.	3	AD	6, 7, 8, 9,10,12	-
C205.5	Distinguish between ethical and unethical practices and analyze harmonious social environment.	4	AD	6, 7, 8, 9,10,12	-
C205.6	Assess the importance of value based life and evaluate the role of professional ethics.	5	AD	6, 7, 8, 9,10,12	-

AD- Affective Domain

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C205.1	-	-	-	-	-	3	2	3	2	2	-	1	-	-
C205.2	-	-	-	-	-	3	2	3	2	2	-	1	-	-
C205.3	-	-	-	-	-	3	2	3	2	2	-	1	-	-
C205.4	-	-	-	-	-	3	2	3	2	2	-	1	-	-
C205.5	-	-	-	-	-	3	2	3	2	2	-	1	-	-
C205.6	-	-	-	-	-	3	2	3	2	2	-	1	-	-
C205	-	-	-	-	-	3	2	3	2	2	-	1	-	-

Course Name : DIGITAL SYSTEMS LABORATORY		Course Code : 20CS3L1			
CO	Course Outcomes	Exp	K-CO	POs	PSOs
C206.1	Apply Boolean simplification techniques to construct combinational logic circuits.	1-2	K3	1-3, 8-10, 12	1
C206.2	Build combinational logic circuits to perform arithmetic operations.	3-4	K3	1-3, 8-10, 12	1
C206.3	Construct combinational circuits using MSI devices	5	K3	1-3, 8-10, 12	1
C206.4	Construct Sequential circuits like registers and counters.	6-8	K3	1-3, 8-10, 12	1
C206.5	Develop combinational and sequential circuits using HDL.	9- 10	K3	1-3, 8-11, 12	1
C206.6	Develop a simple real time application using Digital system.	11	K3		1,2

CO-PO Mapping

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C206.1	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C206.2	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C206.3	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C206.4	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C206.5	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C206.6	3	2	1	-	-	-	-	1	1	1	1	1	3	1
C206	3	2	1	-	-	-	-	1	1	1	1	1	3	1

Course Name : Data Structures And Algorithms Laboratory				Course Code : 20CS3L2	
CO	Course Outcomes	Exp	K	POs	PSOs
C207.1	Develop the array implementation of stack, Queue and List ADTs	1	K3	1-3, 8-10, 12	1
C207.2	Develop the Linked list implementation of list, Stack and Queue ADTs	2-5	K3	1-3, 8-10, 12	1
C207.3	Construct Binary trees, Binary search Trees and AVL tree and its operations	6-9	K3	1-3, 8-10, 12	1
C207.4	Develop various graph traversal algorithms like BFS and DFS.	10-12	K3	1-3, 8-10, 12	1
C207.5	Analyze the performance of various searching, sorting and hashing algorithms	13	K4	1-4, 8-10, 12	1
C207.6	Illustrate any real world problem by implement various techniques of Data structures.	13-14	K4	1-4, 8-11, 12	1

CO-PO Mapping

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C207.1	3	2	1	-	-	-	-	1	1	1	-	2	3	-
C207.2	3	2	1	-	-	-	-	1	1	1	-	2	3	-
C207.3	3	2	1	-	-	-	-	1	1	1	-	2	3	-
C207.4	3	2	1	-	-	-	-	1	1	1	-	2	3	-
C207.5	3	3	2	1	-	-	-	1	1	1	-	2	3	-
C207.6	3	3	2	1	-	-	-	1	1	1	1	2	3	-
C207	3	2	1	1	-	-	-	1	1	1	1	2	3	-

Course Name : OBJECT ORIENTED PROGRAMMING LABORATORY		Course Code : 20CS3L3				
CO	Course Outcomes	Exp	K	POs	PSOs	
C208.1	Develop and implement Java programs for simple applications using classes and packages.	1-3	K3	1-3, 8-10, 12	1,2	
C208.2	Develop and implement Java programs with inheritance and interfaces.	4-6	K3	1-3, 8-10, 12	1,2	
C208.3	Develop simple java programs for files usage and exceptions handling.	7-8	K3	1-3, 8-10, 12	1,2	
C208.4	Develop simple java programs by implementing multithread concepts and generics.	9	K3	1-3, 5, 8-10, 12	1,2	
C208.5	Develop interactive java application using AWT and Swing.	10-11	K3	1-3, 5, 8-12	1,2	
C208.6	Illustrate any real world problem by implement various OOPs concepts.	12	K4	1-5, 8-12	1,2	

CO-PO Mapping

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C208.1	3	2	1	-	-	-	-	1	1	1	-	2	3	1
C208.2	3	2	1	-	-	-	-	1	1	1	-	2	3	1
C208.3	3	2	1	-	-	-	-	1	1	1	-	2	3	1
C208.4	3	2	1	-	1	-	-	1	1	1	-	2	3	1
C208.5	3	2	1	-	1	-	-	1	1	1	1	2	3	1
C208.6	3	3	2	1	1	-	-	1	1	1	1	2	3	1
C208	3	2	1	1	1	-	-	1	1	1	1	2	3	1

SEMESTER IV

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	20BS403	Probability Statistics and Queuing Theory	BS	4	3	1	0	4
2	20CS401	Computer Organization and Architecture	PC	3	3	0	0	3
3	20CS402	Database Management Systems (Common to B.Tech IT programme)	PC	3	3	0	0	3
4	20CS403	Design and Analysis of Parallel Algorithms	PC	3	3	0	0	3
5	20HS401	Environmental Science and Engineering	HS	2	2	0	0	2
THEORY CUM PRACTICAL								
6	20CS404	Operating Systems (Common to B.Tech IT programme)	PC	5	3	0	2	4
PRACTICALS								
7	20CS4L1	Database Management Systems Laboratory (Common to B.Tech IT programme)	PC	4	0	0	4	2
8	20HS4L2	Professional Communication Laboratory	EEC	2	0	0	2	1
TOTAL				26	17	1	8	22

Course Name : PROBABILITY , STATISTICS AND QUEUEING THEORY		Course Code : 20BS403			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C209.1	Build the parameters of statistical distributions using basic probability theory concepts .	1	K3	1, 2, 3, 8&9	-
C209.2	Calculate the statistical measures for two dimensional random variables.	2	K3	1, 2, 3, 8&9	1
C209.3	Apply the concepts of correlation and regression for two dimensional random variables.	2	K3	1, 2, 3, 8&9	1
C209.4	Apply the concept of random processes in engineering disciplines.	3	K3	1, 2, 3, 8&9	1
C209.5	Solve queueing models using finite and infinite server model.	4	K3	1, 2, 3, 8&9	1
C209.6	Solve advanced queueing models using open network.	5	K3	1, 2, 3, 8&9	1

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C209.1	3	2	1	-	-	-	-	1	1	-	-	-	-	-
C209.2	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C209.3	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C209.4	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C209.5	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C209.6	3	2	1	-	-	-	-	1	1	-	-	-	1	-
C209	3	2	1	-	-	-	-	1	1	-	-	-	1	-

Course Name : COMPUTER ORGANIZATION AND ARCHITECTURE		Course Code : 20CS401			
CO	Course Outcomes	Unit	K	POs	PSOs
C210.1	Explain the computer organization components, instructions and addressing modes.	I	K2	1-2	1
C210.2	Compute the arithmetic operations such as Addition, Subtraction, Multiplication and Division.	II	K3	1-3, 8-9	1
C210.3	Discuss the basics of MIPS implementation and pipelining.	III	K2	1-2, 8-10, 12	1
C210.4	Illustrate the basic concepts of parallelism, multi-core processor, GPU & Clusters.	IV	K2	1-2, 8-9, 12	1
C210.5	Describe the memory technologies & I/O systems.	V	K2	1-2, 8-10, 12	1
C210.6	Utilize Raspberry-pi for demonstrating memory systems.	V	K3	1-3, 5, 8-9, 12	1,2

CO-PO Mapping

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C210.1	2	1	-	-	-	-	-	-	-	-	-	-	2	-
C210.2	3	2	1	-	-	-	-	1	1	-	-	-	3	-
C210.3	2	1	-	-	-	-	-	1	1	1	-	1	2	-
C210.4	2	1	-	-	-	-	-	1	1	-	-	1	2	-
C210.5	2	1	-	-	-	-	-	1	1	1	-	1	2	-
C210.6	3	2	1	-	1	-	-	1	1	-	-	1	2	1
C210	3	2	1	-	1	-	-	1	1	1	-	1	2	1

Course Name : DATABASE MANAGEMENT SYSTEMS		Course Code : 20CS402			
CO	Course Outcomes	Unit	K	POs	PSOs
C211.1	Compare File Processing System with Database and summarize the basic concepts of Database, various Data Models and Database System Architecture.	I	K2	1-2, 12	1,2
C211.2	Identify Entities, Attributes and their Relationships to prepare ER diagram for real time applications.	I	K3	1-3, 8-9, 12	1
C211.3	Transfer an information model into a relational database schema and use DDL, DML, DQL, DCL, TCL and advanced concepts of SQL to implement the schema.	II	K3	1-3, 5, 8-10, 12	1
C211.4	Develop simple database using XML and relate advanced databases with relational model.	II	K3	1-3, 8-10, 12	1,2
C211.5	Construct a database by identifying dependencies and optimize it with suitable normal forms to reduce redundancy.	III	K3	1-3, 8-10, 12	1,2
C211.6	Compare real time applications with respect to transaction, concurrency control, and data object locking protocols and select appropriate storage and recovery techniques.	IV	K4	1-5, 8-9, 12	1,2
C211.7	Identify the purpose of query processing and query optimization techniques and also demonstrate the query evaluation for given query.	V	K3	1-3, 5, 8-9, 12	1,2

CO-PO Mapping

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C211.1	2	1	-	-	-	-	-	-	-	-	-	1	3	1
C211.2	3	2	1	-	-	-	-	1	1	-	-	1	3	-
C211.3	3	2	1	-	1	-	-	1	1	1	-	1	3	-
C211.4	3	2	1	-	-	-	-	1	1	1	-	1	3	1
C211.5	3	2	1	-	-	-	-	1	1	1	-	1	3	1
C211.6	3	3	2	1	1	-	-	1	1	-	-	1	3	1
C211.7	3	2	1	-	1	-	-	1	1	-	-	1	3	1
C211	3	2	1	1	1	-	-	1	1	1	-	1	3	1

Course Name : DESIGN AND ANALYSIS OF PARALLEL ALGORITHMS		Course Code : 20CS403			
CO	Course Outcomes	Unit	K	POs	PSOs
C212.1	Apply greedy techniques to solve various optimization problems like Knapsack problem and minimum cost spanning tree.	I	K3	1-3, 8-9, 12	1
C212.2	Make use of dynamic programming approach to solve various optimization problems like multistage graph and travelling salesman problems.	II	K3	1-3, 8-9, 12	1
C212.3	Solve and analyze the performance of problems by Backtracking and Branch & Bound design techniques.	III	K4	1-3, 8-9, 12	1
C212.4	Explain the fundamental techniques and models of parallel algorithms.	IV	K2	1-2	1
C212.5	Apply SIMD parallel algorithms in computation problems like selection and sorting.	V	K3	1-3, 8-9, 12	1
C212.6	Utilize multiprocessors and multicomputer models to solve matrix multiplication.	V	K3	1-3, 8-9, 12	1

CO-PO Mapping

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C212.1	3	2	1	-	-	-	-	1	1	-	-	1	3	-
C212.2	3	2	1	-	-	-	-	1	1	-	-	1	3	-
C212.3	3	3	2	1	-	-	-	1	1	-	-	1	3	-
C212.4	2	1	-	-	-	-	-	-	-	-	-	-	3	-
C212.5	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C212.6	3	2	1	-	-	-	-	1	1	1	-	1	3	-

C212	3	2	1	-	-	-	-	1	1	1	-	1	3	-
------	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Course Name: Environmental Science and Engineering		Course Code: 20HS401			
CO	COURSE OUTCOMES	Unit	K - CO	POs	PSOs
C213.1	Describe the environment, ecosystem and their significances.	I	K2	6,7	-
C213.2	Explain the threats to biodiversity.	I	K2	6,7	-
C213.3	Describe the sources, effects, control methods of environmental pollution.	II	K2	6,7	-
C213.4	Explain the knowledge on various natural resources and its effect on environment due to over utilization.	III	K2	6,7	-
C213.5	Describe the disposal techniques of solid waste and record the consequences of natural disasters.	IV	K2	6,7	-
C213.6	Outline the social issues as welfare, sustainability etc., and relate with population growth.	V	K2	6,7	-

K Level Note	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course Outcomes↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C213.1	-	-	-	-	-	2	3	-	-	-	-	-	-	-
C213.2	-	-	-	-	-	2	3	-	-	-	-	-	-	-
C213.3	-	-	-	-	-	2	3	-	-	-	-	-	-	-
C213.4	-	-	-	-	-	2	3	-	-	-	-	-	-	-
C213.5	-	-	-	-	-	2	3	-	-	-	-	-	-	-
C213.6	-	-	-	-	-	2	3	-	-	-	-	-	-	-
C213	-	-	-	-	-	2	3	-	-	-	-	-	-	-

Course Name : OPERATING SYSTEMS		Course Code : 20CS404			
CO	Course Outcomes	Unit	K	POs	PSOs
C214.1	Apply the basic functions of Operating System and Process communications.	I	K3	1-3, 8-10, 12	1
C214.2	Analyze the performance of CPU scheduling algorithms specifically FCFS, SJF, Priority and Round Robin.	II	K4	1-4, 8-10, 12	1
C214.3	Apply various process synchronization methods and deadlock avoidance algorithm for a given scenario.	II	K3	1-3, 8-10, 12	1
C214.4	Develop memory management schemes using paging and segmentation	III	K3	1-3, 8-10, 12	1
C214.5	Demonstrate various file allocation methods and directory structures.	IV	K3	1-3, 8-10, 12	1

C214.6	Classify different operating systems based on application requirements.	V	K3	1-3, 8-10, 12	1
C214.7	Make use of virtualization platform to build virtual machines	V	K3	1-6, 8-10, 12	1

CO-PO Mapping

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C214.1	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C214.2	3	3	2	1	-	-	-	1	1	1	-	1	3	-
C214.3	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C214.4	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C214.5	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C214.6	3	2	1	-	-	-	-	1	1	1	-	1	3	-
C214.7	3	2	1	-	1	1	-	1	1	1	-	1	3	-
C214	3	2	1	1	1	1	-	1	1	1	-	1	3	-

Course Name : DATABASE MANAGEMENT SYSTEMS LABORATORY		Course Code : 20CS4L1			
CO	Course Outcomes	Exp	K	POs	PSOs
C215.1	Develop simple Database using DDL, DML and TCL commands.	1,2	K3	1-3, 8-10, 12	1,2
C215.2	Construct a Relational Database for real time application through Database constraints.	3	K3	1-3, 8-10, 12	1,2
C215.3	Make use of subqueries and join queries to derive and execute complex queries.	4-5	K3	1-3, 8-10, 12	1,2
C215.4	Develop PL/SQL programs to implement simple logics using Stored Procedure, Functions, Triggers and Cursor.	6-10	K3	1-3, 8-10, 12	1,2
C215.5	Develop a frontend application to display forms, menu and reports.	11	K3	1-3, 5, 8-10, 12	1,2
C215.6	Model real time applications with Database Connectivity.	12	K3	1-3, 5, 8-10, 12	1,2

CO-PO Mapping

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C215.1	3	2	1	-	-	-	-	1	1	1	-	1	3	1
C215.2	3	2	1	-	-	-	-	1	1	1	-	1	3	1

C215.3	3	2	1	-	-	-	-	1	1	1	-	1	3	1
C215.4	3	2	1	-	-	-	-	1	1	1	-	1	3	1
C215.5	3	2	1	-	1	-	-	1	1	1	-	1	3	2
C215.6	3	2	1	-	1	-	-	1	1	1	-	1	3	2
C215	3	2	1	-	1	-	-	1	1	1	-	1	3	1

Course Name : PROFESSIONAL COMMUNICATION LABORATORY		Course Code : 20HS4L2			
CO	Course Outcomes	Exp	K	POs	PSOs
C216.1	Listen and Respond global English appropriately	1,2		9,10,12	-
C216.2	Participate in group discussions towards placement drive	3,4		9,10,12	-
C216.3	Make effective presentations of technical topics	5,6		9,10,12	-
C216.4	Communicate with effective technological skills	7,8		9,10,12	-
C216.5	Read and Write the context cohesively and coherently and organize ideas logically in workplace situations	9,10		9,10,12	-
C216.6	Attend job interviews and be successful in them	1-10		9,10,12	-

CO-PO Mapping

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C216.1	-	-	-	-	-	-	-	-	2	3	-	3	-	-
C216.2	-	-	-	-	-	-	-	-	2	3	-	3	-	-
C216.3	-	-	-	-	-	-	-	-	3	3	-	3	-	-
C216.4	-	-	-	-	-	-	-	-	2	3	-	3	-	-
C216.5	-	-	-	-	-	-	-	-	3	3	-	3	-	-
C216.6	-	-	-	-	-	-	-	-	2	3	-	3	-	-
C216	-	-	-	-	-	-	-	-	2	3	-	3	-	-

SEMESTER V

SI. No.	COURSE CODE	COURSE TITLE	CATEGOR Y	CONTA CT PERIOD S	L	T	P	C
THEORY								
1	20CS501	Computer Networks	PC*	3	3	0	0	3
2	20CS502	Software Engineering	PC*	3	3	0	0	3
3	20CS503	Theory of Computation	PC	4	3	1	0	4
4	20EC506	Microcontrollers and Embedded Systems	PC*	3	3	0	0	3
5		Open Elective I	OE	3	3	0	0	3
6	20MC501	Constitution of India	MC	1	1	-	-	-
PRACTICALS								
7	20CS5L1	Networks Laboratory	PC*	4	0	0	4	2
8	20CS5L2	Software Engineering Laboratory	PC*	4	0	0	4	2
9	20EC5L3	Microcontrollers and Embedded Systems Laboratory	PC*	4	0	0	4	2
TOTAL				29	16	1	12	22

SEMESTER VI

SI. No.	COURSE CODE	COURSE TITLE	CATEGOR Y	CONTA CT PERIOD S	L	T	P	C
THEORY								
1	20HS601	Principles of Management	HS*	3	3	0	0	3
2	20CS601	Mobile Architecture and Programming	PC	3	3	0	0	3
3	20CS602	Cryptography and Network Security	PC	3	3	0	0	3
4	20CS603	Compiler Design	PC	3	3	0	0	3
5		Professional Elective I	PE	3	3	0	0	3
6	20MC601	Essence of Indian Traditional Knowledge	MC	1	1	-	-	-
THEORY CUM PRACTICAL								
6	20CS604	Machine Learning	PC*	5	3	0	2	4
PRACTICALS								
7	20CS6L1	Mobile Application Development Laboratory	PC*	4	0	0	4	2
8	20CS6L2	Web Technology Laboratory	PC	4	0	0	4	2
TOTAL				29	19	0	10	23

*Common to B.E.CSE & B.Tech IT programmes

PROFESSIONAL ELECTIVES (PE)**SEMESTER VI ELECTIVE – I**

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	20CS6A1	Data Warehousing and Data Mining	PE*	3	3	0	0	3
2	20CS6A2	Computer Graphics and Multimedia	PE	3	3	0	0	3
3	20CS6A3	Graph Theory and Applications	PE	3	3	0	0	3
4	20CS6A4	System Software	PE	3	3	0	0	3
5	20HS6A2	Entrepreneurship Development	PE	3	3	0	0	3
6	20IT6A3	Software Testing	PE*	3	3	0	0	3
7	20IT6A6	Real Time Systems	PE*	3	3	0	0	3

*Common to B.E.CSE & B.Tech IT programmes

SEMESTER VII

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	20CS701	Data Analytics	PC*	3	3	0	0	3
2	20CS702	Artificial Intelligence	PC	3	3	0	0	3
3		Open Elective II	OE	3	3	0	0	3
4		Professional Elective II	PE	3	3	0	0	3
5		Professional Elective III	PE	3	3	0	0	3
PRACTICALS								
6	20CS7L1	Data Analytics Laboratory	PC*	4	0	0	4	2
7	20CS7L2	Mini Project	EEC	4	0	0	4	2
TOTAL				23	15	0	8	19

SEMESTER VIII

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1		Professional Elective IV	PE	3	3	0	0	3
2		Professional Elective V	PE	3	3	0	0	3
PRACTICALS								
3	20CS8L1	Project Work	EEC	20	0	0	20	10
TOTAL				26	6	0	20	16

**PROFESSIONAL ELECTIVES (PE)
SEMESTER VII ELECTIVE II**

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	20CS7A1	Cloud Computing	PE	3	3	0	0	3
2	20CS7A2	Agile Methodologies	PE*	3	3	0	0	3
3	20CS7A3	Java Scripting	PE	3	3	0	0	3
4	20CS7A4	Natural Language Processing	PE*	3	3	0	0	3
5	20CS7A5	Advanced Topics on Databases	PE	3	3	0	0	3
6	20IT601	Internet of Things	PE*	3	3	0	0	3
7	20HS7A2	Total Quality Management	PE	3	3	0	0	3

SEMESTER VII ELECTIVE III

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	20CS7B1	C# and .Net Programming	PE*	3	3	0	0	3
2	20CS7B2	Wireless Adhoc and Sensor Networks	PE*	3	3	0	0	3
3	20CS7B3	Multi-core Architectures and Programming	PE	3	3	0	0	3
4	20CS7B4	Distributed Systems	PE	3	3	0	0	3
5	20IT7B2	User Interface Design	PE*	3	3	0	0	3
6	20IT7B4	Service Oriented Architecture	PE*	3	3	0	0	3
7	20HS601	Operations Research	PE	3	3	0	0	3

SEMESTER VIII ELECTIVE IV

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	20CS8A1	Social Network Analysis	PE*	3	3	0	0	3
2	20CS8A2	Software Defined Networks	PE	3	3	0	0	3
3	20CS8A3	Digital Forensics and Ethical Hacking	PE*	3	3	0	0	3
4	20CS8A4	Soft Computing	PE	3	3	0	0	3
5	20IT7B1	Cyber Physical Systems	PE	3	3	0	0	3
6	20IT8A3	Information Security	PE*	3	3	0	0	3
7	20EC8A3	Robotics and Automation	PE	3	3	0	0	3

SEMESTER VIII ELECTIVE V

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1	20CS8B1	Information Retrieval Techniques	PE*	3	3	0	0	3
2	20CS8B2	Green Computing	PE*	3	3	0	0	3
3	20CS8B3	Virtual Reality and Augmented Reality	PE*	3	3	0	0	3
4	20CS8B4	Block Chain Technology	PE*	3	3	0	0	3
5	20IT8B2	Software Project Management	PE	3	3	0	0	3
6	20HS6A1	Intellectual Property Rights	PE	3	3	0	0	3
7	20HS8B2	Economics for Engineers	PE	3	3	0	0	3

*Common to B.E.CSE & B.Tech IT programmes

SEMESTER VII - OPEN ELECTIVE

S. No.	COURSE CODE	COURSE TITLE
<u>VII Semester</u>		
1.	20OE405	Machine Learning Techniques
2.	20OE406	Java Script Programming
3.	20OE407	Computer Graphics
4.	20OE408	Essentials of Data Analytics

Course Name : COMPUTER NETWORKS		Course Code : 20CS501			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C301.1	Explain the organization of computer networks with the concept of layered approach	1	K2	1,2,12	1
C301.2	Classify various Media Access Control Protocols techniques	2	K3	1,2,3,8,9,12	1
C301.3	Apply the error detection and error correction methods for bit streams	2	K3	1,2,3,8,9,12	1
C301.4	Utilize various types of routing techniques to forward packets	3	K3	1,2,3,8,9,10,12	1
C301.5	Describe the mechanisms involved in transport layer	4	K2	1,2,8,9,10,12	1
C301.6	Classify different application layer protocols	5	K3	1,2,3,8,9,10,12	1

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C301.1	2	1	-	-	-	-	-	-	-	-	-	1	2	-
C301.2	3	2	1	-	-	-	-	1	1	-	-	1	2	-
C301.3	3	2	1	-	-	-	-	1	1	-	-	1	2	-
C301.4	3	2	1	-	-	-	-	1	1	1	-	1	2	-
C301.5	2	1		-	-	-	-	1	1	1	-	1	2	-
C301.6	3	2	1	-	-	-	-	1	1	1	-	1	2	-
C301	3	2	1	-	-	-	-	1	1	1	-	1	2	-

Course Name : SOFTWARE ENGINEERING		Course Code : 20CS502			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C302.1	Explain the Software Process and Agile Development.	1	K2	1,2	1,2
C302.2	Identify the software requirements for classical analysis.	2	K3	1,2,3,8,9,12	1,2
C302.3	Develop the software design and UML models.	3	K3	1,2,3,5,8,9,12	1,2
C302.4	Compare various software testing and maintenance techniques.	4	K2	1,2,3,8,9,10,12	1,2
C302.5	Calculate the software project effort and cost.	5	K3	1,2,8,9,10,12	1,2
C302.6	Describe the software quality assurance models.	5	K2	1,2,8,9,10,12	1,2

K Level Note:	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C302.1	2	1	-	-	-	-	-	-	-	-	-	-	-	1
C302.2	3	2	1	-	-	-	-	1	1	-	-	1	1	1
C302.3	3	2	1	-	1	-	-	1	1	-	-	1	1	1
C302.4	2	1	-	-	-	-	-	1	1	1	-	1	1	1
C302.5	3	2	1	-	-	-	-	1	1	1	-	1	1	1
C302.6	2	1	-	-	-	-	-	1	1	1	-	1	1	1
C302	3	2	1	-	1	-	-	1	1	1	-	1	1	1

Course Name : THEORY OF COMPUTATION		Course Code : 20CS503			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C303.1	Construct finite automata for different regular expressions and languages	1	K3	1,2,3,8,9,10,12	1,2
C303.2	Develop context free grammar for the given languages	2	K3	1,2,3,8,9,12	1,2
C303.3	Transfer the context free grammar into its various normal forms	3	K3	1,2,3,8,9,12	1,2
C303.4	Develop Pushdown automata for the given languages	4	K3	1,2,3,8,9,12	1,2
C303.5	Construct Turing machine model for solving simple computational problems	5	K3	1,2,3,8,9,12	1,2
C303.6	Illustrate recursive and recursive enumerable languages	5	K3	1,2,3,8,9,10,12	1,2

K Level	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C303.1	3	2	1	-	-	-	-	2	2	1	-	1	3	1
C303.2	3	2	1	-	-	-	-	2	2	-	-	1	3	1
C303.3	3	2	1	-	-	-	-	2	2	-	-	1	3	1
C303.4	3	2	1	-	-	-	-	2	2	-	-	1	3	1
C303.5	3	2	1	-	-	-	-	2	2	-	-	1	3	1
C303.6	3	2	1	-	-	-	-	2	2	1	-	1	3	1
C303	3	2	1	-	-	-	-	2	2	1	-	1	3	1

Course Name : MICROCONTROLLERS AND EMBEDDED SYSTEMS		Course Code : 20EC506			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C304.1	Describe the architecture of 8051 and its addressing modes.	1	K2	1,2	1
C304.2	Explain 8051 Assembly language Programs.	1	K2	1,2,8,9,10	1
C304.3	Discuss the microcontroller interfacing devices	2	K2	1,2,8,9,10	1
C304.4	Illustrate the concepts of embedded system design	3	K2	1,2,8,9	1
C304.5	Explain the architecture of ARM processor.	4	K2	1,2,8,9	1
C304.6	Discuss the basics of embedded programming	5	K2	1,2,8,9,10	1

K Level	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C304.1	2	1	-	-	-	-	-	-	-	-	-	-	1	-
C304.2	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C304.3	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C304.4	2	1	-	-	-	-	-	1	1	-	-	-	1	-
C304.5	2	1	-	-	-	-	-	1	1	-	-	1	1	-
C304.6	2	1	-	-	-	-	-	1	1	1	-	1	1	-
C304	2	1	-	-	-	-	-	1	1	1	-	1	1	-

Course Name : NETWORKS LABORATORY		Course Code : 20CS5L1			
CO	Course Outcomes	Exp	K-CO	POs	PSOs
C306.1	Demonstrate the different Network Commands	1	K3	1,2,3,8,9,10	1,2
C306.2	Develop Simple Socket Programming	2,3,4	K3	1,2,3,8,9,10	1,2
C306.3	Develop the code for Data Link Layer Protocol Simulation	5,6	K3	1,2,3,8,9,10	1,2
C306.4	Examine Congestion Control Algorithm using Network Simulator	7	K4	1,2,3,4,8,9,10	1,2
C306.5	Develop the code for Transport Layer Protocol Simulation	8,9	K3	1,2,3,8,9,10	1,2
C306.6	Illustrate the performance of various network Routing Protocols	10, 11	K4	1,2,3,4,8,9,10	1,2

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C306.1	3	2	1	-	-	-	-	2	2	3	-	-	2	2
C306.2	3	2	1	-	-	-	-	2	2	3	-	-	2	2
C306.3	3	2	1	-	-	-	-	2	2	3	-	-	2	2
C306.4	3	3	2	1	-	-	-	2	2	3	-	-	2	2
C306.5	3	2	1	-	-	-	-	2	2	3	-	-	2	2
C306.6	3	3	2	1	-	-	-	2	2	3	-	-	2	2
C306	-	-	-	-	-	-	-	2	2	3	-	-	2	2

Course Name : SOFTWARE ENGINEERING LABORATORY		Course Code : 20CS5L2			
CO	Course Outcomes	Exp	K-CO	POs	PSOs
C307.1	Build the SRS for a suggested system using software requirements.	1,2	K3	1,2,3,8,9,10	1,2
C307.2	Construct the Data Flow Diagram(DFD) using software requirements.	3	K3	1,2,3,8,9,10	1,2
C307.3	Examine the identified classes and functionality of the system using USE CASE model.	4,5	K4	1,2,3,4,8,9,10	1,2
C307.4	Demonstrate the objects interaction and implementation models for the system.	6,7	K3	1,2,3,8,9,10	1,2
C307.5	Demonstrate the code from system design.	8	K3	1,2,3,8,9,10	1,2
C307.6	Analyze the developed code using testing strategies	9	K4	1,2,3,4,8,9,10	1,2

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C307.1	3	2	1	-	-	-	-	2	2	3	-	-	1	1
C307.2	3	2	1	-	-	-	-	2	2	3	-	-	1	1
C307.3	3	3	2	1	-	-	-	2	2	3	-	-	1	1
C307.4	3	2	1	-	-	-	-	2	2	3	-	-	1	1
C307.5	3	2	1	-	-	-	-	2	2	3	-	-	1	1
C307.6	3	3	2	1	-	-	-	2	2	3	-	-	1	1
C307	3	2	1	1	-	-	-	2	2	3	-	-	1	1

Course Name : MICROCONTROLLERS & EMBEDDED SYSTEMS LABORATORY		Course Code : 20EC5L3			
CO	Course Outcomes	Exp	K-CO	POs	PSOs
C308.1	Write ALP Programs for Arithmetic and logical operations using 8051	1,2,3	K3	1,2,3,8,9,10	1
C308.2	Interface different I/Os with 8051	4,5,6	K3	1,2,3,8,9,10	1
C308.3	Explain interfacing with ARM processor	7	K2	1,2,8,9,10	1
C308.4	Write programs in ARM for a specific Application	8,9	K3	1,2,3,8,9,10	1
C308.5	Interface memory, A/D and D/A convertors with ARM system	10	K3	1,2,3,8,9,10	1
C308.6	Write programs for interfacing keyboard, display and motor.	11	K3	1,2,3,8,9,10	1

K Level	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C308.1	3	2	1	-	-	-	-	2	2	3	-	-	1	-
C308.2	3	2	1	-	-	-	-	2	2	3	-	-	1	-
C308.3	2	1	-	-	-	-	-	2	2	3	-	-	1	-
C308.4	3	2	1	-	-	-	-	2	2	3	-	-	1	-
C308.5	3	2	1	-	-	-	-	2	2	3	-	-	1	-
C308.6	3	2	1	-	-	-	-	2	2	3	-	-	1	-
C308	3	2	1	-	-	-	-	2	2	3	-	-	1	-

Course Name : PRINCIPLES OF MANAGEMENT		Course Code : 20HS601			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C309.1	Explain the evolution of Management and organization types	1	K2	8,9,10,11	-
C309.2	Demonstrate the concepts involved in Planning process	2	K2	8,9,10,11,12	-
C309.3	Describe the organizing concept and its types.	3	K2	8,9,10,11	-
C309.4	Explain the human resource management and, career planning process.	3	K2	8,9,10,11	-
C309.5	Illustrate the importance of Motivation and leadership.	4	K2	8,9,10,11,12	-
C309.6	Explain the directing and controlling in Management process.	5	K2	8,9,10,11	-

K Level	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C309.1	-	-	-	-	-	-	-	2	2	2	1	-	-	-
C309.2	-	-	-	-	-	-	-	2	2	2	1	1	-	-
C309.3	-	-	-	-	-	-	-	2	2	2	1	-	-	-
C309.4	-	-	-	-	-	-	-	2	2	2	1	-	-	-
C309.5	-	-	-	-	-	-	-	2	2	2	1	1	-	-
C309.6	-	-	-	-	-	-	-	2	2	2	1	-	-	-
C309	-	-	-	-	-	-	-	2	2	2	1	1	-	-

Course Name : MOBILE ARCHITECTURE AND PROGRAMMING		Course Code : 20CS601			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C310.1	Explain the basics of mobile telecommunication systems	1	K2	1,2,8,9	1,2
C310.2	Describe the architecture of telecommunication systems in wireless networks.	2	K2	1,2,8,9	1,2
C310.3	Outline the different types of routing protocol for a given Ad hoc network.	3	K2	1,2,8,9,10	1,2
C310.4	Discuss the functionality of Transport and Application layers.	4	K2	1,2,8,9,10	1,2
C310.5	Build an application programming interface for android OS.	5	K3	1,2,3,8,9,12	1,2
C310.6	Apply the JNI library for mobile application development	5	K3	1,2,3,8,9,10,12	1,2

K Level	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C310.1	2	1	-	-	-	-	-	1	1	-	-	-	1	2
C310.2	2	1	-	-	-	-	-	1	1	-	-	-	1	2
C310.3	2	1	-	-	-	-	-	1	1	1	-	-	1	2
C310.4	2	1	-	-	-	-	-	1	1	1	-	-	1	2
C310.5	3	2	1	-	-	-	-	1	1	-	-	1	1	2
C310.6	3	2	1	-	-	-	-	1	1	1	-	1	1	2
C310	2	1	1	-	-	-	-	1	1	1	-	1	1	2

Course Name : CRYPTOGRAPHY AND NETWORK SECURITY		Course Code : 20CS602			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C311.1	Describe the fundamental theory of cryptography and OSI security architecture in networks.	1	K2	1,2	1,2
C311.2	Apply the classical encryption techniques for network security.	1	K3	1,2,3,8,9,10,12	1,2
C311.3	Illustrate the different cryptographic operations of symmetric cryptographic algorithms	2	K3	1,2,3,8,9,10,12	1,2
C311.4	Illustrate the different cryptographic operations of public key cryptography	3	K3	1,2,3,8,9,12	1,2
C311.5	Apply the various security mechanisms to build different Authentication services.	4	K3	1,2,3,8,9,12	1,2
C311.6	Explain the various Security practices and System security standards.	5	K2	1,2,8,9,10,12	1,2

K Level	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C311.1	2	1	-	-	-	-	-	-	-	-	-	-	3	2
C311.2	3	2	1	-	-	-	-	1	1	1	-	1	3	2
C311.3	3	2	1	-	-	-	-	1	1	1	-	1	3	2
C311.4	3	2	1	-	-	-	-	1	1	-	-	1	3	2
C311.5	3	2	1	-	-	-	-	1	1	-	-	1	3	2
C311.6	2	1	-	-	-	-	-	1	1	1	-	1	3	2
C311	3	2	1	-	-	-	-	1	1	1	-	1	3	2

Course Name : COMPILER DESIGN		Course Code : 20CS603			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C312.1	Construct lexical analyzer for a sample language.	1	K3	1,2,3,8,9	1,2
C312.2	Apply different parsing algorithms to develop the parsers for a given grammar.	2	K3	1,2,3,8,9,10,12	1,2
C312.3	Describe the syntax-directed translation and run-time environment.	2	K2	1,2,8,9	1,2
C312.4	Develop code optimization techniques for source program.	3	K3	1,2,3,8,9,10,12	1,2
C312.5	Build a simple code generator for source program.	4	K3	1,2,3,8,9	1,2
C312.6	Develop a scanner and a parser using LEX and YACC tools.	5	K3	1,2,3,8,9,10,12	1,2

K Level	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C312.1	3	2	1	-	-	-	-	2	2	-	-	-	3	1
C312.2	3	2	1	-	-	-	-	2	2	1	-	1	3	1
C312.3	2	1	-	-	-	-	-	2	2	-	-	-	3	1
C312.4	3	2	1	-	-	-	-	2	2	1	-	1	3	1
C312.5	3	2	1	-	-	-	-	2	2	1	-	1	3	1
C312.6	3	2	1	-	-	-	-	2	2	-	-	-	3	1
C312	3	2	1	-	-	-	-	2	2	1	-	1	3	1

Course Name : ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE		Course Code : 20MC601			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C313.1	Explain philosophy of Indian culture.	1	K2		-
C313.2	Distinguish the Indian languages and literature.	2	K3		-
C313.3	Explain the philosophy of ancient, medieval and modern India.	3	K2		-
C313.4	Acquire the information about the fine arts in India.	4	K2		-
C313.5	Know the contribution of scientists of different eras.	4	K2		-
C313.6	Explain education systems in India	5	K2		-

K Level	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C313.1	-	-	-	-	-	2	-	2	-	-	-	-	-	-
C313.2	-	-	-	-	-	2	-	2	-	-	-	-	-	-
C313.3	-	-	-	-	-	2	-	2	-	-	-	-	-	-
C313.4	-	-	-	-	-	2	-	2	-	-	-	-	-	-
C313.5	-	-	-	-	-	2	-	2	-	-	-	-	-	-
C313.6	-	-	-	-	-	2	-	2	-	-	-	-	-	-
C313	-	-	-	-	-	2	-	2	-	-	-	-	-	-

Course Name : MACHINE LEARNING		Course Code : 20CS604			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C314.1	Identify the category of the learning problem, and measure its performance like recall, precision etc.	1	K3	1,2,3,8,9,10,12	1,2
C314.2	Apply the classification algorithms like K-NN, Decision Tree, Naive Bayes, Logistic Regression to label the data set.	2	K3	1,2,3,8,9,10,12	1,2
C314.3	Apply unsupervised algorithms namely K-means and PCA to cluster the given data set.	3	K3	1,2,3,8,9,10,12	1,2
C314.4	Apply Content-based recommender systems and Collaborative Filtering to implement recommender systems.	4	K3	1,2,3,8,9,10,12	1,2
C314.5	Identify any societal problem and examine by applying acquired knowledge of machine learning in order to develop a mini project	5	K4	1,2,3,4,6,8,9,10,11,12	1,2
C314.6	Combine all the modules of mini project through effective team work after efficient testing, and compile a detailed report.	5	K4	1,2,3,4,5,8,9,10,11,12	1,2

K Level	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C314.1	3	2	1	-	-	-	-	2	2	2	-	2	3	1
C314.2	3	2	1	-	-	-	-	2	2	2	-	2	3	1
C314.3	3	2	1	-	-	-	-	2	2	2	-	2	3	1
C314.4	3	2	1	-	-	-	-	2	2	2	-	2	3	1
C314.5	3	3	2	1	-	1	-	2	2	2	1	2	3	1
C314.6	3	3	2	1	1	-	-	2	2	2	1	2	3	1
C314	3	2	1	1	1	1	-	2	2	2	1	2	3	1

Course Name : Mobile Application Development Laboratory		Course Code : 20CS6L1			
CO	Course Outcomes	EXP	K-CO	POs	PSOs
C315.1	Develop mobile applications using GUI and Layouts.	1,2	K3	1,2,3,8,9,10,12	1,2
C315.2	Develop mobile applications using Event Listener.	2,3	K3	1,2,3,8,9,10,12	1,2
C315.3	Develop mobile applications using Databases.	4	K3	1,2,3,8,9,10,12	1,2
C315.4	Develop mobile applications using Notification Manager	5	K3	1,2,3,8,9,10,12	1,2
C315.5	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi- threading and GPS.	6,7,8	K3	1,2,3,8,9,10,12	1,2
C315.6	Create own mobile app for simple needs	9-12	K6	1,2,3,4,5,6,8,9,10,11,12	1,2

K Level	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C315.1	3	2	1	-	-	-	-	2	2	3	-	1	2	3
C315.2	3	2	1	-	-	-	-	2	2	3	-	1	2	3
C315.3	3	2	1	-	-	-	-	2	2	3	-	1	2	3
C315.4	3	2	1	-	-	-	-	2	2	3	-	1	2	3

CE301.2	2	1	-	-	-	-	-	1	1	1	-	-	2	1
CE301.3	3	2	1	-	-	-	-	1	1	1	-	-	2	1
CE301.4	3	2	1	-	-	-	-	1	1	1	-	1	2	1
CE301.5	3	2	1	-	-	-	-	1	1	1	-	1	2	1
CE301.6	3	2	1	-	-	-	-	1	1	1	-	1	2	1
CE301	3	2	1	-	-	-	-	1	1	1	-	1	2	1

Course Name : COMPUTER GRAPHICS AND MULTIMEDIA		Course Code : 20CS6A2			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
CE302.1	Explain the hardware devices and software used in graphics systems.	1	K2	1,2	1,2
CE302.2	Apply the two and three dimensional geometric transformations in graphics systems.	2,3	K3	1,2,3,8,9,10,12	1,2
CE302.3	Discuss the various graphics colour models	3	K2	1,2	1,2
CE302.4	Apply various algorithms in two and three dimensional viewing and clipping process.	3	K3	1,2,3,8,9,10,12	1,2
CE302.5	Outline the concept of multimedia design and file handling methods.	4	K2	1,2,8,9,10	1,2
CE302.6	Describe the Hypermedia and Distributed multimedia systems	5	K2	1,2,8,9,10	1,2

K Level Note:	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE302.1	2	1	-	-	-	-	-	-	-	-	-	-	2	1
CE302.2	3	2	1	-	-	-	-	1	1	1	-	1	2	1
CE302.3	2	1	-	-	-	-	-	-	-	-	-	-	2	1
CE302.4	3	2	1	-	-	-	-	1	1	1	-	1	2	1
CE302.5	2	1	-	-	-	-	-	1	1	1	-	-	2	1
CE302.6	2	1	-	-	-	-	-	1	1	1	-	-	2	1
CE302	2	1	1	-	-	-	-	-	-	-	-	-	2	1

Course Name : GRAPH THEORY AND APPLICATIONS		Course Code : 20CS6A3			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
CE303.1	Classify mathematical definitions of objects in graph theory	1	K2	1,2,12	1
CE303.2	Explain the concept of vertex connectivity and edge connectivity in graphs	2	K2	1,2,8,9,10,12	1
CE303.3	Discuss the fundamental concept of network flows and planner graphs	3	K2	1,2,12	1
CE303.4	Solve Geometric and Combinatorial Dual problems	4	K3	1,2,3,8,9,10,12	1
CE303.5	Solve graph coloring problems	4	K3	1,2,3,8,9,10,12	1
CE303.6	Apply suitable graph models and algorithms for solving applications	5	K3	1,2,3,8,9,10,12	1

K Level	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE303.1	2	1	-	-	-	-	-	-	-	-	-	1	1	-
CE303.2	2	1	-	-	-	-	-	1	1	1	-	1	1	-
CE303.3	2	1	-	-	-	-	-	-	-	-	-	1	1	-
CE303.4	3	2	1	-	-	-	-	1	1	1	-	1	1	-
CE303.5	3	2	1	-	-	-	-	1	1	1	-	1	1	-
CE303.6	3	2	1	-	-	-	-	2	2	1	-	1	1	-
CE303	3	2	1	-	-	-	-	1	1	1	-	1	1	-

Course Name : SYSTEM SOFTWARE		Course Code : 20CS6A4			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
CE304.1	Explain the concept of machine architecture.	1	K2	1,2,12	-
CE304.2	Discuss machine dependent and machine independent assemblers.	2	K2	1,2,8,9,10	-
CE304.3	Explain the design of loaders and linkers.	3	K2	1,2,8,9,10	-
CE304.4	Describe machine dependent and machine independent loaders	3	K2	1,2	-
CE304.5	Outline the concept of designing macro processors	4	K2	1,2	-
CE304.6	Explain the text editor process of system software.	5	K2	1,2,8,9,10,12	-

K Level	<i>Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)</i>													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE304.1	2	1	-	-	-	-	-	-	-	-	-	1	1	-
CE304.2	2	1	-	-	-	-	-	1	1	1	-	-	1	-
CE304.3	2	1	-	-	-	-	-	1	1	1	-	-	1	-
CE304.4	2	1	-	-	-	-	-	-	-	-	-	-	1	-
CE304.5	2	1	-	-	-	-	-	-	-	-	-	-	1	-
CE304.6	2	1	-	-	-	-	-	1	1	1	-	1	1	-
CE304	2	1	-	-	-	-	-	1	1	1	-	1	1	-

Course Name : ENTREPRENEURSHIP DEVELOPMENT		Course Code : 20HS6A2			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
CE305.1	Explain the qualities of an Entrepreneur and his Role in startup.	1	K2	8,9	-
CE305.2	Illustrate the Entrepreneurial Environment for bringing more ventures	2	K2	8,9	-
CE305.3	Determine the ideation, Product Development, and Project Management	3	K2	8,9,10,11	-
CE305.4	Illustrate Finance planning and capital venture	4	K2	8,9	-
CE305.5	Explain the use of ownership in the small business.	5	K2	8,9,10	-
CE305.6	Explain the E- Commerce and M-Commerce for the Technopreneurship Development.	5	K2	8,9	-

K Level	Apply (PO1-K3), Analyze (PO2-K4), Evaluate (PO3-K5), Create (PO4-K6)													
Note:														
K Level →	K3	K4	K5	K6										
Course outcomes ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE305.1	-	-	-	-	-	-	-	2	2	-	-	-	-	-
CE305.2	-	-	-	-	-	-	-	2	2	-	-	-	-	-
CE305.3	-	-	-	-	-	-	-	2	2	1	1	-	-	-
CE305.4	-	-	-	-	-	-	-	2	2	-	-	-	-	-
CE305.5	-	-	-	-	-	-	-	2	2	1	-	-	-	-
CE305.6	-	-	-	-	-	-	-	2	2	-	-	-	-	-
CE305	-	-	-	-	-	-	-	2	2	1	1	-	-	-

Course Name : Data Analytics										Course Code : 20CS701				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
C401.1	Explain the basic concepts of Data Analytics									1	K2	1, 2, 8, 9	1	
C401.2	Describe the Data Analysis preprocessing Techniques.									2	K2	1, 2, 8,9, 10	1	
C401.3	Explain about how missing data will be handled during preprocessing									2	K2	1, 2, 8,9, 10	1	
C401.4	Apply the Classification and Clustering algorithms for real time applications									3	K3	1,2,3,8, 9,12	1	
C401.5	Apply the different mining concept for Real Time Analytics applications									4	K3	1, 2, 3,8,9	1	
C401.6	Explain the Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics									5	K2	1,2,5, 8,9, 12	1,2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C401.1	2	1	-	-	-	-	-	1	1	-	-	-	1	-
C401.2	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C401.3	2	1	-	-	-	-	-	1	1	1	-	-	1	-
C401.4	3	2	1	-	-	-	-	1	1	-	-	1	1	-
C401.5	3	2	1	-	-	-	-	1	1	-	-	1	1	-
C401.6	2	1	-	-	1	-	-	1	1	-	-	1	1	2
C	2	1	1	-	1	-	-	1	1	1	-	1	1	1

Course Name : ARTIFICIAL INTELLIGENCE										Course Code : 20CS702				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
C402.1	Explain the concept of intelligent agent and various problem solving approaches.									1	K2	1, 2, 8,9	1	
C402.2	Determine the appropriate search algorithms for any AI problem									2	K2	1, 2, 8,9	1	
C402.3	Discuss the suitable agent strategy to solve a given problem.									2	K2	1, 2, 8,9	1	
C402.4	Illustrate first order and predicate logic for a given problem									3	K3	1, 2, 3, 8,9	1	
C402.5	Explain software agents components to solve a problem									4	K2	1, 2, 8,9	1	
C402.6	Summarize the different applications that use Artificial Intelligence									5	K2	1, 2, 8,9	1	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

										10				
C402.1	2	1	-	-	-	-	-	1	1	1	-	-	2	-
C402.2	2	1	-	-	-	-	-	1	1	1	-	-	2	-
C402.3	2	1	-	-	-	-	-	1	1	1	-	-	2	-
C402.4	3	2	1	-	-	-	-	1	1	1	-	-	2	-
C402.5	2	1	-	-	-	-	-	1	1	1	-	-	2	-
C402.6	2	1	-	-	-	-	-	1	1	1	-	-	2	-
C	2	1	1	-	-	-	-	1	1	1	-	-	2	-

Course Name : Data Analytics Laboratory										Course Code : 20CS7L1				
CO	Course Outcomes									Experiments	K-CO	POs	PSOs	
C406.1	Build numerical and statistical analysis on various data sources									1,2	K3	1,2,3,8,9,10,12	1,2	
C406.2	Apply data preprocessing and dimensionality reduction methods on raw data									3	K3	1,2,3,8,9,10,12	1,2	
C406.3	Apply the different regression technique on given dataset									4,5	K3	1,2,3,8,9,10,12	1,2	
C406.4	Apply the classification and clustering algorithms on different datasets									6,7,8	K3	1,2,3,8,9,10,12	1,2	
C406.5	Apply appropriate visualization techniques for presenting the data									9	K3	1,2,3,8,9,10,12	1,2	
C406.6	Solve the real world data analysis problems.									10	K4	1,2,3,4,5,6,8,9,10,11,12	1,2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C406.1	3	2	1	-	-	-	-	2	2	2	-	2	1	2
C406.2	3	2	1	-	-	-	-	2	2	2	-	2	1	2
C406.3	3	2	1	-	-	-	-	2	2	2	-	2	1	2
C406.4	3	2	1	-	-	-	-	2	2	2	-	2	1	2
C406.5	3	2	1	-	-	-	-	2	2	2	-	2	1	2
C406.6	3	3	2	1	1	1	-	2	2	2	2	2	1	2
C	3	2	1	1	1	1	-	2	2	2	1	2	1	2

Course Name : Mini Project										Course Code : 20CS7L2				
CO	Course Outcomes									Experiments	K-CO	POs	PSOs	
C407.1	Identify a problem and its applicability along with suitable domain.									-	K3	1,2,3,6,7,8,9,10,11,12	1,2	
C407.2	Analyze and formulate project modules and identified constraints based on environmental and societal impact.									-	K4	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
C407.3	Select efficient tools and methods for designing and implementing project modules.									-	K4	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
C407.4	Propose an effective solution for the problem identified with the help of developed methodology and tools									-	K6	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
C407.5	Summarize all the modules through effective integration and testing.									-	K5	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
C407.6	Illustrate the completed task and compile the project report.									-	K4	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

C407.1	3	2	1	-	-	3	3	3	3	3	2	2	3	3
C407.2	3	3	2	1	2	3	3	2	2	2	3	2	3	3
C407.3	3	3	2	1	3	2	2	2	2	2	3	2	3	3
C407.4	3	3	3	3	3	3	3	2	2	2	3	2	3	3
C407.5	3	3	3	2	3	3	3	2	2	2	3	2	3	3
C407.6	3	3	2	1	1	1	1	3	3	3	2	2	3	3
C	3	3	2	2	2	3	3	3	3	3	3	2	3	3

Course Name : Project Work										Course Code : 20CS811				
CO	Course Outcomes									Experiments	K-CO	POs	PSOs	
C410.1	Identify a domain and problem by applying required domain knowledge.										K3	1,2,3,6,7,8,9,10, 11,12	1,2	
C410.2	Analyze and categorize executable project modules including real time project constraints based on environmental and societal impact.										K4	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
C410.3	Examine efficient tools and methods for designing and implementing project modules.										K4	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
C410.4	Develop effective solution for the problem identified with the help of proposed methodology and tools										K6	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
C410.5	Assess all the modules through effective integration, optimization and testing.										K5	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
C410.6	Elaborate the completed task and compile the project report.										K4	1,2,3,4,5,6,7,8,9,10,11,12	1,2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C410.1	3	2	1	-	-	3	3	3	3	3	2	2	3	3
C410.2	3	3	2	1	2	3	3	2	2	2	3	2	3	3
C410.3	3	3	2	1	3	2	2	2	2	2	3	2	3	3
C410.4	3	3	3	3	3	3	3	2	2	2	3	2	3	3
C410.5	3	3	3	2	3	3	3	2	2	2	3	2	3	3
C410.6	3	3	2	1	1	1	1	3	3	3	2	2	3	3
C410	3	3	2	2	2	3	3	3	3	3	3	2	3	3

Course Name : Cloud Computing										Course Code : 20CS7A1			
CO	Course Outcomes									Unit	K-CO	POs	PSOs
CE404.1	Describe the main concepts, key technologies, strengths and limitations of cloud computing.									1	K2	1,2,8,9	1,2
CE404.2	Explain the key and enabling technologies that help in the development of cloud.									2	K2	1,2,8,9	1,2
CE404.3	Discuss the usage of architecture of compute and storage cloud, service and delivery models.									3	K2	1,2,8,9	1,2
CE404.4	Explain the core issues of cloud computing such as resource management and security.									4	K2	1,2,8,9	1,2
CE404.5	Illustrate the security features to be adopted in cloud.									4	K2	1,2,8,9	1,2
CE404.6	Infer the appropriate technologies, algorithms and approaches for implementation and use of cloud									5	K3	1,2,3, 8,9	1,2

CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE404.1	2	1	-	-	-	-	-	1	1	1	-	-	2	2
CE404.2	2	1	-	-	-	-	-	1	1	1	-	-	2	2
CE404.3	2	1	-	-	-	-	-	1	1	1	-	-	2	2
CE404.4	2	1	-	-	-	-	-	1	1	1	-	-	2	2
CE404.5	2	1	-	-	-	-	-	1	1	1	-	-	2	2
CE404.6	3	2	1	-	-	-	-	1	1	1	-	-	2	2
C	2	1	1	-	-	-	-	1	1	1	-	-	2	2

Course Name : Agile Methodologies		Course Code : 20CS7A2												
CO	Course Outcomes	Unit	K-CO	POs	PSOs									
CE404.1	Explain the fundamentals of agile and project management	1	K2	1, 2, 8,9,11	1,2									
CE404.2	Discuss the components of agile scrum framework.	2	K2	1, 2, 8, 9	1,2									
CE404.3	Discuss the requirements engineering process in agile.	3	K2	1, 2, 8,9	1,2									
CE404.4	Describe the different types of testing in agile framework.	3	K2	1, 2,5, 8, 9	1,2									
CE404.5	Explain Agile software design and development practices.	4	K2	1, 2,8,9, 11	1,2									
CE404.6	Illustrate agile quality assurance framework and Industry Trends	5	K2	1, 2, 5, 8,9	1,2									
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE404.1	2	1						1	1	1	1		1	2
CE404.2	2	1						1	1	1	1		1	2
CE404.3	2	1						1	1	1	1		1	2
CE404.4	2	1			1			1	1	1			1	2
CE404.5	2	1						1	1	1	1		1	2
CE404.6	2	1			1			1	1	1			1	2
C	2	1			1			1	1	1	1		1	2

Course Name : Java Scripting		Course Code : 20CS7A3												
CO	Course Outcomes	Unit	K-CO	POs	PSOs									
CE404.1	Summarize about HTML and develop a script to validate input	1	K3	1, 2, 3, 8,9	1									
CE404.2	Generalize the basic concepts about Java Script Programming such as variables, Data Types and Expressions	2	K2	1, 2, 8,9	1									
CE404.3	Explain Java Script Document Object Model	3	K2	1, 2, 8,9	1									
CE404.4	Illustrate about various Java Script statements and functions	4	K2	1, 2, 8,9	1									
CE404.5	Make use of Java Script events in Client side programming	5	K3	1, 2, 3, 8,9	2									
CE404.6	Discuss about Web Services and Other Markup Languages	5	K2	1, 2, 8,9	2									
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE404.1	3	2	1					1	1	1			2	

CE404.2	2	1						1	1	1			2	
CE404.3	2	1						1	1	1			2	
CE404.4	2	1						1	1	1			2	
CE404.5	3	2	1					1	1	1				2
CE404.6	2	1						1	1	1				2
C	2	1	1					1	1	1			2	2

Course Name : NATURAL LANGUAGE PROCESSING								Course Code : 20CS7A4						
CO	Course Outcomes							Unit	K-CO	POs	PSOs			
CE404.1	Explain the basic challenges of NLP and describe a given text with basic Language features							1	K2	1,2, 8&9	1,2			
CE404.2	Classify the various word class analysis involved in NLP and tokenization the given text							2	K2	1,2, 8&9	1,2			
CE404.3	Discuss the rule based system to tackle morphology and syntax of a language							3	K2	1,2,8&9	1,2			
CE404.4	Explain the basic knowledge of Semantic Analysis							4	K2	1,2, 8&9	1,2			
CE404.5	Compute word similarity using different thesaurus and distributional methods							4	K3	1, 2, 3, 8&9	1,2			
CE404.6	Generalise the use of different statistical approaches for different types of NLP applications							5	K3	1, 2, 3, 8&9	1,2			
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE404.1	2	1						1	1	1			2	2
CE404.2	2	1						1	1	1			2	2
CE404.3	2	1						1	1	1			2	2
CE404.4	2	1						1	1	1			2	2
CE404.5	3	2	1					1	1	1			2	2
CE404.6	3	2	1		2			1	1	1			2	2
C	2	1	1		2			1	1	1			2	2

Course Name : Advanced Topics on DBMS											Course Code : 20BS402				
CO	Course Outcomes										Unit	K-CO	POs	PSOs	
CE404.1	Explain the database system Architecture and Query processing on parallel systems										1	K2	1, 2, 8,9	1	
CE404.2	Illustrate object methods, structure and object relational features using SQL										2	K3	1, 2, 3, 8,9	1	
CE404.3	Explain design principles of Active data bases and Spatial, temporal databases										3	K2	1, 2, 5, 8,9	1	
CE404.4	Discuss XML schema, Web database and cloud database.										4	K2	1, 2, 8,9	1	
CE404.5	Explain Mobile Transaction models and multimedia data management										5	K2	1, 2, 8,9	1	
CE404.6	Explain feature of data storage and different mining techniques										5	K2	1, 2, 5, 8,9	1	
CO-PO Mapping															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CE404.1	2	1						1	1	1			2		
CE404.2	3	2	1					1	1	1			2		
CE404.3	2	1			1			1	1	1			2		
CE404.4	2	1						1	1	1			2		

CE404.5	2	1					1	1	1			2	
CE404.6	2	1			1		1	1	1			2	
C	2	1	1		1		1	1	1			2	

Course Name : INTERNET OF THINGS										Course Code : 20IT601				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
C311.1	Understand the concept of IOT.									1	K2	1,2		
C311.2	Realize various protocols for IOT.									2	K2	1,2		
C311.3	Design a PoC of an IOT system using Raspberry Pi/Arduino									3	K3	1,2,3	1.2	
C311.4	Apply data analytics and use cloud offerings related to IOT.									4	K3	1,2,3	1,2	
C311.5	Understand the different IOT systems									5	K2	1,2	1,2	
C311.6	Build applications of IOT in real time scenario									5	K4	1,2,3,4	1,2	
CO PO MAPPING														
CO ↓	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C311.1	2	1								1				
C311.2	2	1										1		
C311.3	3	2	1							1			1	1
C311.4	3	2	1									1	1	1
C311.5	2	1								1			1	1
C311.6	3	3	2	1								1	1	1

Course Name : TOTAL QUALITY MANAGEMENT										Course Code : 20HS7A2				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE404.1	Explain basic concepts, TQM framework, Barriers and Benefits of TQM.									I	K3	1,2,3,11	1, 2	
CE404.2	Explain the TQM Principles for application.									II	K3	1,2,3,8,11	2	
CE404.3	Define the basics of Six Sigma and Traditional tools, New tools, Benchmarking and FMEA.									III	K2	1,2,3,4,5,11,12	2	
CE404.4	Describe Taguchi's Quality Loss Function, Performance Measures and apply Techniques like QFD, TPM, COQ and BPR.									IV	K3	1,2,3,4,5,7,11	2	
CE404.5	Illustrate and apply QMS and EMS in any organization.									V	K3	1,2,3,4,11,12	2	
CE404.6	Explain the process of implementation of ISO 9000/9001-2008/14000 for given manufacturing, service sector.									V	K3	1,2,3,5,11,12	2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE404.1	3	2	1	-	-	-	-	-	-	-	2	-	1	2
CE404.2	3	2	1	-	-	-	-	1	-	-	2	-	1	2
CE404.3	3	2	1	1	2	-	-	-	-	-	2	1	1	2
CE404.4	3	2	1	2	2	-	1	-	-	-	2	-	1	2

CE404.5	3	2	1	-	-	-	-	-	-	-	2	1	1	2
CE404.6	3	2	1	-	1	-	-	-	-	-	2	1	1	2
C	3	2	1	1	1			1	1		2	1	1	2

Course Name : C# and .NET Programming										Course Code : 20CS7B1				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE405.1	Describe the core syntax and features of C#									1	K2	1, 2, 8, 9	2	
CE405.2	Illustrate in detail about Lambda Expression, Event Listeners, Memory Management and Pointers									2	K3	1, 2, 3, 8, 9	2	
CE405.3	Illustrate file manipulation and ADO.NET using libraries									3	K3	1, 2, 3, 5, 8, 9	2	
CE405.4	Develop a simple form and events handling using ASP.NET									4	K3	1, 2, 3, 5, 8, 9	2	
CE405.5	Make use of CLR for execution of a .NET application									5	K3	1, 2, 3, 5, 8, 9	2	
CE405.6	Compare features of .NET framework and .NET compact framework									5	K2	1, 2, 8, 9	2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE405.1	2	1						1	1	1				1
CE405.2	3	2	1					1	1	1				1
CE405.3	3	2	1		2			1	1	1				1
CE405.4	3	2	1		2			1	1	1				1
CE405.5	3	2	1		2			1	1	1				1
CE405.6	2	1						1	1	1				1
C	3	2	1		1			1	1	1				1

Course Name : Wireless Adhoc And Sensor Networks										Course Code : 20CS7B2				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE405.1	Explain the basic concepts of wireless networks and challenges of Adhoc and sensor networks.									1	K2	1, 2, 8, 9	2	
CE405.2	Classify the design issues and different categories of MAC protocols.									2	K2	1, 2, 8, 9	2	
CE405.3	Explain the various Adhoc routing protocols and transport layer mechanisms.									3	K2	1, 2, 8, 9	2	
CE405.4	Discuss the sensor characteristics and Data relaying and aggregation strategies.									4	K2	1, 2, 8, 9	2	
CE405.5	Describe the different WSN MAC layer protocols.									4	K2	1, 2, 8, 9	2	
CE405.6	Illustrate the issues of routing, QoS and Localization related performance measurements in WSN									5	K2	1, 2, 8, 9	2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE405.1	2	1						2	2	1			2	
CE405.2	2	1						2	2	1			2	
CE405.3	2	1						2	2	1			2	
CE405.4	2	1						2	2	1			2	
CE405.5	2	1						2	2	1			2	
CE405.6	2	1						2	2	1			2	
C	2	1						2	2	1			2	

Course Name : Multicore Architectures and Programming										Course Code : 20CS7B3				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE405.1	Describe multi core architectures and identify their characteristics and performance issues									1	K2	1, 2, 8, 9	1,2	
CE405.2	Identify the issues in programming Parallel Processors									2	K2	1, 2, 8, 9	1,2	
CE405.3	Illustrate shared memory programs using OpenMP									3	K3	1, 2, 3, 8, 9	1,2	
CE405.4	Illustrate distributed memory programs using MPI.									4	K3	1, 2, 3, 8, 9	1,2	
CE405.5	Analyze the parallel program implementation of n-Body solvers using OpenMP andMPI programs									5	K4	1, 2, 3,4, 8,9	1,2	
CE405.6	Analyze the parallel program implementation of Tree Search problem using OpenMP andMPI programs									5	K4	1, 2, 3,4, 8,9	1,2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE405.1	2	1						1	1	1			1	1
CE405.2	2	1						1	1	1			1	1
CE405.3	3	2	1					1	1	1			1	1
CE405.4	3	2	1					1	1	1			1	1
CE405.5	3	3	2	1				1	1	1			1	1
CE405.6	3	3	2	1				1	1	1			1	1
C	3	2	1	1				1	1	1			1	1

Course Name : Distributed Systems										Course Code : 20CS7B4				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE405.1	Outline the issues and challenges in developing distributed applications									1	K2	1, 2, 8,9	1	
CE405.2	Discuss the various features of Global state of a distributed computation									1	K2	1, 2, 8,9	1	
CE405.3	Describe the needs of message ordering and snapshot recording algorithms in distributed computations									2	K2	1, 2, 8,9	1	
CE405.4	Discuss Mutual Exclusion and Deadlock detection algorithms in distributed systems									3	K2	1, 2, 8,9	1	
CE405.5	Explain the agreement algorithms and recovery algorithms in distributed systems.									4	K2	1, 2, 8,9	1	
CE405.6	Describe the popular distributed systems and distributed shared memory techniques									5	K2	1, 2, 8,9	1	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE405.1	2	1						1	1	1			1	
CE405.2	2	1						1	1	1			1	
CE405.3	2	1						1	1	1			1	
CE405.4	2	1						1	1	1			1	
CE405.5	2	1						1	1	1			1	
CE405.6	2	1						1	1	1			1	
C	2	1						1	1	1			1	

Course Name : USER INTERFACE DESIGN										Course Code :20IT7B2				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	

PE3.2.1	Design effective dialog using HCI.	1	K2	1, 2, 8, 9	1,2
PE3.2.2	Design effective HCI for individuals.	2	K2	1, 2, 8, 9,10	1,2
PE3.2.3	Explain the structures and functions of Menus.	3	K2	1, 2, 8, 9,12	1,2
PE3.2.4	Explain the various controls in Windows.	4	K2	1, 2, 8, 9,10,12	1,2
PE3.2.5	Assess the importance of user feedback and multimedia applications..	5	K2	1, 2, 8, 9,12	1.2
PE3.2.6	Explain the HCI implications for designing hypermedia, and learn about World Wide Web and software tools.	5	K2	1, 2, 8, 9	1,2

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PE3.2.1	2	1			-	-	-	1	1		-	-	1	2
PE3.2.2	2	1			-	-	-	1	1	1	-	-	1	2
PE3.2.3	2	1			-	-	-	1	1	-	-	1	1	2
PE3.2.4	2	1			-	-	-	1	1	1	-	1	1	2
PE3.2.5	2	1			-	-	-	1	1	-	-	1	1	2
PE3.2.6	2	1			-	-	-	1	1				1	2
	2	1			-	-	-	1	1		1		1	2

Course Name : SERVICE ORIENTED ARCHITECTURE								Course Code : 20IT7B4						
CO	Course Outcomes							Unit	K-CO	POs	PSOs			
PE3.6.1	Understand XML technologies							1	K2	1, 2, 8, 9	1,2			
PE3.6.2	Understand service orientation, benefits of SOA							2	K2	1, 2, 3, 8, 9,10	1,2			
PE3.6.3	Understand web services and WS standards							3	K2	1, 2, 3, 8, 9,12	1,2			
PE3.6.4	Use web services extensions to develop solutions							4	K2	1, 2, 3, 8, 9,10,12	1,2			
PE3.6.5	Understand and apply service modeling, service oriented analysis and design for application development							5	K2	1, 2, 3, 8, 9,12	1,2			
PE3.6.6	Understand XML technologies							5	K2	1, 2, 8, 9	1,2			
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PE3.6.1	2	1			-	-	-	1	1		-	-	1	1
PE3.6.2	2	1			-	-	-	1	1	1	-	-	1	1
PE3.6.3	2	1			-	-	-	1	1	-	-	1	1	1
PE3.6.4	2	1			-	-	-	1	1	1	-	1	1	1
PE3.6.5	2	1			-	-	-	1	1	-	-	1	1	1
PE3.6.6	2	1			-	-	-	1	1				1	1
C	2	1			-	-	-	1	1	1		1	1	1

Course Name : Operations Research								Course Code : 20HS601						
CO	Course Outcomes							Unit	K-CO	POs	PSOs			
CE405.1	Solve Linear Programming Problems by appropriate technique.							1	K3	1, 2,3,8,9, 10	1			
CE405.2	Determine the performance characteristics such as time and cost in solving shortest route, transportation problems with an appropriate model.							1	K3	1, 2,3,8,9, 10	1			
CE405.3	Solve the given assignment problem with an appropriate method.							2	K3	1, 2,3,8,9, 10	1			
CE405.4	Determine the optimal solution for a project scheduling problem.							3	K3	1, 2,3,8,9, 10	1			
CE405.5	Determine the order quantity of goods under different							4	K3	1, 2,3,8,9,	1			

	constraints.			10										
CE405.6	Determine the solutions to single and multi channel Queuing problems.	5	K3	1, 2,3,8,9, 10	1									
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE405.1	3	2	1					1	1	1			1	
CE405.2	3	2	1					1	1	1			1	
CE405.3	3	2	1					1	1	1			1	
CE405.4	3	2	1					1	1	1			1	
CE405.5	3	2	1					1	1	1			1	
CE405.6	3	2	1					1	1	1			1	
C	3	2	1					1	1	1			1	

Course Name : Social Network Analysis										Course Code : 20CS8A1				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE408.1	Explain the semantic web concepts and applications of social network analysis.									1	K2	1, 2, 8,9	1,2	
CE408.2	Discuss about modeling and knowledge representation using ontology of social network.									2	K2	1, 2, 8,9	1,2	
CE408.3	Illustrate the extraction and mining communities in web social networks.									3	K3	1, 2, 3, 8,9	1,2	
CE408.4	Illustrate the various methods for predicting human behaviour in social communities.									4	K3	1, 2, 3, 8,9	1,2	
CE408.5	Describe the privacy issues in trust network analysis.									4	K2	1, 2, 8,9	1,2	
CE408.6	Make use of visualization techniques for social network applications									5	K3	1, 2, 3, 8,9	1,2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE408.1	2	1						1	1	1			2	2
CE408.2	2	1						1	1	1			2	2
CE408.3	3	2	1					1	1	1			2	2
CE408.4	3	2	1			1		1	1	1			2	2
CE408.5	2	1				1		1	1	1			2	2
CE408.6	3	2	1		1			1	1	1			2	2
C	3	2	1		1	1		1	1	1			2	2

Course Name : Software Defined Networks										Course Code : 20CS8A2				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE408.1	Explain the key benefits of SDN by separation of Data and Control Planes.									1	K2	1, 2, 8, 9	1	
CE408.2	Discuss the openflow specification and different controllers of SDN.									2	K2	1, 2, 8, 9	1	
CE408.3	Describe various Data centers and SDN solutions for the Data Center networks.									3	K2	1, 2,8, 9	1	
CE408.4	Develop various applications of SDN using current languages and tools.									4	K3	1, 2, 3, 8, 9	1	
CE408.5	Explain the various concepts of Network function virtualization in SDN programming.									4	K2	1, 2, 8, 9	1	
CE408.6	Explain different framework and controller used in SDN									5	K2	1, 2,8,9	1	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

CE408.1	2	1						1	1	1			2	
CE408.2	2	1						1	1	1			2	
CE408.3	2	1						1	1	1			2	
CE408.4	3	2	1					1	1	1			2	
CE408.5	3	2						1	1	1			2	
CE408.6	3	2						1	1	1			2	
C	3	2	1					1	1	1			2	

Course Name : Digital Forensics and Ethical Hacking											Course Code : 20CS8A3				
CO	Course Outcomes										Unit	K-CO	POs	PSOs	
CE408.1	Discuss various forensic techniques and computer investigations										1	K2	1, 2, 8, 9	1, 2	
CE408.2	Apply different computer forensic tools to a given scenario										2	K3	1,2,3, 8, 9	1, 2	
CE408.3	Compute and validate forensics data for network, email and mobile devices										3	K3	1,2,3, 8, 9	1, 2	
CE408.4	Explain various ethical hacking techniques in forensics										4	K2	1, 2, 8, 9	1, 2	
CE408.5	Illustrate different hacking methods for web applications										5	K2	1, 2, 8, 9	1, 2	
CE408.6	Demonstrate real world hacking techniques in mobile platform										5	K3	1,2,3, 8, 9	1, 2	
CO-PO Mapping															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CE408.1	2	1				3		1	1	1			2	2	
CE408.2	3	2	1		3	3		1	1	1		2	2	2	
CE408.3	3	2	1			3		1	1	1			2	2	
CE408.4	2	1				3		1	1	1			2	2	
CE408.5	2	1				3		1	1	1			2	2	
CE408.6	3	2	1		3	3		1	1	1	2	2	2	2	
C	3	2	1		3	3		1	1	1	1	2	2	2	

Course Name : Soft Computing											Course Code : 20CS8A4				
CO	Course Outcomes										Unit	K-CO	POs	PSOs	
CE408.1	Explain the different categories of soft computing techniques										1	K2	1, 2, 8, 9	1	
CE408.2	Illustrate neural networks modeling for different applications										2	K3	1, 2, 3, 8, 9	1	
CE408.3	Apply fuzzy design principles for solving various fuzzy problems										3	K3	1, 2, 3, 8,9	1	
CE408.4	Explain the different operators and phases of genetic algorithm										4	K2	1, 2, 8, 9	1	
CE408.5	Illustrate the techniques for developing hybrid fuzzy based systems										5	K3	1, 2, 3, 8, 9	1	
CE408.6	Apply different soft computing tools to solve engineering problems										5	K3	1, 2, 3, 8, 9	1	
CO-PO Mapping															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO11	PSO12	
CE408.1	2	1	-	-	-	-	-	2	2	1	-	-	2		
CE408.2	3	2	1	-	-	-	-	2	2	1	-	1	2		
CE408.3	3	2	1	-	-	-	-	2	2	1	-	1	2		
CE408.4	2	1	-	-	-	-	-	2	2	1	-	-	2		

CE408.5	3	2	1	-	1	1	-	2	2	1	-	1	2	
CE408.6	3	2	1	-	1	1	-	2	2	1	2	1	2	
C	3	2	1	-	1	1	-	2	2	1	1	1	2	

Course Name : INFORMATION SECURITY										Course Code : 20IT8A2				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE408.1	Discuss the basics of information security									1	K2	1,2,8,9,10,12		
CE408.2	Illustrate the legal, ethical and professional issues in information security									2	K2	1,2,8,9,10,12		
CE408.3	Demonstrate the aspects of risk management.									3	K2	1,2,8,9,10,12		
CE408.4	Aware of various standards in the Information Security System									4	K2	1,2,8,9,10,12	1, 2	
CE408.5	Describe the design and implementation of Security Techniques.									5	K2	1,2,8,9,10,12	1, 2	
CE408.6	Identify the technological aspects of Information Security									5	K2	1,2,8,9,10,12	1, 2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE408.1	2	1						2	2	2		2		
CE408.2	2	1						2	2	2		2		
CE408.3	2	1						2	2	2		2		
CE408.4	2	1						2	2	2		2	1	1
CE408.5	2	1						2	2	2		2	1	1
CE408.6	2	1						2	2	2		2	1	1
C	2	1						2	2	2		2	1	1

Course Name : ROBOTICS AND AUTOMATION										Course Code : 20EC8A3				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
CE408.1	Explain the basic concepts of Robotics									1	K2	1,2,9,10	1,2	
CE408.2	Classify the various sensors used in robotics									2	K4	1,2,3,4,6,7,9,10,11	1,2	
CE408.3	Explain about the differential kinematic in robotics									2	K2	1,2,7, 8,9,10	1,2	
CE408.4	Illustrate the various dynamics in robotics									3	K4	1,2,3, 4, 6,7,9,10,11	1,2	
CE408.5	Discuss the different controls of Robot									4	K2	1,2, 7, 8,9,10	1,2	
CE408.6	Apply AI in the field of robotics									5	K2	1,2,3, 5, 6,8,9,10,11	1,2	

Course Outcomes	Program Outcomes												PSO	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CE408.1	2	1							1	1			2	2
CE408.2	3	3	2	1		1	1		1	1	1		2	2
CE408.3	2	1					1	1	1	1			2	2
CE408.4	3	3	2	1		1	1		1	1	1		2	2
CE408.5	2	1					1	1	1	1			2	2

CE408.6	3	2	1		3	2		1	1	1	1	1	2	2
C	3	2	1			1	1		1	1			2	2

Course Name : INFORMATION RETRIEVAL TECHNIQUES										Course Code : 20CS8B1				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
C409.1	Explain about the IR components and Web Search Engine Framework									1	K2	1, 2, 8, 9	1,2	
C409.2	Discuss about various information retrieval models									2	K2	1, 2,8,9	1,2	
C409.3	Apply appropriate method of classification or clustering.									3	K3	1, 2, 3, 8,9	1,2	
C409.4	Explain the Web Search Engine architecture and ranking functions									4	K2	1, 2,8,9	1,2	
C409.5	Discuss about Web Link Analysis algorithms and advanced search									4	K2	1, 2,8,9	1,2	
C409.6	Illustrate recommendation techniques and develop content-based Recommender Systems.									5	K4	1, 2, 3,5, 8,9	1,2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C409.1	2	1						1	1			2	2	2
C409.2	2	1						1	1			2	2	2
C409.3	3	2	1					1	1			2	2	2
C409.4	2	1						1	1			2	2	2
C409.5	2	1						1	1			2	2	2
C409.6	3	2	1		1			1	1			2	2	2
C	2	2	1		1			1	1			2	2	2

Course Name : GREEN COMPUTING										Course Code : 20CS8B2				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
C409.1	Explain the Green IT strategies and its Policies, Practices and Metrics									1	K2	1, 2, 8, 9	1,2	
C409.2	Summarize the green computing practices like Green Enterprise Architecture and modeling									2	K2	1, 2,8,9	1,2	
C409.3	Illustrate energy saving practices and materials recycling									3	K2	1, 2, 3, 8,9	1,2	
C409.4	Explain Green Data center and Green Grid framework									3	K2	1, 2,8,9	1,2	
C409.5	Describe technology tools to ensure Green Compliance and reduce carbon foot print									4	K2	1, 2,8,9	1,2	
C409.6	Analyze and apply green IT strategies and applications to any real world scenario									5	K4	1, 2, 3,5, 8,9	1,2	
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C409.1	2	1				2	2	1	1	2		2	2	2
C409.2	2	1				2	2	1	1	2		2	2	2
C409.3	2	1				2	2	1	1	2		2	2	2
C409.4	2	1				2	2	1	1	2		2	2	2
C409.5	2	1				2	2	1	1	2		2	2	2
C409.6	2	3	2	1		2	2	1	1	2		2	2	2
C	2	2	1	1		2	2	1	1	2		2	2	2

Course Name : VIRTUAL REALITY AND AUGMENTED REALITY		Course Code : 20CS8B3			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C409.1	Explain the Virtual Reality and Environment, Virtual Reality Requirements and benefits	1	K2	1,2,8,9	1,2
C409.2	Illustrate the visualization techniques for augmented reality	2	K2	1,2,8,9, 10	1,2
C409.3	Discuss the concept of Computer Graphics And Geometric Modeling	3	K2	1,2,8,9	1,2
C409.4	Use various types of Hardware and software in virtual Reality systems	4	K3	1,2,3,8,9, 12	1,2
C409.5	Apply Development Tools And Framework for Virtual Reality	4	K3	1,2,3, 5,6,8,9, 12	1,2
C409.6	Analyze and Design a system or process to meet given specifications with Realistic Engineering Constraints	5	K4	1,2,3,4, 5,6,8,9, 10, 12	1,2

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C409.1	2	1	-	-	-	-	-	1	1	2	-	-	2	3
C409.2	2	1	-	-	-	-	-	1	1	2	-	-	2	3
C409.3	2	1	-	-	-	-	-	1	1	2	-	-	2	3
C409.4	3	2	1	-	-	-	-	1	1	2	-	1	2	3
C409.5	3	2	1	-	2	1	-	2	2	2	-	1	2	3
C409.6	3	3	2	1	1	1	-	2	2	2	-	1	2	3
C	3	2	1	1	1	1	-	1	1	2	-	1	2	3

Course Name : Block Chain Technology		Course Code : 20CS8B4			
CO	Course Outcomes	Unit	K-CO	POs	PSOs
C409.1	Discuss the basic of block chain in terms of protocols and security and privacy	1	K2	1, 2, 8, 9	1, 2
C409.2	Explain the crypto primitives of block chain architecture	2	K2	1, 2, 8, 9	1, 2
C409.3	Illustrate the appropriate Consensus design for application protocol	2	K2	1, 2, 8, 9	1, 2
C409.4	Apply Hyper ledger Fabric to implement the Block chain	3	K3	1, 2, 3, 5,6,8, 9	1, 2
C409.5	Apply various cryptographic techniques in Block chain cryptography, privacy and security	4	K3	1, 2, 3, 5,6, 8, 9	1, 2
C409.6	Discuss the research issues of Block chain	5	K2	1, 2, 8, 9	1, 2

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C409.1	2	1	-	-	-	-	-	1	1	1	-	-	2	3
C409.2	2	1	-	-	-	-	-	1	1	1	-	-	2	3
C409.3	2	1	-	-	-	-	-	1	1	1	-	-	2	3
C409.4	3	2	1	-	1	1	-	1	1	1	-	1	2	3
C409.5	3	2	1	-	1	1	-	1	1	1	-	1	2	3
C409.6	2	1	-	-	-	-	-	1	1	1	-	-	2	3
C	3	2	1	-	1	1	-	1	1	1	-	1	2	3

Course Name SOFTWARE PROGRAM MANAGEMENT		Course Code : 20IT8B2			
CO	Course Outcomes	Unit	K-CO	POs	PSOs

C409.1	Explain the software project evaluation techniques and planning	1	K2	1,2,8,9,10,12	1,2									
C409.2	Demonstrate different software process models and cost estimation techniques	2	K2	1,2,8,9,10,12	1,2									
C409.3	Illustrate critical path using network planning models in activity planning	3	K3	1,2,3,8,9,10,12	1,2									
C409.4	Outline the different phases of risk management process	4	K2	1,2,8,9,10,12	1,2									
C409.5	Explain the need and framework for project management and control	5	K2	1,2,8,9,10,12	1,2									
C409.6	Summarize the organizational behavior and working in teams	5	K2	1,2,8,9,10,12	1,2									
CO-PO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C409.1	2	1						2	2	2		2	1	1
C409.2	2	1						2	2	2		2	1	1
C409.3	3	2	1					2	2	2		2	1	1
C409.4	2	1						2	2	2		2	1	1
C409.5	2	1						2	2	2		2	1	1
C409.6	2	1						2	2	2		2	1	1
C	2	1	1					2	2	2		2	1	1

Course Name : INTELLECTUAL PROPERTY RIGHTS										Course Code : 20HS6A1				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	
C409.1	Explain the fundamental aspects of Intellectual property Rights which plays a major role in development and management of innovative projects in industries.									1	K2	1,2,8	1,2	
C409.2	Describe the patents, patent regime in India and abroad and registration aspects.									2	K2	1,2,8	1,2	
C409.3	Describe the copyrights and its related rights and registration aspects.									3	K2	1,2,8	1,2	
C409.4	Explain the trademarks and registration aspects.									4	K2	1,2,8	1,2	
C409.5	Explain the Design, Geographical Indication (GI), Plant Variety and Layout Design Protection and their registration aspects.									5	K2	1,2,8	1,2	
C409.6	Analyze the current trends in IPR and Government steps in fostering IPR									5	K3	1,2,3,8	1,2	
CO-PO mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C409.1	2	1				1	1	2	2	2			1	1
C409.2	2	1				1	1	2	2	2			1	1
C409.3	2	1				1	1	2	2	2			1	1
C409.4	2	1				1	1	2	2	2			1	1
C409.5	2	1				1	1	2	2	2			1	1
C409.6	2	1				1	1	2	2	2			1	1
C	2	1				1	1	2	2	2			1	1

Course Name : ECONOMICS FOR ENGINEERS										Course Code : 20HS8B2				
CO	Course Outcomes									Unit	K-CO	POs	PSOs	

C409.1	Describe the concept of engineering economics	1	K2	1,2,8	1,2
C409.2	Comprehend macroeconomic principles	2	K2	1,2,8	1,2
C409.3	Decision making in diverse business set up	3	K2	1,2,8	1,2
C409.4	Explain the Inflation & Price Change	3	K2	1,2,8	1,2
C409.5	Explain Present Worth Analysis	4	K2	1,2,8	1,2
C409.6	Apply the principles of economics through various case studies	5	K3	1,2,3,8	1,2

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C409.1	2	1				1	1	2	2	2			1	1
C409.2	2	1				1	1	2	2	2			1	1
C409.3	2	1				1	1	2	2	2			1	1
C409.4	2	1				1	1	2	2	2			1	1
C409.5	2	1				1	1	2	2	2			1	1
C409.6	2	1				1	1	2	2	2	2		1	1
C	2	1				1	1	2	2	2	1		1	1