



COURSE OUTCOMES - 2018 SCHEME

3rd Semester

Subject:	Transform Calculus, Fourier Series And Numerical Techniques(M3)		
Subject Code:	18MAT31	NBA Code:	C201
CO 1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.		
CO 2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.		
CO 3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.		
CO 4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.		
CO5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.		

3rd Semester

Subject:	Data Structures And Applications		
Subject Code:	18CS32	NBA Code:	C202
CO 1	Use different types of data structures, operations and algorithms		
CO 2	Apply searching and sorting operations on files		
CO 3	Use stack, Queue, Lists, Trees and Graphs in problem solving		
CO 4	Implement all data structures in a high-level language for problem solving.		

3rd Semester

Subject:	ANALOG AND DIGITAL ELECTRONICS		
Subject Code:	18CS33	NBA Code:	C203
CO 1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.		
CO 2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.		
CO 3	Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods		
CO 4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.		
CO 5	Develop simple HDL programs		

3rd Semester

Subject:	COMPUTER ORGANIZATION		
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Subject Code:	18CS34	NBA Code:	C204
CO 1	Explain the basic organization of a computer system.		
CO 2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.		
CO 3	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.		
CO 4	Design and analyse simple arithmetic and logical units.		

3rd Semester			
Subject:	SOFTWARE ENGINEERING		
Subject Code:	18CS35	NBA Code:	C205
CO 1	Design a software system, component, or process to meet desired needs within realistic constraints.		
CO 2	Assess professional and ethical responsibility		
CO 3	Function on multi-disciplinary teams		
CO 4	Use the techniques, skills, and modern engineering tools necessary for engineering practice		
CO5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems		

3rd Semester			
Subject:	DISCRETE MATHEMATICAL STRUCTURES		
Subject Code:	18CS36	NBA Code:	C206
CO 1	Use propositional and predicate logic in knowledge representation and truth verification.		
CO 2	Demonstrate the application of discrete structures in different fields of computer science.		
CO 3	Solve problems using recurrence relations and generating functions.		
CO 4	Application of different mathematical proofs techniques in proving theorems in the courses.		
CO5	Compare graphs, trees and their applications.		

3rd Semester			
Subject:	ANALOG AND DIGITAL ELECTRONICS LABORATORY		
Subject Code:	18CSL37	NBA Code:	C207
CO 1	Use appropriate design equations / methods to design the given circuit.		
CO 2	Examine and verify the design of both analog and digital circuits using simulators.		
CO 3	Make us of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.		
CO 4	Compile a laboratory journal which includes; aim, tool/instruments/software/components used, design equations used and designs, schematics, program listing, procedure followed, relevant theory, results as graphs and tables, interpreting and concluding the findings.		

3rd Semester			
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Subject:	DATA STRUCTURES LABORATORY		
Subject Code:	18CSL38	NBA Code:	C208
CO 1	Analyze and Compare various linear and non-linear data structures		
CO 2	Code, debug and demonstrate the working nature of different types of data structures and their applications		
CO 3	Implement, analyze and evaluate the searching and sorting algorithms		
CO 4	Choose the appropriate data structure for solving real world problems		

4th Semester

Subject:	COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS		
Subject Code:	18MAT41	NBA Code:	C209
CO 1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.		
CO 2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.		
CO 3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.		
CO 4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.		
CO 5	Construct joint probability distributions and demonstrate the validity of testing		

4th Semester

Subject:	DESIGN AND ANALYSIS OF ALGORITHMS		
Subject Code:	18CS42	NBA Code:	C210
CO 1	Describe computational solution to well-known problems like searching, sorting etc.		
CO 2	Estimate the computational complexity of different algorithms.		
CO 3	Devise an algorithm using appropriate design strategies for problem solving.		

4th Semester

Subject:	OPERATING SYSTEMS		
Subject Code:	18CS43	NBA Code:	C211
CO 1	Demonstrate need for OS and different types of OS		
CO 2	Apply suitable techniques for management of different resources		
CO 3	Use processor, memory, storage and file system commands		
CO 4	Realize the different concepts of OS in platform of usage through case studies		

4th Semester

Subject:	MICROCONTROLLER AND EMBEDDED SYSTEMS		
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Subject Code:	18CS44	NBA Code:	C212
CO 1	Describe the architectural features and instructions of ARM microcontroller.		
CO 2	Apply the knowledge gained for Programming ARM for different applications.		
CO 3	Interface external devices and I/O with ARM microcontroller.		
CO 4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.		
CO5	Develop the hardware /software co-design and firmware design approaches.		
CO 6	Demonstrate the need of real time operating system for embedded system applications.		

4th Semester			
Subject:	OBJECT ORIENTED CONCEPTS		
Subject Code:	18CS45	NBA Code:	C213
CO 1	Explain the object-oriented concepts and JAVA.		
CO 2	Develop computer programs to solve real world problems in Java.		
CO 3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.		

4th Semester			
Subject:	DATA COMMUNICATION		
Subject Code:	18CS46	NBA Code:	C214
CO 1	Explain the various components of data communication.		
CO 2	Explain the fundamentals of digital communication and switching.		
CO 3	Compare and contrast data link layer protocols.		
CO 4	Summarize IEEE 802.xx standards		

4rd Semester			
Subject:	DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY		
Subject Code:	18CSL47	NBA Code:	C215
CO 1	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)		
CO 2	Implement a variety of algorithms such as sorting, graph related, combinatorial, etc., in a high level language.		
CO 3	Analyze and compare the performance of algorithms using language features.		
CO 4	Apply and implement learned algorithm design techniques and data structures to solve real-world problems.		

4th Semester			
Subject:	MICROCONTROLLER AND EMBEDDED SYSTEMS LABORATORY		
Subject Code:	18CSL48	NBA Code:	C216
CO 1	Develop and test program using ARM7TDMI/LPC2148		

CO 2	Conduct the following experiments on an ARM7TDMI/LPC2148 evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4 tool/compiler.
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5 th Semester			
Subject:	MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY		
Subject Code:	18CS51	NBA Code:	C301
CO 1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship		
CO 2	Utilize the resources available effectively through ERP		
CO 3	Make use of IPRs and institutional support in entrepreneurship		

5 th Semester			
Subject:	COMPUTER NETWORKS AND SECURITY		
Subject Code:	18CS52	NBA Code:	C302
CO 1	Explain principles of application layer protocols		
CO 2	Recognize transport layer services and infer UDP and TCP protocols		
CO 3	Classify routers, IP and Routing Algorithms in network layer		
CO 4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard		
CO5	Describe Multimedia Networking and Network Management		

5 th Semester			
Subject:	DATABASE MANAGEMENT SYSTEM		
Subject Code:	18CS53	NBA Code:	C303
CO 1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.		
CO 2	Use Structured Query Language (SQL) for database manipulation.		
CO 3	Design and build simple database systems		
CO 4	Develop application to interact with databases.		

5 th Semester			
Subject:	AUTOMATA THEORY AND COMPUTABILITY		
Subject Code:	18CS54	NBA Code:	C304
CO 1	Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation		
CO 2	Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).		
CO 3	Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.		
CO 4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.		

CO5	Classify a problem with respect to different models of Computation.
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5 th Semester			
Subject:	APPLICATION DEVELOPMENT USING PYTHON		
Subject Code:	18CS55	NBA Code:	C305
CO 1	Demonstrate proficiency in handling of loops and creation of functions.		
CO 2	Identify the methods to create and manipulate lists, tuples and dictionaries.		
CO 3	Discover the commonly used operations involving regular expressions and file system.		
CO 4	Interpret the concepts of Object-Oriented Programming as used in Python.		
CO5	Determine the need for scraping websites and working with CSV, JSON and other file formats.		

5 th Semester			
Subject:	UNIX PROGRAMMING		
Subject Code:	18CS56	NBA Code:	C306
CO 1	Explain Unix Architecture, File system and use of Basic Commands		
CO 2	Illustrate Shell Programming and to write Shell Scripts		
CO 3	Categorize, compare and make use of Unix System Calls		
CO 4	Build an application/service over a Unix system.		

5 th Semester			
Subject:	COMPUTER NETWORK LABORATORY		
Subject Code:	18CSL57	NBA Code:	C307
CO 1	Analyze and Compare various networking protocols.		
CO 2	Demonstrate the working of different concepts of networking.		
CO 3	Implement, analyze and evaluate networking protocols in NS2 / NS3 and JAVA programming language		

5 th Semester			
Subject:	DBMS LABORATORY WITH MINI PROJECT		
Subject Code:	18CSL58	NBA Code:	C308
CO 1	Create, Update and query on the database.		
CO 2	Demonstrate the working of different concepts of DBMS		
CO 3	Implement, analyze and evaluate the project developed for an application.		

6 th Semester			
Subject:	SYSTEM SOFTWARE AND COMPILERS		
Subject Code:	18CS61	NBA Code:	C309

CO1	Understand the system softwares such as assemblers and loaders.
CO2	Understand Language processor & Science of compiler.
CO3	Analyze top down and bottom up parsers.
CO4	Apply the usage of lex and yacc tools.
CO5	Knowledge of SDD, SDT, intermediate code generation and machine code generation.

6th Semester			
Subject:	COMPUTER GRAPHICS AND VISUALIZATION		
Subject Code:	18CS62	NBA Code:	C310
CO 1	Design and implement algorithms for 2D graphics primitives and attributes.		
CO 2	Illustrate Geometric transformations on both 2D and 3D objects.		
CO 3	Apply concepts of clipping and visible surface detection in 2D and 3D		
CO 4	Apply concepts of 2D and 3D viewing and illumination models.		
CO5	Decide suitable hardware and software for developing graphics packages using OPENGL.		

6th Semester			
Subject:	WEB TECHNOLOGY AND ITS APPLICATIONS		
Subject Code:	18CS63	NBA Code:	C311
CO 1	Adapt HTML and CSS syntax and semantics to build web pages.		
CO 2	Construct and visually format tables and forms using HTML and CSS		
CO 3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.		
CO 4	Appraise the principles of object oriented development using PHP		
CO5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.		

6th Semester			
Subject:	OBJECT ORIENTED MODELING AND DESIGN		
Subject Code:	18CS642	NBA Code:	C312
CO 1	Describe the concepts of object-oriented and basic class modelling.		
CO 2	Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.		
CO 3	Choose and apply a befitting design pattern for the given problem.		

6th Semester	
Subject:	OCCUPATIONAL HEALTH AND SAFETY

Subject Code:	18CV653	NBA Code:	C313
CO 1	Identify hazards in the workplace that pose a danger or threat to their safety or health, or that of others.		
CO 2	Control unsafe or unhealthy hazards and propose methods to eliminate the hazard.		
CO 3	Present a coherent analysis of a potential safety or health hazard both verbally and in writing, citing the occupational Health and Safety Regulations as well as supported legislation.		
CO 4	Discuss the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors.		
CO5	Identify the decisions required to maintain protection of the environment, workplace as well as personal health and safety.		

6th Semester			
Subject:	SYSTEM SOFTWARE LABORATORY		
Subject Code:	18CSL66	NBA Code:	C314
CO1	Implement and demonstrate Lexers and Parsers.		
CO2	Evaluate different algorithms required for management, scheduling, allocation and communication used in operating system.		
CO3	List out the requirements for the given problem.		
CO4	Design and implement the solution for given problem in any programming language (C, C++, Java).		
CO5	Derive test cases for any given problem.		
CO6	Apply the appropriate technique for the design of flow graph.		
CO7	Create appropriate document for the software artifact.		

6th Semester			
Subject:	COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT		
Subject Code:	18CSL67	NBA Code:	C315
CO 1	Apply the concepts of computer graphics		
CO 2	Implement computer graphics applications using OpenGL		
CO 3	Animate real world problems using OpenGL		

6th Semester	
Subject:	Mobile Application Development Lab

Subject Code:	18CSMP68	NBA Code:	C316
CO 1	Create, test and debug Android application by setting up Android development environment		
CO 2	Implement adaptive, responsive user interfaces that work across a wide range of devices		
CO 3	Infer long running tasks and background work in Android applications.		
CO 4	Demonstrate methods in storing, sharing and retrieving data in Android applications		
CO 5	Infer the role of permissions and security for Android applications		

7th Semester			
Subject:	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING		
Subject Code:	18CS71	NBA Code:	C401
CO 1	Appraise the theory of Artificial intelligence and Machine Learning.		
CO 2	Illustrate the working of AI and ML Algorithms.		
CO 3	Demonstrate the applications of AI and ML.		

7th Semester			
Subject:	BIG DATA AND ANALYTICS		
Subject Code:	18CS72	NBA Code:	C402
CO 1	Understand fundamentals of Big Data analytics.		
CO 2	Investigate Hadoop framework and Hadoop Distributed File system.		
CO 3	Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data.		
CO 4	Demonstrate the MapReduce programming model to process the big data along with Hadoop tools.		
CO 5	Use Machine Learning algorithms for real world big data.		
CO 6	Analyze web contents and Social Networks to provide analytics with relevant visualization tools.		

7th Semester			
Subject:	ADVANCED COMPUTER ARCHITECTURES(PROFESSIONAL ELECTIVE-2)		
Subject Code:	18CS733	NBA Code:	C403
CO 1	Explain the concepts of parallel computing and hardware technologies		
CO 2	Compare and contrast the parallel architectures		
CO 3	Illustrate parallel programming concepts		

7th Semester

Subject:	User Interface Design(PROFESSIONAL ELECTIVE-2)		
Subject Code:	18CS734	NBA Code:	C403
CO 1	Understand the importance of user interface and benefits of good design.		
CO 2	Understand the user interface design process and business function.		
CO 3	Understand the types of system menus and navigation schemes.		
CO 4	Understand the characteristics of windows and device based controls.		
CO 5	Understand the screen based controls and kinds of tests.		

7th Semester

Subject:	Digital Image Processing(PROFESSIONAL ELECTIVE-3)		
Subject Code:	18CS741	NBA Code:	C404
CO 1	Explain fundamentals of image processing		
CO 2	Compare transformation algorithms		
CO 3	Contrast enhancement, segmentation and compression techniques		

7th Semester

Subject:	ROBOTIC PROCESS AUTOMATION DESIGN AND DEVELOPMENT(PROFESSIONAL ELECTIVE-3)		
Subject Code:	18CS745	NBA Code:	C404
CO 1	To Understand the basic concepts of RPA		
CO 2	To Describe various components and platforms of RPA		
CO 3	To Describe the different types of variables, control flow and data manipulation techniques		
CO 4	To Understand various control techniques and OCR in RPA		
CO 5	To Describe various types and strategies to handle exceptions		

7th Semester

Subject:	Energy and Environment		
Subject Code:	18ME751	NBA Code:	C405

CO 1	Understand energy scenario, energy sources and their utilization.
CO 2	Understand various methods of energy storage, energy management and economic analysis.
CO 3	Analyse the awareness about environment and eco system.
CO 4	Understand the environment pollution along with social issues and acts.
CO 5	Understand the Social issues of Environment

7th Semester

Subject:	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LABORATORY		
Subject Code:	18CSL76	NBA Code:	C406
CO 1	Implement and demonstrate AI and ML algorithms.		
CO 2	Evaluate different algorithms.		

8th Semester

Subject:	INTERNET OF THINGS		
Subject Code:	18CS81	NBA Code:	C408
CO 1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.		
CO 2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.		
CO 3	Appraise the role of IT protocols for efficient network communication.		
CO 4	Elaborate the need for Data Analytics and Security in IoT.		
CO5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.		

8th Semester

Subject:	STORAGE AREA NETWORKS (PROFESSIONAL ELECTIVE-4)		
Subject Code:	18CS822	NBA Code:	C409
CO 1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization		
CO 2	Explain components and the implementation of NAS		
CO 3	Describe CAS architecture and types of archives and forms of virtualization		
CO 4	Illustrate the storage infrastructure and management activities		