



S J P N Trust's  
**Hirasugar Institute of Technology, Nidasoshi.**

*Inculcating Values, Promoting Prosperity*  
Approved by AICTE, Recognized by Govt. of Karnataka and Affiliated to VTU Belagavi.

Accredited at 'A' Grade by NAAC  
Programmes Accredited by NBA: CSE, ECE, EEE & ME

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Course Outcomes

2021-22

### III SEMESTER

SUB: Transform Calculus, Fourier Series And Numerical Techniques Sub Code: 18MAT31

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

CO	Description
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
C201.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

SUB: Data Structures and Applications

Sub Code: 18CS32

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

CO	Description
C202.1	Use different types of data structures, operations and algorithms
C202.2	Apply searching and sorting operations on files
C202.3	Use stack, Queue, Lists, Trees and Graphs in problem solving
C202.4	Implement all data structures in a high-level language for problem solving.

SUB: Analog and Digital Electronics

Sub Code: 18CS33

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

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



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SUB: Computer Organization

Sub Code: 18CS34

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

CO	Description
C204.1	Explain the basic structure of computers, performance of processor, memory organization, machine instructions and assembly language.
C204.2	Demonstrate functioning of different subsystems, such as processor, input output and memory.
C204.3	Explain the working principles of different type's memory system.
C204.4	Apply the knowledge of arithmetic operations and analyze simple arithmetic and logical units.
C204.5	Illustrate hardwired control and micro programmed control, pipelining, embedded system and other computing systems.

SUB: Software Engineering

Sub Code: 18CS35

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

CO	Description
C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.
C205.2	Assess professional and ethical responsibility
C205.3	Function on multi-disciplinary teams
C205.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

SUB: Discrete Mathematical Structures

Sub Code: 18CS36

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

CO	Description
C206.1	Demonstrate the correctness of an argument using propositional and predicate logic, and truth tables.
C206.2	Demonstrate the properties of Integers & fundamental principles of Counting.
C206.3	Make use of Relation and Function's properties to solve logical problems.
C206.4	Solve problems involving principle of Inclusion & Exclusion, and recurrence relations.
C206.5	Explain the fundamentals of Graphs and Trees.



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SUB: Analog and Digital Electronics Laboratory

Sub Code: 18CSL37

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

CO	Description
C207.1	Use appropriate design equations / methods to design the given circuit.
C207.2	Examine and verify the design of both analog and digital circuits using simulators
C207.3	Make use of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.
C207.4	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.

SUB: Data Structures Laboratory

Sub Code: 18CSL38

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

CO	Description
C208.1	Implement various linear and non-linear data structures.
C208.2	Demonstrate the working nature of different types of data structures and their applications.
C208.3	Implement the searching and sorting algorithms.
C208.4	Select the appropriate data structures for solving computing problems.



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### IV SEMESTER

SUB: Complex Analysis, Probability and Statistical Methods

Sub Code: 18MAT41

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

CO	Description
C210.1	Use the concepts of analytic function and complex potentials to solve the problems arising in Electromagnetic field theory.
C210.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow Visualization and image processing.
C210.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
C210.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the Statistical data.
C210.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

SUB: Design and Analysis of Algorithms

Sub Code: 18CS42

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

CO	Description
C211.1	Explain the specifications of algorithms, fundamental data structures and their operations.
C211.2	Explain various searching problem solving techniques.
C211.3	Explain various sorting problem solving techniques.
C211.4	Estimate the computational complexity of different algorithms.
C211.5	Choose appropriate algorithmic strategies for problem solving.

SUB: Operating Systems

Sub Code: 18CS43

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

CO	Description
C212.1	Demonstrate need for Operating System and its types.
C212.2	Explain the multithreaded systems and scheduling algorithms.
C212.3	Illustrate the concept of process synchronization and Deadlock.
C212.4	Explain the concept of memory management and File System.
C212.5	Illustrate the different concepts of disk management, Protection and Linux System case studies.



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SUB: Microcontrollers and Embedded Systems

Sub Code: 18CS44

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

CO	Description
C213.1	Describe the architectural features and instructions of ARM microcontroller.
C213.2	Apply the knowledge gained for Programming ARM for different applications.
C213.3	Interface external devices and I/O with ARM microcontroller.
C213.4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C213.5	Develop the hardware /software co-design and firmware design approaches.

SUB: Object Oriented Concepts

Sub Code: 18CS45

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

CO	Description
C214.1	Explain concepts of object oriented programming with C++.
C214.2	Develop Java programs to solve problems.
C214.3	Explain Inheritance, Exceptions, Packages and Interfaces in Java.
C214.4	Develop multithreaded programs.
C214.5	Develop simple event based Graphical User Interfaces using Swings.

SUB: Data Communication

Sub Code: 18CS46

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

CO	Description
C215.1	Explain the various components of data communication.
C215.2	Explain the fundamentals of digital communication and switching.
C215.3	Compare and contrast data link layer protocols.
C215.4	Summarize IEEE 802.xx standards



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SUB: Design, Analysis of Algorithms Laboratory

Sub Code: 18CSL47

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

CO	Description
C216.1	Develop Java programs to demonstrate Inheritance, Exception handling and multi-threading concepts.
C216.2	Develop a Java Program to demonstrate the stack operations.
C216.3	Develop the variety of algorithms using Greedy, dynamic programming and Backtracking techniques.
C216.4	Analyze the performance of sorting algorithms based on divide-and-conquer technique.

SUB: Microcontrollers and Embedded Systems Laboratory

Sub Code: 18CSL48

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

CO	Description
C217.1	Develop and test Assembly Language Program (ALP) using ARM7TDMI/LPC2148
C217.2	Conduct the following experiments on an ARM7TDMI/LPC2148 evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4 tool /compiler tool/ compiler.
C217.3	Choose micro controllers for various kinds of applications.



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## V SEMESTER

SUB: Management & Entrepreneurship For IT Industry

Sub Code: 18CS51

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

CO	Description
C301.1	Explain the basic concepts of management, planning, Organizing and Staffing.
C301.2	Summarize the appropriate leadership styles, motivation theories, communications, Coordination and controlling, methods
C301.3	Interpret the meaning of entrepreneur, entrepreneurship and role in economic development on India. Along with Identification of business opportunities and feasibility study
C301.4	Inferring the new ideas, Prepare project report based on guidelines of planning commission by utilizing the resources available effectively through ERP
C301.5	Explain the IPRs and institutional support in Micro and Small Enterprises as per the Indian Industrial Policy 2007.

SUB: Computer Networks

Sub Code: 18CS52

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

CO	Description
C302.1	Explain principles of application layer protocols
C302.2	Identify transport layer services and infer UDP and TCP protocols
C302.3	Classify routers, IP and Routing Algorithms in network layer
C302.4	Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard
C302.5	Explain Multimedia Networking and Network Management

SUB: Database Management Systems

Sub Code: 18CS53

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

CO	Description
C303.1	Define, Identify and analyze database objects, enforce integrity constraints on a database using RDBMS.
C303.2	Use Structured Query Language (SQL) for database manipulation.
C303.3	Build simple database systems
C303.4	Develop application to interact with databases.





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SUB: Automata Theory and Computability

Sub Code: 18CS54

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

CO	Description
C304.1	Apply the fundamental understanding of automata theory to design FSMs for regular Languages.
C304.2	Demonstrate the understanding of the regular expressions & Regular grammar and their Equivalence.
C304.3	Apply the fundamental understanding of automata theory to design and develop CFG and PDA and their relative powers.
C304.4	Apply the fundamental understanding of automata theory to design and develop Turing Machine.
C304.5	Explain the fundamental understanding of Decidability and Complexity of the problems.

SUB: Application Development Using Python

Sub Code: 18CS55

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

CO	Description
C305.1	Demonstrate proficiency in handling of loops and creation of functions
C305.2	Identify the methods to create and manipulate lists, tuples and dictionaries.
C305.3	Discover the commonly used operations involving regular expressions and file system.
C305.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C305.5	Determine the need for scraping websites and working with CSV, JSON and other file formats.

SUB: Unix Programming

Sub Code: 18CS56

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

CO	Description
C306.1	Explain Unix Architecture, File system and use of Basic Commands
C306.2	Illustrate Shell Programming and to write Shell Scripts
C306.3	Categorize, compare and make use of Unix System Calls
C306.4	Build an application/service over a Unix system
C306.5	Explain signal and daemon characteristics





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SUB: Computer Networks Laboratory

Sub Code: 18CSL57

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

CO	Description
C307.1	Analyze and Compare various networking protocols.
C307.2	Demonstrate the working of different concepts of networking.
C307.3	Implement, analyze and evaluate networking protocols in NS2 / NS3 and Java Programming.

SUB: DBMS Laboratory with Mini Project

Sub Code: 18CSL58

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

CO	Description
C308.1	Demonstrate creation and manipulation operations on database.
C308.2	Demonstrate the working of different concepts of DBMS
C308.3	Develop and demonstrate the project developed for an application.

SUB: Environmental Studies

Sub Code: 18CIV59

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

CO	Description
C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.
C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components
C309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.



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## VI SEMESTER

SUB: System Software and Compilers

Sub Code: 18CS61

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

CO	Description
C310.1	Explain system software such as assemblers and Loader
C310.2	Apply the fundamental concepts learnt for designing & implementing lexical analysis phase of compiler.
C310.3	Apply the concepts studied for designing & Developing Syntax analysis phase.
C310.4	Make use of translation techniques learnt for code generation phase.
C310.5	Utilize LEX and YACC tools for implementing different concepts of system software.

SUB: Computer Graphics and Visualization

Sub Code: 18CS62

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

CO	Description
C311.1	Explain hardware, software and OpenGL Graphics Primitives.
C311.2	Illustrate Geometric transformations on both 2D and 3D objects.
C311.3	Apply concepts of clipping, color and Illumination Models in 2D and 3D objects.
C311.4	Apply the concepts of viewing and visible surface detection of 3D objects
C311.5	Explain curve generating concepts and interactive computer graphics using the OpenGL.

SUB: Web Technology and its Applications

Sub Code: 18CS63

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

CO	Description
C312.1	Adapt HTML and CSS syntax and semantics to build web pages.
C312.2	Construct and visually format tables and forms using HTML and CSS.
C312.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
C312.4	Appraise the principles of object oriented development using PHP
C312.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.



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SUB: Data Mining and Data Warehousing

Sub Code: 18CS641

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

CO	Description
C313.1	Explain data warehouse and multi-dimensional data models.
C313.2	Explain various operations on data warehouse and data models.
C313.3	Apply concept, algorithms and applications of association rules for solving data mining problems.
C313.4	Apply concept, algorithms and applications of classifications for solving data mining problems.
C313.5	Apply concept, algorithms and applications clustering for solving data mining problems.

SUB: Programming in Java

Sub Code: 18CS653

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

CO	Description
C320.1	Explain the object-oriented concepts and JAVA.
C320.2	Develop computer programs to solve real world problems in Java.
C320.3	Develop simple GUI interfaces for a computer program to interact with users.

SUB: System Software Laboratory

Sub Code: 18CSL66

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

CO	Description
C322.1	Demonstrate the Lexical analysis using Lexer.
C322.2	Demonstrate the syntax analysis phase of Compiler design using Parser.
C322.3	Develop the different CPU scheduling algorithms.
C322.4	Demonstrate the different memory management algorithms.
C322.5	Demonstrate the deadlock handling algorithm.



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SUB: Computer Graphics Laboratory with Mini Project

Sub Code: 18CSL67

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

CO	Description
C323.1	Demonstrate simple algorithms using OpenGL Graphics Primitives and attributes.
C323.2	Demonstrate line drawing and clipping algorithms using OpenGL functions.
C323.3	Demonstrate 2D and 3D Geometric transformations using OpenGL functions.
C323.4	Demonstrate computer graphics applications using OpenGL.
C323.5	Make use of OpenGL functions to animate real world problems.

SUB: Mobile Application Development

Sub Code: 18CSMP68

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

CO	Description
C324.1	Create, test and debug Android application by setting up Android development environment.
C324.2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
C324.3	Infer long running tasks and background work in Android applications.
C324.4	Demonstrate methods in storing, sharing and retrieving data in Android applications.
C324.5	Infer the role of permissions and security for Android applications.



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## VII SEMESTER

SUB: Artificial Intelligence and Machine Learning

Sub Code: 18CS71

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

CO	Description
C401.1	Appraise the theory of Artificial intelligence and Machine Learning
C401.2	Illustrate the working of AI and ML Algorithms.
C401.3	Demonstrate the applications of AI and ML.

SUB: Big Data Analytics

Sub Code: 18CS82

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

CO	Description
C402.1	Understand fundamentals of Big Data analytics.
C402.2	Investigate Hadoop framework and Hadoop Distributed File system.
C402.3	Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data.
C402.4	Demonstrate the MapReduce programming model to process the big data along with Hadoop tools.
C402.5	Use Machine Learning algorithms for real world big data and analyze web contents and Social Networks to provide analytics with relevant visualization tools.

SUB: Advanced Computer Architecture

Sub Code: 18CS733

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

CO	Description
C405.1	Explain the fundamentals of computer architecture.
C405.2	Explain the basic concepts of Pipelining.
C405.3	Explain Internal Data Forwarding, Software Interlocking, Hardware Score boarding, Hazard avoidance, Branch handling and Instruction issuing techniques.
C405.4	Explain multi-processor and thread level parallelism.
C405.5	Explain parallel programming model.



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SUB: Cryptography

Sub Code: 18CS744

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

CO	Description
C411.1	Define and Explain cryptography, its principles and algorithms.
C411.2	Illustrate Public and Private key cryptography
C411.3	Explain Key management, distribution and certification
C411.4	Explain authentication protocols
C411.5	Explain IP Security.

SUB: Artificial Intelligence and Machine Learning Laboratory

Sub Code: 18CSL76

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

CO	Description
C417.1	Implement and demonstrate AI and ML algorithms.
C417.2	Evaluate different algorithms.

SUB: Project Work Phase - I

Sub Code: 18CSP77

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

CO	Description
C418.1	Understanding of the state of things.(Literature Survey)
C418.2	Serious needs/problems of the people where it demands solution.(Problem Identification)
C418.3	Discover answers to problems through the application of scientific procedures. (Methodology)
C418.4	Written and overall communication.
C418.5	Understand the planning of Project.



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### VIII SEMESTER

SUB: Internet of Things

Sub Code: 18CS81

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

CO	Description
C419.1	Assess the genesis and impact of IoT applications, architectures in real world.
C419.2	Illustrate diverse methods of deploying smart objects and connect them to network.
C419.3	Compare different Application protocols for IoT.
C419.4	Infer the role of Data Analytics and Security in IoT.
C419.5	Appraise and Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry.

SUB: Storage Area Networks

Sub Code: 18CS822

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

CO	Description
C421.1	Summarize key challenges in managing information and analyze different storage networking technologies and virtualization.
C421.2	Explain components and the implementation of NAS.
C421.3	Outline the CAS architecture and types of archives and forms of virtualization.
C421.4	Understand the cloud computing technology in SAN.
C421.5	Illustrate the storage infrastructure and management activities.

SUB: Project Work Phase - 2

Sub Code: 18CSP83

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

CO	Description
C424.1	Determine, dissect, and estimate the parameters, required in the solution.
C424.2	Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics.
C424.3	Compile the report and take part in presentation.





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C424.4	Formulate and Analyze the problem and determine the scope of the solution chosen
C424.5	Identify a issue and derive problem related to society, environment, economics, energy and technology

SUB: Technical Seminar

Sub Code: 18CSS84

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

CO	Description
C425.1	Choose the modern topic, carryout the comprehensive survey & understand the relevance.
C425.2	Analyze and interpret the impact of the topic on the society/Environment/ domain.
C425.3	Build the report with Technical content and communicating it to the audience, following the moral and ethics.
C425.4	Select appropriate Communication and Visual aids for effective presentation

SUB: Internship

Sub Code: 18CSI85

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

CO	Description
C426.1	Adapt easily to the industry environment.
C426.2	Take part in team work.
C426.3	Make use of modern tools.
C426.4	Decide upon project planning and financing.
C426.5	Adapt ethical values.
C426.6	Motivate for lifelong learning.