Department of Internet of Things

Course Outcomes

R20

Class: I Year I Semester

Course Name with code	Course Outcome	
Mathematics -I (C111)	CO1	Utilize mean value theorems to real life problems
	CO2	To be able to form differential equation from some physical problems and to solve various first order differential equations.
	CO3	Solve the differential equations related to various engineering fields
	CO4	Familiarize with functions of several variables which is useful in optimization
	CO5	Apply double integration techniques in evaluating areas bounded by region
	CO6	Students will also learn important tools of calculus in higher dimensions.Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
Applied Physics(C1112)	CO1	Understand the concepts of interference, diffraction and polarization: connect it to a few engineering applications
	CO2	Explain concepts of lasers and Optical fibers
	CO3	Explain the fundamental concepts of Quantum behavior of matter and electron theory.
	CO4	Describe basics of dielectrics and magnetism
	CO5	Comprehend the use of concepts of semiconductor physics. Explore a few of their technological applications
	CO6	Illustrate basics of Superconductivity and its applications.
Communicative English(C1113)	CO1	Identifying the life of people, culture and tradition interpreting the information, speaking English to elicit information, identifying the vocabulary and Nouns
	CO2	Understanding the responsibility and values, conversing for expressing greetings and leave takings, usage of articles, prepositions
	CO3	Remembering life and contributions of Stephen Hawking discuss about specific topics practice letter writing, CVs, E-mail etiquette, application of verb forms
	CO4	Understanding the life of Wangari Maathai, Role plays, use of adjectives and adverbs, vocabulary
	CO5	Understanding way of life and values, technical writing and presentation, Vocabulary, common errors
	CO6	Understanding soft skills, recognize Scientific and Technical English

Computer Engineering Workshop ((C114)	CO1	Understand past culture, tradition, speaking English in real life situations
	CO2	Infer and interpret the admonitions of a father to his daughter answering a series of questions, greetings and leave takings
	CO3	Apply mechanics of writing in writing letters on various contexts,cover letters, CVs, E-mail etiquette, academic proposals, research articles and biographies.
	CO4	Understanding societal problems and finding the suitable solution with reference to Wangari Maathai
	CO5	Compare and contrast racial discrimination, better listening for better speaking and using right vocabulary
	CO6	Understand the importance of soft skills, effective communication skills, usage of functional grammar in communication.
Programming for Problem Solving using C (C115)	CO1	To discuss machine language with the help of numbering system and recognize different variables different statements and different storages to write a program
	CO2	To predict for which problem we have to use which type of decision statements and which type of loop
	CO3	To classify the data by storing data in different formats like arrays structures and unions
	CO4	To analyze diff application of pointers to access values of memory locations through address and variable
	CO5	To subdivide the problem into functions and retrieving file information using file operations
	CO6	To operate data in file information using file operations
English Communication Skills Laboratory (C116)	CO1	Identify 44 sounds of language and develop correct pronunciation
	CO2	Demonstrate language functions: LSRW Skills
	CO3	Develop and practice correct accent, intonation, and rhythm to get acquaintance with language.
	CO4	Develop speaking skills through participation in activities and vocabulary
Applied Physics Lab (C117)	CO1	Explain volumetric analysis with different indicators
	CO2	Calculate the Hardness of water by EDTA
	CO3	Calculate the Alkalinity of water sample by HCl solution
	CO4	Analyse the quantity of ions in organic solutions
Programming for Problem Solving using C Lab(C118)	CO1	Knowledge on various concepts of C language
	CO2	Design and development of C program using loops
	CO3	Design and development of C problem solving skills using arrays
	CO4	Design and develop programs on functions

Class: I Year II Semester

Mathematics-II(C121)	CO1	Explain system of linear algebraic equations using Gauss Elimination method
	CO2	Use Cayley-Hamilton theorem to find the inverse and power of a matrix problems
	CO3	Solve the approximate roots of polynomial and transcendental equations by using Iterative methods
	CO4	Solve the system of linear equations using Gauss Jacobi and Gauss- Seidal methods
	CO5	Apply Newton's forward and backward interpolation forequal intervals and Lagrange's formula for unequal intervals
	CO6	Apply Numerical Integral techniques to different Engineering problems
Applied Chemistry (C122)	CO1	Explain about fabrication of plastic and recycling of e waste.
	CO2	Explain types of batteries and control methods of corrosion.
	CO3	Determine the preparation of Non elemental semiconducting materials
	CO4	Determine the synthesis of nano materials and its applications.
	CO5	Analyse spectroscopic instrumentations and compare sources of energy
	CO6	Discuss molecular machines and molecular motors
Problem solving using Python(C123)	CO1	Develop essential programming skills in computer programming concepts like data types, containers
	CO2	Apply the basics of programming in the Python language
	CO3	Solve coding tasks related conditional execution, loops
	CO4	Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming
	CO5	Design the functionalities of Lists and dictionaries
	CO6	Analyze different File Operations
Basic Electrical& Electronics Engineering (C124)	CO1	Understandthe basic DC and AC networks used in electrical circuits
	CO2	Study the basic concepts of electrical engineering
	CO3	Demonstrate the concepts of electrical wiring and safety.
	CO4	To understand the principle of operation and construction details of DC machines & Transformers
	CO5	To understand the principle of operation and construction details of alternator and 3-Phase Inductionmotor.

Digital Logic Design (C125)	CO1	Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
	CO2	Understand the different switching algebra theorems and apply them for logic functions
	CO3	Define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
	CO4	Design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.
	CO5	Design various sequential circuits starting from flip-flop to registers and counters.
	CO6	Understand Synchronous sequential Logic: Latches and Flip-Flops
Problem Solving Using Python Lab (C126)	CO1	Develop key programming abilities in data types, containers, and other computer programming topics.
	CO2	Utilize the fundamentals of programming with the Python programming language
	CO3	Solve code problems involving conditional execution and loops
	CO4	Find out how to do coding tasks that relate to the basic ideas and techniques used in object-oriented programming.
Applied Chemistry Lab (C127)	CO1	Explain volumetric analysis with different indicators
	CO2	Calculate the Hardness of water by EDTA
	CO3	Calculate the Alkalinity of water sample by HCl solution
	CO4	Analyse the quantity of ions in organic solutions
Digital Logic Design Lab (C128)	CO1	To learn about the basics of gates.
	CO2	To understand, analyse and design the basic digital circuits and any digital design in real time applications.
	CO3	Construct basic combinational circuits and verify their functionalities
	CO4	Apply the design procedures to design basic sequential circuits.
	CO5	An ability to measure and record the experimental data, analyse the results, and prepare a formal laboratory report
Constitution of India (C129)	CO1	Understand historical background of the constitution making and its importance for building a democratic India.
	CO2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary
	CO3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
	CO4	Analyze the decentralization of power between central, state and local self-government.
	CO5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy
	CO6	Learn about Union Government, State government and its administration

Class: II Year I Semester

Course Name with Code	Course Outcome	
Mathematics – III(C211)	CO1	Compute Line, Surface, Volume integrals using Green's, Stoke's and Divergence theorems.
	CO2	Use Laplace Transform methods to solve initial value problems for constant coefficient linear ordinary differential equations.
	CO3	Discuss the expansion of a given periodic function by Fourier series in the given interval.
	CO4	Solve engineering problems using Fourier Transforms and Inverse Fourier Transforms.
	CO5	Apply a range of techniques to solve first and second order linear partial differential equations.
	CO6	Model physical phenomena of Heat and Wave equations by using Partial differential equations.
Mathematical Foundations of Computer Science(C212)	CO1	Discuss the validity of logical argument.
	CO2	Use logical notations to formulate and reason about fundamental concept such as sets, relations and functions.
	CO3	Explain the conceptpermutation, combination, binomial and multiple coefficients.
	CO4	Apply various properties of integers including the primes and unique factorization.
	CO5	Solve and formulate generating function and recurrence functions
	CO6	Identify various graphs, types of graphs and properties of graphs
Data Structures(C213)	CO1	Discuss the computational efficiency of the principal algorithms for sorting & searching
	CO2	Summarize the properties and types of linked list
	CO3	Use arrays, stacks, queues, trees, and Graphs in writing programs.
	CO4	Demonstrate different methods for traversing trees.
	CO5	Implement algorithms on Graphs
	CO6	Implement applications on Graphs
Operating Systems((C214)	CO1	Discuss various generations of Operating System and functions of Operating System
	CO2	Discuss the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance
	CO3	Solve Inter Process Communication problems using Mathematical Equations by various methods
	CO4	Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques
	CO5	Outline File Systems in Operating System like UNIX/Linux and Windows
Java Programming(C215)	CO1	Describe data types, variables, operators,strings and simple programs
	CO2	Explain control statements and arrays
	CO3	Discuss classes, objects and methods
	CO4	Describe inheritance and interfaces
	CO5	Apply the concepts packages and Exception handling
	CO6	Solve problems using Multithreading and Java Database connectivity.

Java Programming Lab(C216)	CO1	Write Programs using operators and data types
	CO2	Write programs using control statements and arrays
	CO3	Design programs using classes, objects and methods
	CO4	Design programs using inheritance and interfaces
	CO5	Apply the concepts packages and Exception handling
	CO6	Design programs using Strings,Multithreading and Java Database connectivity.
OS and UNIX Programming Lab (C217)	CO1	Define unix utilities and perform basic control of the utilities
	CO2	compare unix file syatem and file access control
	CO3	Explain the operating system to develp software
	CO4	Extend the use of linux environment efficiently by the students
	CO5	Develop shell scripting by using bash
Data Structures Lab (C218)	CO1	Use various searching and sorting algorithms
	CO2	Use basic data structure linked list
	CO3	Design and development of Queues and Stacks
	CO4	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
Free and Open source Software(C219)	CO1	Execute the basic commands in linux operating system
	CO2	Design applications of shell programming in linux environment
	CO3	Explain about application deployment on cloud based LAMP stack/server with PHP
	CO4	Implement the installation of various software packages
	CO5	Design applications to share files to windows using samba
Essence of Indian Traditional Knowledge(C2110)	CO1	Outline the Indian traditional knowledge
	CO2	Analyze the traditional knowledge system
	CO3	Summarize the need of Indian traditional knowledge
	CO4	Choose the Recognition of forest rights, Biological diversity act and Geographical indications
	CO5	Explain the protection of Indian traditional knowledge
	CO6	Make use of traditional knowledge connects with agriculture, biotechnology and medicine system

Class: II Year II Semester

Course Name with Code	Course Outcome	
Computer Organization& Architecture(C221)	CO1	Develop a detailed understanding of computersystems
	CO2	Cite different number systems, binary addition and subtraction, standard, floating-point, and microoperations
	CO3	Develop a detailed understanding of architecture and functionality ofcentral processing unit
	CO4	Exemplify in a better way the I/O and memoryorganization
	CO5	Illustrate concepts of parallel processing, pipelining and inter processor communication
Probability and Statistics(C222)	CO1	Define complex variation and function also State and Prove Cauchy integral theorem and
	CO2	Explain line integral and also use expand taylor's and Laurent series expression
	CO3	Explain the concept of probability and probability distributions. Also calculate mean and variance of different probability distributions.
	CO4	Differentiate the concept of sampling and non sampling procedures
	CO5	Predict Confidence interval estimation and determination of sample size
	CO6	Setup hypothesis and parameters are verified through the sample
Formal Languages & Automata Theory(C223)	CO1	Define the mathematical principles behind theoretical Computer Science
	CO2	Differentiate and Give examples for the different types of Automata concepts
	CO3	Correlate the different types of Automata to real world applications using Context Free Grammars
	CO4	Apply Context Free Grammars Normal Forms conversion
	CO5	Choose and design appropriate automata for the different requirements outlined by theoretical Computer Science
	CO6	Identify the different Computational problems and their associated complexity
Database Management Systems(C224)	CO1	Illustrate the concept of Database Management System.
	CO2	Explain Entity Relationship Diagrams.
	CO3	Identify and apply the SQL, Relational Algebra and Relational Calculus queries.
	CO4	Construct a database with understanding on normal forms based on functional dependency.
	CO5	Explain the concept of Transaction Processing.
	CO6	Summarize the concepts related to Concurrency Control.

Managerial Economics and Financial Accountancy(C225)	CO1	Discuss the validity of logical argument.
	CO2	Use logical notations to formulate and reason about fundamental concept such as sets, relations and functions.
	CO3	Explain the conceptpermutation, combination, binomial and multiple coefficients.
	CO4	Apply various properties of integers including the primes and unique factorization.
	CO5	Solve and formulate generating function and recurrence functions
	CO6	Identify various graphs, types of graphs and properties of graphs
Computer Organization& Architecture Lab (C226)	CO1	Understand working of logic families and logic gates.
	CO2	Design and implement Combinational and Sequential logic circuits
	CO3	Solve elementary problems by assembly language programming
	CO4	Implement assembly language program for given task for 8086 microprocessor.
	CO5	Design and Realization of Logic gates,Flipflops annd Counters
R Programming Lab(C227)	CO1	Implement basic concepts of R programming, and its different module that includes conditional, looping, lists, Strings, Functions, Frames, Arrays, and File programming.
	CO2	Implement the concepts of R Script to extract the data from data frames and file operations.
	CO3	Implement the various statistical techniques using R.
	CO4	Extend the functionality of R by using add-on packages
	CO5	Use R Graphics and Tables to visualize results of various statistical operations on data
Database Management Systems Lab(C228)	CO1	Write the queries for create , drop and alter the table in database system to apply constraints.
	CO2	Write the quaries using operations in SQL
	CO3	Write the Quaries using in functions of SQL
	CO4	Write the Quaries using in transaction control language commands.
	CO5	Design the programs of basic PL/SQL program
	CO6	Design the programs using loops,conditional statements in PL/SQL program
Android Application Development(C229)	CO1	Develop Applications in android environment
	CO2	Develop an android application using GUI and Layouts
	CO3	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces
	CO4	Design an android application using Databases
	CO5	Develop URL related applications

Class: III Year I Semester

Course Name with Code	Course Outcome	
Design and Analysis of Algorithms(C311)	CO1	Demonstrate asymptotic notation used for denoting performance of algorithms
	CO2	Analyse the performance of a given algorithm and denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms
	CO3	List and describe various algorithmic approaches
	CO4	Solve problems using divide and conquer, greedy, dynamic programming, backtracking and branch and bound algorithmic approaches
	CO5	Apply graph search algorithms to real world problems
	CO6	Demonstrate an understanding of NP- Completeness theory and lower bound theory
IoT Architecture and its Protocols(C312)	CO1	Understand about IoT overview including requirements.
	CO2	Learn IoT related protocols and specifications.
	CO3	Develop a project of IoT mock-up application of their own.
	CO4	To Analyze IoT Sensors and Devices Sensing the Real-world using Analog and Digital Sensors,
	CO5	Examine the Advance topics in IoTSecurity and Privacy Requirements, Threat Analysis,
Computer Networks(C313)	CO1	Explain basic concepts, OSI reference model, services and role of each layer of OSI model and TCP/IP, networks devices and transmission media, Analog and digital data transmission
	CO2	Apply channel allocation, framing, error and flow control techniques.
	CO3	Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism
	CO4	Explain the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism
	CO5	Explain the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN.

Compiler Design(C314)	CO1	Demonstrate phases in the design of compiler
	CO2	Organize Syntax Analysis, Top Down and LL(1) grammars
	CO3	Determine Bottom Up Parsing and Construction of LR parsers
	CO4	Analyze synthesized, inherited attributes and syntax directed translation schemes
	CO5	Determine algorithms to generate code for a target machine
	CO6	Organize Run time Environments
Network Programming lab (C315)	CO1	Apply the basics of Physical layer in real time application
	CO2	Apply data link layer concepts, design issues, and protocols
	CO3	Apply Network layer routing protocols and IP addressing
	CO4	Implement the functions of Application layer and Presentation layer paradigms and Protocols
	CO5	Simplify the Implementing Routing Protocols using border gate way protocol(BGP)
Internet of Things Lab(C316)	CO1	Analyze to introduce the concept of M2M (machine to machine) with necessary protocols and get awareness in implementation of distance sensor
	CO2	Develop program using Python Scripting Language which is used in many IoT devices
	CO3	Utilize Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace and debug Python code on the device
	CO4	Use Arduino
	CO5	Adapt Node MCU
Web Application Development Using Full Stack – Frontend Development – Module -I(C317)	CO1	To Understand the Concept Of HTML and CSS
	CO2	Analyze a webpage and identify its elements and attributes
	CO3	Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet
	CO4	To Develop MVC and responsive design to scale well across PC, tablet and Mobile Phone
	CO5	Create web pages using HTML and Cascading Style Sheets

Class: III Year II Semester

Course Name with Code	Course Outcome	
Embedded System Design(C321)	CO1	Describe the functional components within an embedded system and the procedures involved in its software development.
	CO2	Explain the conceptual foundation in creating and refining advanced embedded systems.
	CO3	Demonstrate the significance of ensuring safety and dependability in modern design of embedded systems.
	CO4	Outline the methods for optimizing performance in Embedded system design
	CO5	Evaluate the understanding of Embedded systems in the realm of Distributed Embedded Systems.
Machine Learning(C322)	CO1	Identify machine learning techniques suitable for a given problem
	CO2	Solve the problems using various machine learning techniques
	CO3	Apply Dimensionality reduction techniques
	CO4	Design application using machine learning techniques
	CO5	
	CO6	
Sensors and Actuator Devices for IoT(C323)	CO1	Able to execute different Linux commands on Raspberry Pi.
	CO2	Write and execute Python programs on Raspberry Pi.
	CO3	Identify LEDs and program them on Raspberry Pi.
	CO4	Use various sensors like temperature, humidity, smoke, light, etc. and be able to control web camera, network, and relays connected to the Raspberry Pi.
	CO5	Implement an intruder system that sends an alerts
Social Network and Semantic Web(C324)	CO1	Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved.
	CO2	Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules
	CO3	Interpret Market forecast for IoT devices with a focus on sensors
	CO4	Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi
	CO5	To Identify IoT Physical Servers and Cloud Offerings

Embedded System Design Lab(C325)	CO1	Elaborate programs in ARM for a specific Application
	CO2	to Understand Interface memory, A/D and D/A convertors with ARM system
	CO3	Analyze the performance of interrupt
	CO4	Demonstrate program for interfacing keyboard, display, motor and sensor
	CO5	Formulate a mini project using embedded system
Sensors and Actuator Devices for IoT Lab (C326)	CO1	To Execute different linux commands on Raspberry pi
	CO2	Write and execute python program on Raspberry pi
	CO3	Discuss interface LEDs and program them in Raspberry pi
	CO4	Design to control web camera connected to Raspberry pi by using various sensors
	CO5	Develop an application to invoke various sensors in Raspberry pi
Web Application Development Using Full Stack Frontend Development – Module -II (C327)	CO1	To Understand the concept of JavaScript and JS Syntax
	CO2	To Apply Java Script(internal and External),Js Syntax and Window Object
	CO3	Develop of the major Web application tier- Client side development
	CO4	Explain the active development of cross-browser applications through JavaScript
	CO5	Develop JavaScript applications that transition between states
Machine Learning Lab (C328)	CO1	Implement procedures for the machine learning algorithms
	CO2	Design and Develop Python programs for various Learning algorithms
	CO3	Apply appropriate data sets to the Machine Learning algorithms
	CO4	Develop Machine Learning algorithms to solve real world problems
	CO5	Analyse Data Analysis for Classification using Pandas or Matplotlib
	CO6	Implement an algorithm to demonstrate the significance of genetic algorithm