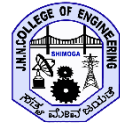**National Education Society (R.)**

Jawaharlal Nehru New College of Engineering, Shivamogga

(Approved by AICTE, New Delhi, Certified by UGC 2f & 12B, Accredited by NAAC –'B', UG programs:CE,ME,EEE,ECE,CSE,ISE, ETE PG Programs: MBA, acredited by NBA:1.7.2022 to 30.6.2025, Recognized by Govt. of Karnataka and Affiliated to VTU, Belagavi)

INTERNAL QUALITY ASSURANCE CELL (IQAC)

2018 Scheme

Sl.No	Branch	Sem	Subject	CO,S
1	CSE	3	Transform Calculus, Fourier Series and Numerical Techniques Mathematics (18MAT31)	1. To remember the definition of Laplace transform, Fourier series, Fourier transform, Z-transform, formulae of numerical methods and calculus of variation.
				2. To understand the concept of periodic function, Unit step function, Convolution theorem in Laplace transform, Fourier series of period 2 pi, arbitrary period 2l, half range series, Fourier transform and Z- transform, numerical methods and calculus of variations.
				3. To apply the concept of Laplace transform in 2nd and higher order linear differential equations. Harmonic analysis in Fourier series, Z-transform in difference equations, numerical solution of ODE's by various numerical methods and Euler's equation, Geodesics in Calculus of variation.
2		3	Data Structures and Applications (18CS32)	1. Understand the concepts of arrays, functions and dynamic memory allocations.
				2. Design and illustrate algorithms/functions for operations of linear data structures.
				3. Design and illustrate algorithms/functions for operations of nonlinear data structures.

3		3	Analog And Digital Electronics (18CS33)		4. Apply appropriate data structures for solving given problems.
					1. Understand the working of Photodiodes, Light Emitting Diodes and Opto couplers ,BJT, Transistors, Operational Amplifier circuits and their applications, A/D and D/A Converters.
					2. Analyze the Combinational Circuits and simplify those using K- Map, Quine McCluskey, Petrick and EVM techniques.
					3. Understand the working of Gates, flip flops and VHDL logic.
					4. Design combinational and Sequential Circuits using gates and Flip-flops as Multiplexers, Decoders and Programmable Logic Devices. Design such as Registers and Counters using Flip Flops.
4		3	Computer Organization (18CS34)		1. Understand the basic Operational concepts of digital computer and its memory systems
					2. Analyze the various modes of data transfer between CPU and I/O devices
					3. Design adder circuits to perform arithmetic operations on integers
					4. Comprehend the basic organization of a simple processor and concepts of pipelining.
5		3	Software Engineering (18CS35)		1. Identify suitable software process/system principles/models used in building software systems.
					2. Analyze different design principles used in software development.
					3. Apply entire development process in developing software systems.
					4. Create documents related to various activities in developing software systems.

6		3	Discrete Mathematical Structures (18CS36)	1. Analyze statements in Boolean logic.
				2. Design Mathematical solutions using proofs of induction and recursive definitions.
				3. Describe relations, functions and Hasse diagrams for partial orders.
				4. Apply the principles of inclusion, exclusion with DE arrangements to solve problems.
				5. Understand the basic properties of graphs and related discrete structures.
7		3	Analog And Digital Electronics Laboratory (18CSL37)	1. Demonstrate various Electronic Devices like Cathode Ray Oscilloscope, Signal generators, Digital Trainer Kits, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
				2. Design various combinational logic circuits using integrated circuits.
				3. Design sequential circuits such as counters and registers using flip-flops.
				4. Implement analog and digital circuits using simulation tools.
8		3	Data Structures Laboratory (18CSL38)	1. Implement Linear data structures using C.
				2. Implement nonlinear data structures using C.
				3. Apply appropriate data structures to solve given problems.
9		4	Complex Analysis, Probability And Statistical Methods (18MAT41)	1. Remember the concept of probability to solve the problems on probability distribution and joint probability distribution.
				2. Understand the concept of correlation , regression and curve fitting
				3. Demonstrate testing of hypothesis of sampling distribution

				4. Apply the knowledge of complex differentiation and complex integration in diverse fields related to field theory and signal processing
10		4	Additional Mathematics - 2 (18MATDIP41)	1. Solve rank of matrix by elementary row operations - Echelon form. Consistency of system of linear equations - Gauss elimination method
				2. Demonstrate various physical models through 2nd and higher order linear differential equation and solve such equations.
				3. Construct a variety of Partial differential equation and solution by direct integration, method of separation of variables.
				4. Apply the knowledge of numerical methods, infinite series and series solution of ordinary differential equation to explain various physical and engineering problems.
11		4	Design And Analysis Of Algorithms (18CS42)	1. Comprehend the fundamental concepts for designing and analyzing algorithms to solve given problems
				2. Apply appropriate algorithmic design paradigms to solve given problems
				3. Analyze the performance of algorithms in terms of space and time complexity
				4. Develop an efficient algorithm for solving given problems
12		4	Operating Systems (18CS43)	1. Understand the issues involved in design and development of Operating Systems
				2. Apply the concepts of process scheduling, process synchronization, memory and resource management
				3. Analyze the process scheduling, thread scheduling, main memory allocation and disk

					scheduling algorithms to solve resource allocation problems
					4. Understand the mechanism of protection and security in operating system.
13		4		Microcontroller And Embedded Systems (18CS44)	1. Understand the architectural features and instruction set of 32 bit ARM micro
					2. Apply instructions of assembly language for programming ARM.
					3. Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
					4. Explain the need of real time operating system for embedded system applications.
14		4		Object Oriented Concepts (18CS45)	1. Understanding the fundamental concepts of object oriented programming
					2. Analyze object oriented programming concepts using C++ and Java
					3. Apply the concepts of exceptions, package and interfaces in Java programming
					4. Apply the concepts of multithreading and event handling using Java programming language
					5. Develop Java applications based on applets, AWT and Swings
15		4		Data Communication (18CS46)	1. Understand the basics of networks and working principles of OSI and TCP/IP models, Performance metrics, Data, and Signals.
					2. Apply various analog and digital encoding techniques for data transmission.
					3. Compare and contrast different Error Detection and Correction techniques and identify the different types of network devices and their functions within a network

					4. Design the network using IP addressing and subnetting / super netting schemes.
					5. Analyze Wired LANs Ethernet, Wireless LANs, and other Wireless Networks like Cellular Telephony.
16			4	Constitution of India, Professional Ethics and Cyber Law (18CPC49)	1. To assimilate and get familiarized with basic information about Indian constitution and provide overall legal literacy to the young technocrats to manage complex societal issues in the present scenario.
					2. To identify their individual roles and ethical responsibilities towards society
					3. To understand engineering ethics & responsibilities, through the learning of these topics students will be able to understand human rights/ values and its implications in their life.
17			4	Design And Analysis Of Algorithm Laboratory (18CSL47)	1. Design Aalgorithms using appropriate design techniques (brute force, greedy, dynamic programming etc.)
					2. Implement a variety of algorithms such as sorting, graph related, combinotrial, etc.
					3. Analyze and compare the performance of algorithms
					4. Apply algorithm design techniques and data structures to solve problems.
18			4	Microcontroller And Embedded Systems Laboratory (18CSL48)	1. Develop and test programs using ARM7TDMI/LPC2148
					2. Write Embedded 'C' programs for evaluation boards of ARM7TDMI/LPC2148
					3. Conduct the experiments on an ARM7TDMI/LPC2148 evaluation board using Embedded 'C' and Keil Vision tool/Compiler

19		5	Management, Entrepreneurship For IT Industry (18CS51)	1. Define Management, Organization, Planning, Staffing.
				2. Analyze Directing, Controlling & Communication in organization environment.
				3. Analyze Directing, Controlling & Communication in organization environment.
				4. Develop business plan using Elements of Project Management and ERP.
				5. Understand IPRs and institutional support in entrepreneurship.
20		5	Computer Networks And Security (18CS52)	1. Explain principles an working of application layer protocol
				2. Recognize transport layer services and infer UDP and TCP protocols
				3. Enunciate the working of various Routing Algorithms in network layer
				4. Demystification of various network security algorithms
				5. Illustrate concepts of Multimedia Networking and Network Management
21		5	Database Management System (18CS53)	1. Understand the features and architectures of DBMS.
				2. Develop Relational and SQL query for Database operations.
				3. Design applications to interact with Databases.
				4. Apply the concept of Normalization on Relational Databases.
				5. Comprehend the concepts of Concurrency control, Data recovery and Transaction processing.
22		5	Automata Theory And Computability (18CS54)	1. Acquire fundamental understanding of the core concepts of automata theory and computation.

				2. Build different models of computation: automata, regular expression and grammar for different language classes and translate among them
				3. Construct PDA to recognize context free languages and prove their properties.
				4. Design the Turing Machines and identify decidability of computational models.
23		5	Application Development Using Python (18CS55)	1. Demonstrate the salient features of python in handling control flow statements and functions.
				2. Illustrate various methods to define and manipulate the lists, tuples, dictionaries and strings.
				3. Use the various operations involving Regular expressions and file system
				4. Implement Object Oriented Concepts in python
				5. Apply the need for scrapping websites, working with Excel spreadsheets, PDF, Word documents, CSV files and JSON data.
24		5	Unix Programming (18CS56)	1. Explain Unix Architecture, File system and use of Basic Commands
				2. Illustrate Shell Programming and to write Shell Scripts
				3. Categorize, compare and make use of Unix System Calls
				4. Build an application/service over a Unix system.
25		5	Computer Network Laboratory (18CSL57)	1. Simulate the wired and wireless networks by setting various network parameters using NS-2
				2. Simulate and study the performance of CDMA/GSM networks by using NS-2

					3. Design and implement Application layer protocols using JAVA.
					4. Design and implement Transport layer protocols using JAVA
					5. Design and implement Network layer protocols using JAVA
26		5		DBMS Laboratory With Mini Project (18CSL58)	1. Design database by specifying the constraints based on requirements.
					2. Develop queries to retrieve the required data from database.
					3. Implement mini project for real world problems.
					4. Prepare a Report for the mini project carried out.
27		6		System Software And Compilers (18CS61)	1. Understand the working of hypothetical machine, assemblers and loaders.
					2. Analyze the working of lexical analyzer in design of compiler
					3. Design syntax analyzer using top down and bottom up approach
					4. Demonstrate LEX and YACC tools for implementing different concepts of system software
					5. Analyze syntax directed translation, intermediate code representation and code generation phases of compilers
28		6		Computer Graphics And Visualization (18CS62)	1. Understand the fundamentals concepts and applications of computer graphics
					2. Design various geometric objects in 2d and 3 d by using primitives and attributes
					3. Apply geometric transformations and camera viewing for 2d and 3d.
					4. Analyze the representation of curves and surfaces and illumination models.

29		6	Web Technology And Its Applications (18CS63)	1. Adapt HTML and CSS syntax and semantics to build web pages
				2. Construct and visually format tables and forms using HTML and CSS
				3. Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically
				4. Appraise the principles of object-oriented development using PHP
				5. Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features
30		6	Cloud Computing And Its Applications (18CS643)	1. Explain cloud computing, virtualization and classify services of cloud computing
				2. Able to identify the infrastructure of cloud and different cloud services
				3. Describe different cloud services
				4. Analyzing different cloud data storage and cloud security options.
				5. To analyze the need to migrate to the cloud and how cloud computing might evolve.
31		6	Advanced Java and J2EE (18CS644)	1. Apply advanced Java concepts like enumerations and Annotations in developing modular and efficient programs
				2. Develop java programs using collection classess
				3. Analyze java programs based on string and string buffer operations
				4. Develop web based applications using java servlets and JSP
				5. Demonstrate database interaction and transaction processing using JDBC

32		6	Mobile Application Development (18CS651)	1. Create, test and debug Android application by setting up Android development environment
				2. Implement adaptive, responsive user interfaces that work across a wide range of devices
				3. Demonstrate methods in storing, sharing ,retrieving data and analyze performance in Android applications
				4. Describe the steps involved in publishing Android application to share with the world
33		6	Introduction To Data Structures And Algorithms (18CS652)	1. Understand the concepts of arrays, functions and dynamic memory allocations.
				2. Understand the fundamental concepts of design and analysis of algorithm
				3. Design and illustrate algorithms/functions for operations of linear data structures.
				4. Design and illustrate algorithms/functions for operations of nonlinear data structures.
				5. Apply appropriate data structures for solving given problems.
34		6	Programming In Java (18CS653)	1. To explain the features and object-oriented concepts in JAVA programming
				2. To demonstrate working of bitwise operators in JAVA
				3. To develop simple programs based on control statements, overloading and inheritance
				4. To understand the concepts of importing of packages and exception handling mechanism.
				5. To analyse Enumeration, String Handling and IO operations in JAVA
35		6	System Software Laboratory (18CSL66)	1. Design and implement Lexical and Syntax Analysis phases of Compiler Design using LEX & YACC tools

					2. Design and implement predictive and shift-Reduce parsing mechanism for a given context free grammar.
					3. Implement process scheduling, deadlock avoidance and page replacement algorithms.
36		6		Computer Graphics Laboratory With Mini Project (18CSL67)	1. Design geometrical Objects in 2d and 3d
					2. Apply the transformation functions on different objects.
					3. Develop lighting shading and curve surface effects.
					4. Develop graphical applications using Open-GL API'S
37		6		Mobile Application Development (18CSMP68)	1. Learn the various layout management and event handling mechanism in Android using Kotlin
					2. Develop mechanism to pass data between different Android Activities using Intents and Bundle
					3. Accessing resources and implicit intents in Android using Kotlin
					4. Implement Multi threading in Kotlin to perform user interface activities concurrently
					5. Develop parsing of semistructured data in Android using Kotlin
					6. Development and demonstration of Mini Project
38		7		Artificial Intelligence And Machine Learning (18CS71)	1. Apply different Artificial Intelligence techniques to solve given problems.
					2. Analyze various knowledge representation methods and issues.
					3. Apply Machine Learning Concepts to build models to address real world problems.
					4. Design supervised, unsupervised techniques to solve machine learning problems.

					5. Analyze learning through Reinforcement learning techniques.
39		7		Big Data Analytics (18CS72)	1. Understand fundamentals of Big Data analytics.
					2. Analyze Hadoop framework and Hadoop Distributed File system.
					3. Apply the concepts of NoSQL using MongoDB and Cassandra for Big Data.
					4. Demonstrate the Map Reduce programming model to process the big data along with Hadooptools.
					5. Describe the Machine Learning algorithms for real world big data, web contents and Social Networks to provide analytics with relevant visualization tools.
40		7		User Interface Design (18CS734)	1. Understand the concepts of web, user and graphical interface designs
					2. Analyze the business functions and user interface design guidelines.
					3. Design the menus, windows and interface components of windows
					4. Realize the various problems in window design with text, graphics and selection controls.
					5. Apply the testing methods on presentation and operable controls.
41		7		Cryptography (18CS744)	1. Define cryptography and its principles
					2. Explore the working principles of Public key cryptography algorithms
					3. Elliptic curve cryptography and arithmetic, Illustration and use of Key management and distribution
					4. Understand the principles of user authentication, working of kerberos Email and IP Security

42		7	Python Application Programming (18CS752)	1. write programs using functions in python
				2. use strings and file operation in python programs
				3. create python programs to demonstrate the lists, dictionaries and regular expression
				4. implement object oriented concepts in python
				5. build web services, network and database programs in python
43		7	Introduction To Artificial Intelligence (18CS753)	1. Identify the problems where Artificial Intelligence is required and apply different Artificial Intelligence techniques to solve the Artificial Intelligence problems.
				2. Analyze various knowledge representation methods and issues
				3. Understanding reasoning with certainty and reasoning with uncertainty.
				4. Apply problem solving techniques in game playing and understand the process of natural languages
				5. Understand various learning algorithms strategies and process of designing expert systems
44		7	Artificial Intelligence And Machine Learning Laboratory (18CSL76)	1. Implement Informed (Heuristic) search Artificial Intelligence algorithms.
				2. Implement supervised machine learning algorithms.
				3. Implement unsupervised machine learning algorithms.
				4. Apply Artificial Intelligence and Machine Learning concepts to solve real world problems.
45		7	Project Work Phase - 1 (18CSP77)	1. Consolidate the literature survey to identify and formulate the engineering problem.

				2. Identify the community that shall benefit through the solution to the identified engineering problem and also demonstrate the concern for environment.
				3. Arrive at an exhaustive list of available engineering tools that may be used for solving the identified engineering problem.
				4. Engage in effective oral and written communication of the project work.
				5. Ability to perform in the team, contribute to the team and mentor/lead the team.
46		8	Internet Of Things (18CS81)	1. Understand the impact, challenges and various architecture of IoT networks
				2. Analyse different connecting technologies used in IoT networks.
				3. Understand the Network, Transport and application layer protocols for IoT.
				4. Analyse the data analytics and Security protocols for IoT.
				5. Design IoT applications using Adrino Uno and Rasberry Pi.
47		8	Nosql Database (18CS823)	1. Define, compare and use the four types of NoSQL Databases
				2. Explain distributed model and the CAP Theorem
				3. Explain the architecture, define objects, load data, query data and performance tune on NoSQL databases
				4. Explain Document and Graph database
48		8	Internship (18CSI85)	1. Understand Engineering Processes relevant to the Industry
				2. Apply theory and principles of computer science and engineering to solve an engineering problem

				3. Analyze the usage of modern technologies, tools and processes to solve the live problems
				4. Communicate effectively and work in teams. (Oral and Written communication, Report writing, Presentation skills)
				5. Imbibe the practice of professional ethics.
49		8	Project Work Phase - 2 (18CSP83)	1. Select the engineering tools/components for solving the identified engineering problem
				2. Apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem
				3. Implement the design solution(s) using identified tools
				4. Analyze and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusion
				5. Engage in effective oral and written communication through presentation of the project work
				6. Perform in the team, contribute to the team and mentor/lead the team and follow professional ethics
50		8	Technical Seminar (18CSS84)	1. Identify and Understand the Recent Advancements in the Cutting edge Software technologies.
				2. Prepare the Effective presentations on the chosen topic of interest.
				3. Deliver the presentation effectively in front of the Audience.
				4. Prepare the Technical Document on the Topic Chosen.

2021 Scheme

Sl.No	Branch	Sem	Subject	CO,S
1	CIVIL	3	Transform Calculus, Fourier Series and Numerical Techniques (21MAT31)	1. To solve ordinary differential equations using Laplace transform
				2. Demonstrate the Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory
				3. To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
				4. To solve mathematical models represented by initial or boundary value problems involving partial differential equations
				5. Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
2		3	Data Structures and Applications (21CS32)	1. Understand the concepts of structures, arrays, functions, and dynamic memory allocations.
				2. Design and implement algorithms/functions for operations of linear data structures.
				3. Design and implement algorithms/functions for operations of nonlinear data structures.
				4. Apply appropriate data structures for solving given problems.

3		3	Analog and Digital Electronics (21CS33)	1. Understand the working of Photodiodes, Light Emitting Diodes and Opt couplers, BJT, Transistors, Operational Amplifier circuits and their applications, A/D and D/A Converters.
				2. Analyze and Design the Combinational Circuits and simplify those using K- Map, Quine-McCuskey, Patrick, and EVM techniques.
				3. Understand and Design the working of Gates in the flip flops and VHDL logic on sequential circuits such as counters and registers.
				4. Design and simulate combinational and Sequential Circuits using gates and Flip-flops as Multiplexers, Decoders and Programmable Logic Devices. Design such as Registers and Counters using Flip Flops.
4		3	Computer Organization and Architecture (21CS34)	1. Understand the basic Operational concepts of digital computer and its memory systems
				2. Analyze the various modes of data transfer between CPU and I/O devices
				3. Design adder circuits to perform arithmetic operations on integers
				4. Comprehend the basic organization of a simple processor and concepts of pipelining.
5		3	Object Oriented Programming with JAVA Laboratory (21CSL35)	1. Demonstrate the use of Eclipse/Netbeans IDE to create Java Applications
				2. Analyze the necessity of OOP and become familiar with fundamental concepts
				3. To design and develop Java programs, analyze document the result
				4. Apply the concepts of multiprogramming and Exception to develop the programs

					5. To develop the programs on File handling and GUI concepts
6		3		Social Connect and Responsibility (21SCR36)	1. Understand social responsibility
					2. Practice sustainability and creativity
					3. Showcase planning and organizational skills
7		3		Mastering Office (21CSL381)	1. Know the basics of computers and prepare documents, spreadsheets, make small presentations with audio, video and graphs and would be acquainted with internet.
					2. Create, edit, save and print documents with list tables, header, footer, graphic, spellchecker, mail merge and grammar checker
					3. Attain the knowledge about spreadsheet with formula, macros.
					4. Demonstrate the ability to apply application software in an office environment.
8		4		Mathematical Foundations for Computing (21MATCS41)	1. Apply the concepts of logic for effective computation and relating problems in the Engineering domain
					2. Analyze the concepts of functions and relations to various fields of Engineering. Comprehend the concepts of Graph theory for various applications of computational sciences.
					3. Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data
					4. Apply discrete and continuous probability distributions in analyzing the probability models arising in the engineering fields

				5. Construct joint probability distributions and demonstrate the validity of testing the hypothesis
9		4	Design and Analysis of Algorithms (21CS42)	1. Comprehend the fundamental concepts for designing and analyzing algorithms to solve given problems
				2. Apply appropriate algorithmic design paradigms to solve given problems
				3. Analyze the performance of algorithms in terms of space and time complexity
				4. Develop an efficient algorithm for solving given problems
10		4	Microcontroller and Embedded Systems (21CS43)	1. Explain C-Compilers and optimization
				2. Describe the ARM microcontroller's architectural features and program module.
				3. Apply the knowledge gained from programming on ARM to different applications.
				4. Program the basic hardware components and their application selection method.
				5. Demonstrate the need for a real-time operating system for embedded system applications
11		4	Operating Systems (21CS44)	1. Understand the issues involved in design and development of Operating Systems
				2. Apply the concepts of process scheduling, process synchronization, memory and resource management
				3. Analyze the process scheduling, thread scheduling, main memory allocation and disk scheduling algorithms to solve resource allocation problems
				4. Understand the mechanism of protection and security in operating system

12		4	Universal Human Values (21UH49)	1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
				2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way
				3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature
13		4	Constitution of India and Professional Ethics (21CIP47)	1.Analyse the basic structure of Indian Constitution
				2. Remember their fundamental rights, DPSP's and fundamental duties (FD's) of our constitution
				3. Know about our Union Government, Political Structure & codes, procedures
				4. Understand our State Executive & Election system of India
				5.Remember the Amendments and Emergency Provisions, other important provisions given by the constitution
14		4	Python Programming Laboratory (21CSL46)	1.Demonstrate the use of IDLE or PyCharm IDE to create Python Applications
				2.Using Python programming language to develop programs for solving real-world problems
				3.Implement the Object-Oriented Programming concepts in Python

				4.Appraise the need for working with various documents like Excel, PDF, Word and Others
				5.Demonstrate regular expression using python programming
15		4	Web Programming (21CSL481)	1. Learn Web tool box and history of web browsers.
				2. Learn HTML, XHTML tags with utilizations.
				3. Know CSS with dynamic document utilizations.
				4. Learn JavaScript with Element access in JavaScript.
				5. Logically plan and develop web pages.