HKBK College of Engineering
Department of Computer Science & Engineering
Curriculum Components
2018 Scheme

Sl. No.	Course Component	Subject Code	Course Code	Course Name	Credits
1	BSC	18MAT1 1	CS111	Calculus and Linear Algebra	4
2	BSC	18PHY12	CS112	Engineering Physics	4
3	ESC	18ELE13	CS113	Basic Electrical Engineering	3
4	ESC	18CIV14	CS114	Elements of Civil Engineering and Mechanics	3
5	ESC	18EGDL15	CS115	Engineering Graphics	3
6	BSC	18PHYL16	CS116	Engineering Physics Laboratory	1
7	ESC	18ELEL17	CS117	Basic Electrical Engineering Laboratory	1
8	HSMC	18EGHL18	CS118	Language Laboratory –I (English)	1
9	BSC	18MAT21	CS121	Advanced Calculus and Numerical Methods	4
10	BSC	18CHE22	CS122	Engineering Chemistry	4
11	ESC	18CPS23	CS123	C Programming for Problem Solving	3
12	ESC	18ELN24	CS124	Basic Electronics	3
13	ESC	18ME25	CS125	Elements of Mechanical Engineering	3
14	BSC	18CHEL26	CS126	Engineering Chemistry Laboratory	1
15	ESC	18CPL27	CS127	C Programming Laboratory	1
16	HSMC	18EGHL28	CS128	Language Laboratory –II (English)	1
17	BSC	18MAT31	CS231	Transform Calculus, Fourier Series and Numerical Techniques	3
18	PCC	18CS32	CS232	Data Structures and Applications	4
19	PCC	18CS33	CS233	Analog and Digital Electronics	3
20	PCC	18CS34	CS234	Computer Organization	3
21	PCC	18CS35	CS235	Software Engineering	3
22	PCC	18CS36	CS236	Discrete Mathematical Structures	3
23	PCC	18CSL37	CS237	Analog and Digital Electronics Laboratory	2
24	PCC	18CSL38	CS238	Data Structures Laboratory	2
25	HSMC	18CPC39	CS239	Constitution of India, Professional Ethics and Cyber Law	1
26	NCMC	18MATDIP 31	18MATDIP 31	Additional Mathematics - I	
27	BSC	18MAT41	CS241	Complex Analysis, Probability and Statistical Methods	3
28	PCC	18CS42	CS242	Design and Analysis of Algorithms	4
29	PCC	18CS43	CS243	Operating Systems	3
30	PCC	18SC44	CS244	Microcontroller and Embedded Systems	3
31	PCC	18CS45	CS245	Object Oriented Concepts	3
32	PCC	18CS46	CS246	Data Communication	3
33	PCC	18CSL47	CS247	Design and Analysis of Algorithm Laboratory	2
34	PCC	18CSL48	CS248	Microcontroller and Embedded Systems Laboratory	2
35	HSMC	18KVK49	CS249	Vyavaharika Kannada (Kannada for communication)/	1
36	HSMC	18KAK49	CS249	Aadalitha Kannada (Kannada for Administration)	
37	NCMC	18MATDIP 31	18MATDIP 31	Additional Mathematics - II	

38	HSMC	18CS51	CS351	Management, Entrepreneurship for IT Industry	3
39	PCC	18CS52	CS352	Computer Networks and Security	4
40	PCC	18CS53	CS353	Database Management System	4
41	PCC	18CS54	CS354	Automata theory and Computability	3
42	PCC	18CS55	CS355	Application Development using Python	3
43	PCC	18CS56	CS356	Unix Programming	3
44	PCC	18CSL57	CS357	Computer Network Laboratory	2
45	PCC	18CSL58	CS358	DBMS Laboratory with mini project	2
46	HSMC	18CIV59	CS359	Environmental Studies	1
47	PCC	18CS61	CS361	System Software and Compilers	4
48	PCC	18CS62	CS362	Computer Graphics and Visualization	4
49	PCC	18CS63	CS363	Web Technology and its applications	4
50	PEC	18CS641	CS3641	Data Mining and Data Warehousing	
51	PEC	18CS642	CS3642	Object Oriented Modelling and Design	
52	PEC	18CS643	CS3643	Cloud Computing and its Applications	3
53	PEC	18CS644	CS3644	Advanced JAVA and J2EE	
54	PEC	18CS645	CS3645	System Modelling and Simulation	
55	OEC	18CS651	CS3651	Mobile Application Development	
56	OEC	18CS652	CS3652	Introduction to Data Structures and Algorithms	
57	OEC	18CS653	CS3653	Programming in JAVA	3
58	OEC	18CS654	CS3654	Introduction to Operating System	
59	PCC	18CSL66	CS366	System Software Laboratory	2
60	PCC	18CSL67	CS367	Computer Graphics Laboratory with mini project	2
61	MP	18CSMP68	CS368	Mobile Application Development	2
62	PCC	18CS71	CS471	Artificial Intelligence and Machine Learning	4
63	PCC	18CS72	CS472	Big Data Analytics	4
64	PEC	18CS731	CS4731	Software Architecture and Design Patterns	
65	PEC	18CS732	CS4732	High Performance Computing	
66	PEC	18CS733	CS4733	Advanced Computer Architecture	3
67	PEC	18CS734	CS4734	User Interface Design	
68	PEC	18CS741	CS4741	Digital Image Processing	
69	PEC	18CS742	CS4742	Network management	
70	PEC	18CS743	CS4743	Natural Language Processing	3
71	PEC	18CS744	CS4744	Cryptography	
72	PEC	18CS745	CS4745	Robotic Process Automation Design & Development	
73	OEC	18CS751	CS4751	Introduction to Big Data Analytics	
74	OEC	18CS752	CS4752	Python Application Programming	
75	OEC	18CS753	CS4753	Introduction to Artificial Intelligence	3
76	OEC	18CS754	CS4754	Introduction to Dot Net framework for Application Development	
77	PCC	18CSL76	CS476	Artificial Intelligence and Machine Learning Laboratory	2
78	Project	18CSP77	CS477	Project Work Phase – 1	1
79	PCC	18CS81	CS481	Internet of Things	3
80	PEC	18CS821	CS4821	Mobile Computing	
81	PEC	18CS822	CS4822	Storage Area Networks	
82	PEC	18CS823	CS4823	NoSQL Database	3
83	PEC	18CS824	CS4824	Multicore Architecture and Programming	
84	Project	18CSP83	CS483	Project Work Phase – 2	8
85	Seminar	18CSS84	CS484	Technical Seminar	1

86	INT	18CSI85	CS485	Internship	3
				TOTAL	175

Summary

Components	Credits	Percentage
Basic Science Courses	24	14%
Engineering Science Courses	20	11%
Humanity, Social Science and Management Courses	8	5%
Professional Core Courses	90	51%
Professional Elective Courses,	12	7%
Open Elective Courses,	6	3%
Skill Enhancing Courses (Internships, Projects, Technical Seminar)	15	9%

Sl. No.	Components	No. of Subjects Mapped	Total Credits	Weightage in % (Courses)	Weightage in % (Credits)	POs Mapped	PSOs Mapped
1	Basic Science Courses, Humanity, Social Science and Management Courses	15	32	21%	18%	PO1-12	PSO1,2,3
2	Engineering Science Courses	8	20	11%	11%	PO1-7 PO9-12	PSO1,2,3
3	Professional Core Courses	30	90	42%	51%	PO1-12	PSO1,2,3
4	Professional and Open Elective Courses	14	18	19%	10%	PO1-12	PSO1,2,3
5	Skill Enhancing Courses (Internships, Projects, Technical Seminar)	5	15	7%	9%	PO1-12	PSO1,2,3
	All/Total	72	175	100%	100%		

COURSE OUTCOMES (2018 Scheme)

Subject Code: 18MAT11	Subject Name: Engineering Mathematics – I
CO#	Course Outcomes
CS111.1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
CS111.2	Learn the notation of partial differentiation to calculate rates of changes of multivariate functions and solve problems related to composite functions and Jacobians
CS111.3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage n computing the area and volumes
CS111.4	Solve first order linear/nonlinear differential equation analytically using standard methods
CS111.5	Make use of matrix theory for solving system of linear equations and compute eigen values and eigen vectors required for matrix diagonalization process

Subject Code: 18MAT21	Subject Name: Engineering Mathematics – II
CO#	Course Outcomes
CS121.1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of ine, surface and volume integrals
CS121.2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
CS121.3	Construct a variety of partial differential equations and solutions by exact methods/method of separation of variables
CS121.4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
CS121.5	Apply the knowledge of numerical methods in the modelling of various physical and engineering phenomena

Subject Code: 18CHE22	Subject Name: Engineering Chemistry
CO#	Course Outcomes
CS122.1	Use of free energy in equilibrium, rationalize bulk properties and processes using Thermodynamic considerations, Electrochemical energy systems.
CS122.2	Causes and effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electro plating and electroless plating
CS122.3	Production and consumption of energy for industrialization of country and living standards of people. Electrochemical and concentration cell, classical and modern batteries and fue ces. Utilization of solar energy for different useful forms of energy.
CS122.4	Environmental pollution, waste management and water chemistry.
CS122.5	Different techniques of instrumental methods of analysis. Fundamental principles of nonmaterial.

Subject Code: 18PHY12	Subject Name: Engineering Physics
CO#	Course Outcomes
CS112.1	Understand various types of oscillations and their implications, the role of shock waves n various fields and recognize the elastic properties of materials for engineering applications.
CS112.2	Realize the interrelation between time varying electric field and magnetic field, the transverse nature of the EM waves and their role n optical fiber communication.
CS112. 3	Compute Eigen values, Eigen Functions, momentum of atomic and subatomic particles using time independent 1 –D Schrodinger's wave equation
CS112.4	Apprehend theoretical background of laser and its applications in different fields
CS112.5	Understand various electrical and thermal properties of materials like conductors' semiconductors and dielectrics using different theoretical models.
Subject Code: 18ELE13	Subject Name: Basic Electrical Engineering
CO#	Course Outcomes
CS113.1	To explain Ohm's law and Kirchhoff's laws used for the analysis of DC circuits
CS113.2	To explain fundamentals of AC circuits and the behaviour of R and C and their combinations in AC circuits.
CS113.3	To discuss three phase balanced circuits
CS113.4	To explain principle of operation, construction and performance of electrical machines such as single-phase transformer, DC machines, synchronous generator and three phase induction motor
CS113.5	To introduce concepts of electrical wiring, circuit protecting devices and Earthing.
Subject Code: 18CPS23	Subject Name: C Programming for Problem Solving
CO#	Course Outcomes
CS123.1	Illustrate Simple algorithms from the different domains such as Mathematics, physics, etc.
CS123.2	Construct a Programming solution to the given problem using C.
CS123.3	Identify and correct the syntax and logical errors in C programs.
CS123.4	Modularize the given problem using functions and structures.
Subject Code: 18CIV14	Subject Name: Elements of Civil Engineering and Mechan
CO#	Course Outcomes
CS114.1	Mention the applications of various fields of Civil Engineering.
CS114.2	Compute the resultant of given force system subjected to various loads
CS114.3c	Comprehend the action of Forces, Moments and other loads on systems of rigid bodes and compute the reactive forces that develop as a result of the external loads.
CS114.4	Locate the Centroid and compute the Moment of Inertia of regular and built - up sections.
CS114.5	Express the relationship between the motion of bodies and analyze the bodies in motion

Subject Code: 18ELN24	Subject Name: Basic Electronics
CO#	Course Outcomes
CS124.1	Describing the operations of diodes, FET and Operational Amplifiers.
CS124.2	Design and explain the construction of rectifiers, regulators, amplifiers and oscillators.
CS124.3	Describe general operating principles of SCR's and its application.
CS124.4	Explain the working and design of fixed voltage C regulators using 7805 and A stable oscillator using Timer C 555.
CS124.5	Explain the different number system and their conversions and construct simple combinational and sequential logic circuits using Flip-Flops.
CS124.6	Describe the basic principle of operation of communication system and mobile phones.

Subject Code: 18EGDL15	Subject Name: Engineering Graphics
CO#	Course Outcomes
CS115.1	Prepare engineering drawings as per BIS conventions mentioned in the
CS115.2	Produce computer generated drawings using CAD software
CS115.3	Use the knowledge of orthographic projections to represent engineering information concepts and present the same in the form of drawings
CS115. 4	Develop isometric drawings of simple objects reading the orthographic
CS115.5	Convert pictorial and isometric views of simple objects to orthographic views

Subject Code: 18EME25	Subject Name: Elements of Mechanical Engineering
CO#	Course Outcomes
CS125.1	Identify different sources of energy and their conversion process.
CS125.2	Explain the working principle of hydraulic turbines, pumps, IC engines and
CS125.3	Recognize various metal joining processes and power transmission elements.
CS125.4	Understand the properties of common engineering materials and their applications in engineering industry.
CS125.5	Discuss the working of conventional machine tools, machining processes,
CS125.6	Describe the advanced manufacturing systems

Subject Code: 18PHYL16	Subject Name: Engineering Physics Lab
CO#	Course Outcomes
CS116.1	Apprehend the concepts of interference of light diffraction of light, Fermi
CS116.2	Understand the principles of operations of optical fibers and semiconductor devices such as Photodiode, and NPN transistor using simple circuits
CS116.3	Determine elastic moduli and moment of inertia of given materials with the help of suggested procedures
CS116.4	Recognize the resonance concept and its practical applications
CS116.5	Understand the importance of measurement procedure, honest recording and representing the data, reproduction of final results

Subject Code: 18CHEL26	Subject Name: Engineering Chemistry Laboratory
CO#	Course Outcomes
CS126.1	Handling different types of instruments for analysis of materials using s mal quantities of materials involved for quick and accurate results.
CS126.2	Carrying out different types of titrations for estimation of concerned n materials using comparatively more quantities of materials involved for good

Subject Code: 18ELEL17	Subject Name: Basic Electrical Engineering Lab
CO#	Course Outcomes
CS117.1	Identify the common electrical components and measuring instruments used
CS117.2	Compare power factor of lamps.
CS117.3	Determine impedance of Electrical Circuits and power consumed in a three-
CS117.4	Determine earth resistance and understand two way &amp, three-way

Subject Code: 18CPL27	Subject Name: Computer Programming Laboratory
CO#	Course Outcomes
CS127.1	Write algorithms, flowcharts and program for simple problems.
CS127.2	Correct syntax and logical errors to execute a program.
CS127.3	Write iterative and wherever possible recursive programs
CS127.4	Demonstrate use of functions, arrays, strings, structures and pointers n

Subject Code: 18EGH18	Subject Name: Technical English-I
CO#	Course Outcomes
CS118.1	Use grammatical English and essentials of language skills and identify the nuances of phonetics, intonation and flawless pronunciation
CS118.2	Implement English Vocabulary at command and language proficiency
CS118.3	Identify common errors in spoken and written communication.
CS118.4	Understand and improve the non-verbal communication and kinetics
CS118.5	Perform well in campus recruitment, engineering and all other general

Subject Code: 18EGH28	Subject Name: Technical English-II
CO#	Course Outcomes
CS128.1	Identify common errors in spoken and written communication
CS128.2	Get familiarized with English vocabulary and language proficiency
CS128.3	Improve nature and style of sensible writing and acquire employment and workplace communication skills
CS128.4	Improve well in campus recruitment, engineering and all other general

Subject Code: 18MAT31	Subject Name: Engineering Mathematics-III

CO#	Course Outcomes
CS231.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising n network analysis, control systems and other fields
CS231.2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory
CS231.3	Make use of Fourier transform and Z -transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems
CS231.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods
CS231.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibration analysis
Subject Code: 18CS32	Subject Name: Data Structures and Application
CO#	Course Outcomes
CS232.1	Use different types of data structures, operations and algorithms
CS232.2	Apply searching and sorting operations on files
CS232.3	Use stack, Queue, Lists, Trees and Graphs n problem solving
CS232.4	Implement all data structures in a high-level language for problem solving.
Subject Code: 18CS33	Subject Name: Analog and Digital Electronic
CO#	Course Outcomes
CS233.1	Design and analyze application of analog circuits using photo devices, timer C, power supply and regulator C and op -amp.
CS233.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
CS233.3	Simplify digital circuits using Karnaugh Map, and Quine-McClusky Methods
CS233.4	Explain Gates and flip flops and make use in designing different data processing circuits, registers and counters and compare the types.
CS233.5	Develop simple HDL programs
Subject Code: 18CS34	Subject Name: Computer Organization
CO#	Course Outcomes
CS234.1	Explain the basic organization of a computer system
CS234.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory
CS234.3	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.
CS234.4	Design and analyze simple arithmetic and logical units.
Subject Code: 18CS35	Subject Name: Software Engineering

CO#	Course Outcomes
CS235. 1	Design a software system, component, or process to meet desired needs
CS235.2	Assess professional and ethical responsibility
CS235.3	Function on multi-disciplinary teams.
CS235.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
CS235.5	Analyze, design, implement, verify validate, implement, apply, and maintain software systems or parts of software systems

Subject Code: 18CS36	Subject Name: Discrete Mathematical Structures
CO#	Course Outcomes
CS236.1	Use propositional and predicate logic in knowledge representation and truth
CS236.2	Demonstrate the application of discrete structures in different fields of
CS236.3	Solve problems using recurrence relations and generating functions
CS236.4	Application of different mathematical proofs techniques in proving theorems
CS236.5	Compare graphs, trees and their applications

Subject Code: 18CSL37	Subject Name: Analog and Digital Electronics Laborator
CO#	Course Outcomes
CS237.1	Use appropriate design equations / methods to design the given circuit
CS237.2	Examine and verify the design of both analog and digital circuits using
CS237.3	Make use of electronic components, Cs, instruments and tools for design and testing of circuits for the given appropriate circuits.
CS237.4	Compile a laboratory journal which includes; aim tool/instruments/software/ components used, design equations used and designs, schematics, program l sting, procedure followed, relevant theory, results as graphs and tables,

Subject Code: 18CSL38	Subject Name: Data Structures Laboratory
CO#	Course Outcomes
CS238.1	Asymptotic performance of algorithm
CS238.2	Linear data structures and their applications such as stacks, queues and ists
CS238.3	Non-linear data structures and their applications such as trees and graphs
CS238.4	Sorting and searching algorithms

Subject Code: 18CPC39	Subject Name: Constitution of India Professional Ethics and Cyber Laws
CO#	Course Outcomes
CS239.1	Have constitutional knowledge and legal literacy
CS239.2	Understand Engineering and Professional ethics and responsibilities of
CS239.3	Understand the cybercrimes and cyber laws for cyber safety measures

Subject Code: 18MAT41	Subject Name: Engineering Mathematics -IV

CO#	Course Outcomes
CS241.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
CS241. 2	Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing
CS241.3	Apply discrete and continuous probability distributions in analyzing the probability models arising n engineering field.
CS241.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data
CS241.5	Construct joint probability distributions and demonstrate the validity of testing
Subject Code: 18CS42	Subject Name: Design and Analys s of Algorithm
CO#	Course Outcomes
CS242.1	Describe computational solution to well-known problems like searching, sorting etc.
CS242.2	Estimate the computational complexity of different algorithms
CS242.3	Devise an algorithm using appropriate design strategies for problem solving.
Subject Code: 18CS43	Subject Name: Operating Systems
CO#	Course Outcomes
CS243.1	Demonstrate need for OS and different types of OS
CS243.2	Apply suitable techniques for management of different resource
CS243.3	Use processor, memory storage and f le system commands
CS243.4	Realize the different concepts of OS in platform of usage through case studies
Subject Code: 18CS44	Subject Name: Microprocessors and Microcontrollers
CO#	Course Outcomes
CS244.1	Describe the architectural features and instructions of ARM microcontroller
CS244.2	Apply the knowledge gained for Programming ARM for different applications.
CS244.3	Interface external devices and I/O with ARM microcontroller
CS244.4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CS244.5	Develop the hardware /software co-design and firmware design approaches
CS244.6	Demonstrate the need of real time operating system for embedded system
Subject Code: 18CS45	Subject Name: Object-Oriented Concept
CO#	Course Outcomes
CS245.1	Explain the object-oriented concepts and JAVA
CS245.2	Develop computer programs to solve real world problems in Java
CS245.3	Develop simple GUI interfaces for a computer program to ineract with users, and to understand the event-based GUI handling principles using swings

Subject Code: 18CS46	Subject Name: Data Communication
CO#	Course Outcomes
CS246.1	Explain the various components of data communication
CS246.2	Explain the fundamentals of digital communication and switching
CS246.3	Compare and contrast data link layer protocols
CS246.4	Summarize IEEE 802.xx standards
CS246. 5	Use propositional and predicate logic in knowledge representation and truth

Subject Code: 18CSL47	Subject Name: Design and Analys s of Algorithm Laboratory
CO#	Course Outcomes
CS247.1	Design algorithms using appropriate design techniques (brute –force, greedy, dynamic programming etc)
CS247.2	Implement a variety of algorithms such as sorting graph related, combinatorial, etc., in a high–level language
CS247.3	Analyze and compare the performance of algorithms using language features
CS247.4	Apply and implement learned algorithm design techniques and data structures to solve real–world problems.

Subject Code: 18CSL48	Subject Name: Microprocessor and Microcontroller Laboratory
CO#	Course Outcomes
CS248.1	Develop and Test Program using ARM7TDMI/LPC2148
CS248.2	Conduct the following experiments on an ARM7TDMI/LPC2148 valuation board using evaluation version of Embedded 'C' and Keil Uvision–4 tool/compiler

Subject Code: 18CS51	Subject Name: Management and Entrepreneurship for IT Industry
CO#	Course Outcomes
CS351.1	Explain the principles of management, organization and entrepreneur.
CS351.2	Discuss on Planning, Staffing, ERP and their importance.
CS351.3	Infer the importance of intellectual property rights and relate the nstitutional support.

Subject Code: 18CS52	Subject Name: Computer Networks and Security
CO#	Course Outcomes
CS352.1	Explain principles of application layer.
CS352.2	Recognize transport layer services and infer UDP and TCP protocols.
CS352.3	Classify routers, IP and Routing Algorithms n network layer.
CS352.4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard.
CS352.5	Describe Multimedia Networking and Network Management.

Subject Code: 18CS53	Subject Name: Database Management System
CO#	Course Outcomes
CS353.1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS
CS353.2	Use Structured Query Language (SQL) for database manipulation
CS353.3	Design and bud simple database systems
CS353.4	Develop application to interact with databases

Subject Code: 18CS54	Subject Name: Automata Theory and Computability
CO#	Course Outcomes
CS354.1	To Procure the core concepts in Automata theory and Theory of Computation.
CS354.2	Translation of different models DFA and NFA
CS354.3	Formation of Grammars and Recognizers for different language classes
CS354.4	Verification of theorems n Automata theory with their properties
CS354.5	Resolve the decidability and intractability of Computational problems.

Subject Code: 18CS55	Subject Name: Application Development using Python
CO#	Course Outcomes
CS355.1	Demonstrate proficiency in handling of oops and creation of functions.
CS355.2	Identify the methods to create and manipulate lists, tuples and dictionaries.
CS355.3	Discover the commonly used operations involving regular expressions and
CS355.4	Interpret the concepts of Object-Oriented Programming used in Python
CS355.5	Determine the need for scraping websites and working with CSV, JSON and other file

Subject Code: 18CS56	Subject Name: UNIX Programming
CO#	Course Outcomes
CS356.1	Explain Unix Architecture, File system and use of Basic Commands
CS356.2	Illustrate Shell Programming and write Shell Scripts
CS356.3	Categorize, compare and make use of Unix System Cells
CS356.4	Build an application/ Service over a UNIX System

Subject Code: 18CSL57	Subject Name: Computer Networks Laboratory
CO#	Course Outcomes
CS357.1	Analyze and compare various networking protocols.
CS357.2	Demonstrate the working of different concepts of networking
CS357.3	Implement, analyze and evaluate networking protocols n NS2 / NS3 and JAVA programming language

Subject Code: 18CSL58	Subject Name: DBMS Laboratory with Mini Project
CO#	Course Outcomes
CS358.1	Create, Update and query on the database.
CS358.2	Demonstrate the working of different concepts of DBMS
CS358.3	Implement, analyze and evaluate the project developed for an application.

Subject Code: 18CIV59	Subject Name: Environmental Studies
CO#	Course Outcomes
CS359.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.
CS359.2	Develop critical thinking and/or observation skis, and apply them to the analysis of a problem or questions related to the environment.
CS359.3	Demonstrate ecology knowledge of a complex relationship between biotic and
CS359.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

Subject Code: 18CS61	Subject Name: System Software and Compilers
CO#	Course Outcomes
CS361.1	Explain system software
CS361.2	Design and develop lexical analyzers, parsers and code generators
CS361.3	Utilize lex and yacc tools for implementing different concepts of system

Subject Code: 18CS62	Subject Name: Computer Graphics and Visualization
CO#	Course Outcomes
CS362.1	Design and Implement Algorithms for 2D Graphics Primitives and Attributes
CS362.2	Illustrate Geometric Transformations on Both 2D and 3D Objects
CS362.3	Apply Concepts of Clipping and Visible Surface Detection n 2D and 3D Viewing and Illumination Models
CS362.4	Decide Suitable Hardware and Software for Designing Graphics packages using OpenGL

Subject Code: 18CS63	Subject Name: Web Technology and its Applications
CO#	Course Outcomes
CS363.1	Adapt HTML and CSS syntax and semantics to build web pages.
CS363.2	Construct and visually format tables and forms using H TML and CSS
CS363.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CS363.4	Appraise the principles of object-oriented development using PHP
CS363.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Subject Code: 18CS641	Subject Name: Data Mining and Warehousing
CO#	Course Outcomes
CS3641.1	Identify data mining Problems and implement the data
CS3641.2	Write association rules for a given data pattern
CS3641.3	Choose between classification and clustering solution

Subject Code: 18CS642	Subject Name: Object Oriented Modelling and Design
CO#	Course Outcomes
CS3642.1	Describe the concepts of object-oriented and basic class modelling.
CS3642.2	Draw class diagrams, sequence diagrams and interaction diagrams to solve
CS3642.3	Choose and apply a befitting design pattern for the given problem.

Subject Code: 18CS643	Subject Name: Cloud Computing and its Application
CO#	Course Outcomes
CS3643.1	Explain cloud computing, virtualization and classify services of cloud
CS3643.2	Illustrate architecture and programming in cloud
CS3643.3	Describe the platforms for development of cloud applications and List the

Subject Code: 18CS644	Subject Name: ADVANCED JAVA AND J2EE
CO#	Course Outcomes
CS3644.1	Interpret the need for advanced Java concepts like enumerations and collections n developing modular and efficient programs
CS3644.2	Build client-server applications and TCP/IP socket programs
CS3644.3	Illustrate database access and details for managing information using the
CS3644.4	Describe how servlets fit into Java-based web application architecture
CS3644.5	Develop reusable software components using Java Beans

Subject Code: 18CS645	Subject Name: System Modelling and Simulation
CO#	Course Outcomes
CS3645.1	Explain the system concept and apply functional modelling method to model the activities of a static systems
CS3645.2	Describe the behaviour of a dynamic system and create an analogous model for a dynamic system;
CS3645.3	Simulate the operation of a dynamic system and make improvement according to the simulation results

Subject Code: 18CS651	Subject Name: Mobile Application Development

CO#	Course Outcomes
CS3651.1	Create, test and debug Android application by setting up Android development environment
CS3651.2	Implement adaptive, responsive user interfaces that work across a w de
CS3651.3	Infer long running tasks and background work in Android applications
CS3651.4	Demonstrate methods in storing, sharing and retrieving data in Android applications
CS3651.5	Analyze performance of android applications and understand the role of
CS3651.6	Describe the steps involved n publishing Android application to share with the world
Subject Code: 18CS652	Subject Name: Introduction to Data Structures and Algorithms
CO#	Course Outcomes
CS3652.1	Identify different data structures in C programming language
CS3652.2	Appraise the use of data structures in problem solving
CS3652.3	Implement data structures using C programming language.
Subject Code: 18CS653	Subject Name: Programming in JAVA
CO#	Course Outcomes
CS3653.1	Explain the object-oriented concepts and JAVA.
CS3653.2	Develop computer programs to solve real world problems in ava.
Subject Code: 18CS654	Subject Name: Introduction to Operating System
CO#	Course Outcomes
CS3654.1	Explain the fundamentals of operating system
CS3654.2	Comprehend process management, memory management and storage management
CS3654.3	Familiar with various types of operating systems
Subject Code: 18CSL66	Subject Name: System software & Laboratory
CO#	Course Outcomes
CS366.1	Implement and demonstrate Lexer's and Parser's
CS366.2	Evaluate different algorithms required for management, scheduling, allocation and communication used in operating system
Subject Code: 18CSL67	Subject Name: Computer Graphics Laboratory with Mini Project
CO#	Course Outcomes
CS367.1	Apply the concepts of computer graphics
CS367.2	Implement computer graphics applications using OpenGL
CS367.3	Animate real world problems using OpenGL

Subject Code: 18CSMP68	Subject Name: Mobile Application Development Laboratory
CO#	Course Outcomes
CS368.1	Create, test and debug Android application by setting up Android development
CS368.2	Implement adaptive, responsive user interfaces that work across a wide
CS368.3	Infer long running tasks and background work in Android applications
CS368.4	Demonstrate methods on storing, sharing and retrieving data in Android
CS368.5	Infer the role of permissions and security for Android applications
Subject Code: 18CS71	Subject Name: Artificial Intelligence and Machine Learning
CO#	Course Outcomes
CS471.1	Appraise the theory of Artificial intelligence and Machine Learning
CS471.2	Illustrate the working of AI and ML Algorithms
CS471.3	Demonstrate the applications of AI and ML.
Subject Code: 18CS72	Subject Name: Big Data Analytics
CO#	Course Outcomes
CS472.1	Understand fundamentals of Big Data analytics.
CS472.2	Investigate Hadoop framework and Hadoop Distributed File system
CS472.3	Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data
CS472.4	Demonstrate the MapReduce programming model to process the big data
CS472.5	Use Machine Learning algorithms for real world big data.
CS472. 6	Analyze web contents and Social Networks to provide analytics with relevant
Subject Code: 18CS731	Subject Name: Software Architecture and Design Patterns
CO#	Course Outcomes
CS4731.1	Design and implement codes with higher performance and lower complexity
CS4731.2	Be aware of code qualities needed to keep code flexible
CS4731.3	Experience core design principles and be able to assess the quality of a design with respect to these principles.
CS4731.4	Capable of applying these principles and the design of object –oriented
CS4731.5	Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
CS4731.6	Be able to select and apply suitable patterns and specific contexts
Subject Code: 18CS732	Subject Name: High Performance Computing
CO#	Course Outcomes
CS4732.1	Illustrate the key factors affecting performance of CSE applications
CS4732.2	Illustrate mapping of applications to high –performance computing systems

CS4732.3	Apply hardware/software co-design for achieving performance on real-world applications
Subject Code: 18CS733	Subject Name: Advance Computer Architectures
CO#	Course Outcomes
CS4733.1	Explain the concepts of parallel computing and hardware technologies
CS4733.2	Compare and contrast the parallel architectures
CS4733.3	Illustrate parallel programming concepts
Subject Code: 18CS734	Subject Name: User Interface Design
CO#	Course Outcomes
CS4734.1	Design the User Interface, design, menu creation, windows creation and connection between menus and windows
Subject Code: 18CS741	Subject Name: Digital Image Processing
CO#	Course Outcomes
CS4741.1	Explain fundamentals of image processing
CS4741.2	Compare transformation algorithms
CS4741.3	Contrast enhancement, segmentation, and compression techniques
Subject Code: 18CS742	Subject Name: Network management
CO#	Course Outcomes
CS4742. 1	Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/ wireless networks and high-speed
CS4742.2	Apply network management standards to manage practical network
CS4742.3	Formulate possible approaches for managing OSI network model
CS4742.4	Use on SMMP for managing the network
CS4742.5	Use RMON for monitoring the behaviour of the network
CS4742.6	Identify the various components of network and formulate the scheme for
Subject Code: 18CS744	Subject Name: Cryptography
CO#	Course Outcomes
CS4744.1	Define cryptography and its principles
CS4744.2	Explain cryptographic algorithms
CS4744.3	Illustrate public and private key cryptography
CS4744.4	Explain Key management, distribution and certification
CS4744.5	Explain authentication protocols
CS4744.6	Tell about Psec

Subject Code: 18CS745	Subject Name: Robotic Process Automation Design and Development
CO#	Course Outcomes
CS4745.2	To Describe various components and platforms of RPA
CS4745.3	To Describe the different types of variables, control flow and data
CS4745.4	To Understand various control techniques and OCR n RPA
CS4745.5	To Describe various types and strategies to handed exceptions

Subject Code: 18CS751	Subject Name: Introduction to Big Data Analytics
CO#	Course Outcomes
CS4751.1	Explain the importance of data and data analysis
CS4751.2	Interpret the probabilistic models for data
CS4751.3	Define hypothesis, uncertainty principle
CS4751.4	Evaluate regression analysis

Subject Code: 18CS752	Subject Name: Python Application Programming
CO#	Course Outcomes
CS4752.1	Examine Python syntax and semantics and be fluent in the use of python flow
CS4752.2	Demonstrate proficiency in handling Strings and File Systems
CS4752.3	Create, run and manipulate python programs using core data structures like Lists, Dictionaries and Use Regular Expressions
CS4752.4	Interpret exemplary applications related to Network Programming, Web Series and Databases n Python

Subject Code: 18CS753	Subject Name: Introduction to Artificial Intelligence
CO#	Course Outcomes
CS4753.1	Identify the AI based problems
CS4753.2	Apply techniques to solve the AI problems
CS4753.3	Define learning and explain various learning techniques
CS4753.4	Discuss on expert systems

Subject	Subject Name: Introduction to Dot NET Framework for Application
CO#	Course Outcomes
CS4754.1	Build applications on Visual Studio .NET platform by understanding the syntax
CS4754.2	Demonstrate Object Oriented Programming concepts in C# programming
CS4754.3	Design custom interfaces for applications and leverage the available built -in interfaces in building complex applications.
CS4754.4	Illustrate the use of generics and collections in C#
CS4754.5	Compose queries to query in-memory data and define own operator

Subject	Subject Name: Artificial Intelligence and Machine Learning Laboratory
CO#	Course Outcomes
CS476.1	Implement and demonstrate A and ML algorithms

CS476.2	Evaluate different algorithms
Subject Code: 18CSP77	Subject Name: Project Phase-I
CO#	Course Outcomes
CS477.1	Analyze the problem, formulation and solution of the selected project
CS477.2	Develop solutions for contemporary problems using modern tools for
CS477.3	Demonstrate ethical and professional sustainability while working n a team and communicate effectively for the benefit of the society
CS477.4	Understand the engineering, finance and management principles
Subject Code: 18CS81	Subject Name: Internet of Things
CO#	Course Outcomes
CS481.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models
CS481.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network
CS481.3	Appraise the role of IoT protocols for efficient network communication
CS481.4	Elaborate the need for Data Analytics and Security n IoT
CS481.5	Illustrate different sensor technologies for sensing real world entities and identity the applications of IoT in Industry
Subject Code: 18CS821	Subject Name: Mobile Computing
CO#	Course Outcomes
CS4821.1	Explain state of art techniques n wireless communication.
CS4821.2	Discover CDMA, GSM. Mobile P WI max
CS4821.3	Demonstrate program for CLDC, MIDP let model and security concerns
Subject Code: 18CS822	Subject Name: Storage Area Networks
CO#	Course Outcomes
CS4822.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
CS4822.2	Explain components of NAS and the implementation of NAS
CS4822.3	Describe CAS architecture and types of archives and FORMS of virtualization
CS4822.4	Illustrate the storage infrastructure and management activities
Subject Code: 18CS823	Subject Name: NoSQL Database
CO#	Course Outcomes
CS4823.1	Define, compare and use the four types of NoSQL. Databases Document - oriented, Key Value Pairs, Column-Oriented and Graph)
CS4823.2	demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL

Course

CS4823.3	Explain the detailed architecture, define objects, oad data. Query data performance tune Document-Oriented NoSQL databases
Subject Code: 18CS824	**Subject Name: MULTICORE ARCHITECTURE AND PROGRAMMING**
CO#	**Course Outcomes**
CS4824.1	Identify the limitations of LP and the need for multicore architectures
CS4824.2	Define fundamental concepts of parallel programming and its design issues
CS4824.3	Solve the issues related to multiprocessing and suggest solutions
CS4824.4	Make out the salient features of different multicore architectures and how they exploit parallelism
CS4824.5	Demonstrate the role of OpenMP and programming concept
Subject Code: 18CSP83	**Subject Name: Project Work Phase-II**
CO#	**Course Outcomes**
CS483.1	Analyze the problems, formulation and solution of the selected project
CS483. 2	Develop solutions for contemporary problems using modern tools for
CS483.3	Demonstrate ethical and professional sustainable while working in a team and communicate effectively for the benefit of the society
CS483.4	Understand the engineering, finance and management principles
CS483.5	Develop report of the project work
Subject Code: 18CSS84	**Subject Name: Technical Seminar**
CO#	**Course Outcomes**
CS484.1	Identify the recent technical topics from interested domains
CS484.2	Analyze the applicability of modern software tools and technology
CS484.3	Develop presentation and communication skills
CS484.4	Develop technical report presentation skills
Subject Code: 18CSI85	**Subject Name: Internship**
CO#	**Course Outcomes**
CS485.1	Adapt easily to the industry environment
CS485.2	Take part in team work
CS485.3	Make use of modern tools
CS485.4	Decide upon project planning and financing
CS485.5	Adapt ethical values
CS485.6	Motivate for lifelong learning