RVR & JCCOLLEGEOFENGINEERING (Autonomous),CHOWDAVARAM,GUNTUR-19
B.Tech.,ComputerScience&Engineering(IoT) **(R-20)**

Semester-III(SecondYear)

S.No	Course Code	Course Title	HoursPerWeek		SchemeofExamination			Category
			L	P	Internal Marks	SemEnd ExamMarks	Credits	
1	CO211	Digital Electronics	3	0	30	70	3	ES
2	CO/CS/CM/IT/CD212	DiscreteMathematics	3	0	30	70	3	ES
3	CO213	ComputerOrganization & Micro Processors	3	0	30	70	3	PC
4	CO214	Fundamentals of Internet of Things	3	0	30	70	3	PC
5	CO/CS/CM/IT/CD215	ObjectOrientedProgramming	3	0	30	70	3	PC
6	CO251	Technical Communication & Value Science Lab	0	3	30	70	1.5	ES
7	CO252	Fundamentals to Internet of Things Lab	0	3	30	70	1.5	PC
8	CO/CS/CM/IT/CD253	ObjectOrientedProgrammingLab	0	3	30	70	1.5	PC
9	COSL1	**Web Development** (SkillOrientedCourse–I)	1	2	100	-	2	SC
10	CO/CM/CS/IT/CD MC3	DesignThinking&ProductInnovation	2	0	100	-	-	MC
		TOTAL	**18**	**11**	**440**	**560**	**21.5**	

Category	CREDITS
BasicScienceCourse	3
ProfessionalCoreCourses	16.5
SkillOrientedBasicCourse	2
TOTALCREDITS	**21.5**

CO 211	**Digital Electronics**	**L**	**P**	**C**
		3	**0**	**3**

Course Objectives:

1. Know the concepts of different number systems, conversions and functionality of logic gates.
2. To analyze and design combinational logic circuits.
3. To analyze and design sequential logic circuits.
4. Understand programmable logic devices.

Course Outcomes:

On successful completion of the course, students will be able to

CO1. Demonstrate the knowledge in number systems, Boolean algebra, Combinational, sequential circuits, Programmable logic devices and Logic families.

CO2. Analyze and Design various combinational Circuits.

CO3. Analyze and Design various sequential Circuits.

CO4. Implement combinational circuit functionality with Programmable logic devices**.**

Course Content:

UNIT I **CO1, CO2, CO3, CO4** **12 Periods**

Digital systems: Digital Systems Binary Numbers, Number Base Conversions, Octal and Hexa decimal Numbers, complements, signed binary numbers.

Codes: BCD, excess-3, Gray

Boolean Algebra & Logic Gates: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Digital Logic gates.

Gate-Level Minimization: The Map Method, Four-Variable K-Map, Five-Variable K-Map, Product of sums simplification Don't Care Conditions, NAND and NOR implementation

UNIT II **CO1, CO2, CO3** **12 Periods**

Combinational Logic: Combinational Circuits, Analysis Procedure, Design procedure, Half adder, Full adder, Half subtractor, Full subtractor, Carry lookahead adder, Magnitude comparator, Encoders, Decoders, Multiplexers, Demultiplexers**.**

UNIT III **CO1, CO2, CO3** **12 Periods**

Synchronous and sequential Logic: Sequential circuits, Latches, Flip-Fops, Analysis of clocked Sequential circuits, State Reduction and Assignment, Design Procedure.

UNIT IV **CO1, CO4** **12 Periods**

Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters. Programmable Logic Devices: Programmable Read-Only Memory, Programmable Logic Array, Programmable Array Logic.

Learning Resources:

Text Book:

1. M. Morris Mano, Digital Design, 3rdEdition, Pearson Education, 2009

Reference Books:

1. Z. Kohavi-Switching and FiniteAutomataTheory,2nd Edition Tata McGraw-Hill.
2. R.P.Jain-Modern digital electronics,4thEdition, McGraw-Hill.

WEB RESOURCES:

http://nptel.ac.in/courses/117105080/3
http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-111-introductory

CSE(IOT)

CO/CS/CM/IT/CD 212	Discrete Mathematics	L	P	C
		3	0	3

Course Objectives:

At the end of the course, the student will

1. Introduce the concepts of mathematical logic.
2. Understand the combinatorial problems using counting principles,
3. Create generating functions and solve recurrence relations.
4. Use Directed & Un-Directed Graphs concepts and its applications.

Course Outcomes:

At the end of the course, the student will be able to

CO1. Apply formal methods of proof and propositional & First order logic to validate the Propositional statements.

CO2. Apply techniques for counting the occurrences of discrete events including

CO3. permutations, combinations with or without repetitions.

CO4. Solve generating function and recurrence relations.

CO5. Solve the real-world problems using directed and undirected graphs.

Course Content:

UNIT – I **CO1** **13 Periods**

Foundations: Sets, Relations and Functions, Fundamentals of Logic, Logical Inferences Methods of Proof of an implication, First order Logic & Other methods of proof, Rules of Inference for Quantified propositions, Mathematical Induction.

UNIT – II **CO2 , CO3** **10 Periods**

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of combinations and permutations ,enumerating of Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Combinations and Permutations with Constrained Repetitions.

UNIT – III **CO4** **13 Periods**

Recurrence Relations: Generating functions of sequences, Calculating Coefficients of generating Functions, solving recurrence relations by Substitution and generating functions. The methods of characteristic roots, solutions of inhomogeneous recurrence relations.

UNIT – IV **CO5** **14 Periods**

Relations & Digraphs: Properties & Equivalence relations, Operations on relation, Directed Graphs and Adjacency Matrices, Ordering relations, Lattices and Enumerations.

Graphs: Isomorphism's and Sub graphs, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four Color Problem.

Learning Resources:

Text Book:

1. Joe L. Mott, Abraham Kandel & Theodore P.Baker, Discrete Mathematics for Computer Scientists & Mathematicians, PHI 2nd edition.

Reference Books:

1. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach,3rd Edition by, Tata McGraw – Hill.
2. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition– Ralph. P. Grimaldi. Pearson Education
3. Discrete Mathematical Structures with applications to computer science Trembly J.P. & Manohar. P, TMH
4. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition. TMH.

CSE(IOT)

CO 213	Computer Organization and Micro Processors	L	P	C
		3	0	3

Course Objectives:

1. To describe the functional blocks of a computer to interpret the instructions and various addressing modes and also perform Arithmetic micro operations
2. To analyze the cost performance and design trade-offs in designing and constructing a computer processor and memory
3. To discuss the different ways of communicating with I/O devices & interfaces and the design techniques to enhance the performance using pipelining, parallelism
4. To understand the basic microprocessor architecture, functionality and programming skills

Course Outcomes:

After completion of the course, the student should be able to
CO1. Interpret the functional architecture of computing systems
CO2. Explore memory, control and I/O functions
CO3. Analyze instruction level parallelism and concepts of advanced pipeline techniques
CO4. Impart the knowledge on microprogramming and also overview of microprocessor

Course Content:

UNIT – I **CO1** **13 Periods**

Functional Blocks of a Computer: CPU, memory, input-output subsystem, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set, Fixed and floating point representation of signed numbers.
Computer Arithmetic: Addition and subtraction, multiplication algorithms, Division algorithms, floating-point arithmetic operations.

UNIT – II **CO2** **10 Periods**

Micro programmed Control: Control memory, address sequencing, micro program example, and design of control unit, hardwired control, and micro programmed control.
The Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory

UNIT – III **CO3** **13 Periods**

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction pipeline, RISC pipeline Vector Processing, Array Processors
Peripheral Devices and their Characteristics: Input-output subsystems, I/O device interface, I/O transfers, -program controlled, Interrupt driven and DMA, privileged and non –privileged instructions, software interrupts and exceptions.

UNIT – IV **CO4** **14 Periods**

Architecture of 8086 Microprocessor: Microprocessors vs. microcontrollers, 8086 internal Architecture, Pin diagram and description, Basic 8086 Configurations-Minimum mode and maximum mode.

Programming of 8086 Microprocessor: String instructions, logical and arithmetic instructions, control transfer instructions, process control instructions, assembler directives, procedures and macros, simple assembly language program.

Learning Resources:

Text Book:

1. Computer System Architecture, by M. Morris Mano. 3rd Edition, Pearson Education, 2007
2. Microprocessors and Interfacing programming and hardware, 3rd Edition, Douglas V.Hall, 2nd Edition, TMH, 1999 (UNIT IV)

Reference Books:

1. Computer Organization and Design: "The Hardware/Software Interfaces", David A. Patterson and John L. Hennessy, 5th Edition, Elsevier
2. Computer Architecture and Organization, 3rd Edition by John P. Hayes, WCB/McGraw-Hill
3. Computer Organization and Embedded Systems, Carl Hamacher, 6th Edition McGraw Hill Higher Education
4. Computer Organization and Architecture: Designing for Performance, 10th Edition by William Stallings, Pearson Education
5. Advanced microprocessor and peripherals, K Bhurchandi and A. K. Ray, 3rd Edition, McGraw Hill, 2013

CSE(IOT)

(R-20)

Fundamentals of Internet of Things **L P C**

CO 214

3 0 3

Course Learning Objectives:

This course will develop students' knowledge in/on…

- fundamentals of IoT, sensors, actuators and IoT boards
- basic elements of arduino, i/o functions, interrupts, working with LED and buttons
- analog and digital communication with arduino, UART, I2C and SPI communication protocol
- integration of sensors and actuators with arduino

Course Learning Outcomes:

On completion of this course, students will be able to…

CO1: identify the basics of IoT, sensors, actuators and IoT boards in real time environment

CO2: make use of syntax of control statements, operators, i/o functions for problem solving

CO3: compare analog and digital communications with arduino

CO4: design a real time application using sensors, actuators and arduino board

UNIT-I **CO1** **[11 Periods]**

Introduction: Introduction to IoT, Evolution of IoT - IoT versus M2M, IoT versus CPS, IoT versus WoT; Enabled technologies, Networking components, Challenges and applications

Sensors: Definition, Characteristics, Deviations, Types-Scalar, Multimedia, Hybrid and virtual; Considerations

Actuators: Definition, Types-Hydraulic, Pneumatic, Electric, Thermal or Magnetic, Mechanical, Soft and shape memory polymers; Characteristics

Classification of IoT boards: Microcontroller boards, Single board controller, System on Chipboard

UNIT-II **CO2** **[10 Periods]**

Programming with Arduino: Introduction to arduino, Features, Components, Arduino IDE, Program elements-Structure, Variables and constants, Data types, Operators, Control statements, Loops, Functions, Arrays, String objects; Time, I/O function, Display, Random numbers, GPIO, Controlling LEDs-Blinking led without delay, Connecting an external led, RGB LED, The 7-segment display; Working with buttons-Connecting a button, Button with no resistor, The toggle switch, Button to serial, Button multiplexing; Interrupts

UNIT-III **CO3** **[10 Periods]**

Analog and Digital Communication with Arduino: Introduction-Serial communication, Parallel communication, Interfacing LCD character display

UART Communication: UART protocol, Serial communication, Interfacing ESP8266 module

I2C Communication: I2C protocol, ADXL345 module, Interfacing BMP180 module

SPI Communication: SPI protocol, SD card interfacing, Ethernet module interfacing

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UNIT-IV **CO3** **[10 Periods]**

Integration of Sensors with Arduino: Interfacing with potentiometer, Temperature sensor, Detecting motion using PIR sensor, Measuring distance using infrared and ultrasonic sensor, Object position using accelerometer and localization using Global Positioning System (GPS)

Integration of Actuators with Arduino: Controlling motors with transistors, Controlling speed with Pulse Width Modulation(PWM), Spinning motors both ways, Servo motor, Stepper motor, Bipolar stepper motors, Brushless motors

Case Study: Smart campus water management system

Text Books:

[1] Sudeep Mishra, Anandarup mukherjee and Arijit Roy, Introduction to IoT, New Delhi: University Cambridge Press, 2021. (Chapter 4)

[2] Cornel Amariei, Arduino Development Cook Book, Birmingham: Packt Publishing Ltd., 2015. (Chapter 2-6)

Reference Text Books:

[1] Arshdeep Bahga and Vijay Madisetti, Internet of Things: A Hands-On Approach, Hyderabad: University Press, 2015.

[2] Marco Schwartz, Internet of Things with ESP8266, Birmingham: Packt Publishing Ltd., 2016.

[3] Rajesh Singh, Anita Gehlot, Lovi Raj Gupta, Bhupendra Singh, Mahendra Swain, Internet of things With Raspberry Pi and Arduino, Boca Raton: CRC Press, Taylor & Francis Group,2020.

[4] Brian Evans, Beginning Arduino Programming, New York: Apress, 2011.

CSE(IOT)

CO /CS/CM/IT/CD 215	Object Oriented Programming	L	P	C
		3	0	3

Course Objectives:

The learning objectives of this course are:

1. To make the students understand Java fundamental concepts
2. To elucidate the fundamentals of object-oriented programming in Java
3. To create awareness on exception handling and multithreading
4. To familiarize students with the concepts of Event Handling, Generics and Collections

Course Outcomes:

By the end of the course, the students will be able to

CO1. Comprehend the concepts of OOP and fundamentals of Java Programming.
CO2. Develop reusable and efficient programs using Inheritance & Polymorphism.
CO3. Demonstrate the importance of packages and interfaces.
CO4. Use the concept of exception handling to create error free codes and avoid abnormal program terminations.
CO5. Design multi-tasking applications using Multithreading.
CO6. Develop Event Driven applications and generic programs

Course Content:

UNIT – I **CO1** **11 Periods**

Introduction: The history and evolution of Java, Java Buzz words, object-oriented programming, Data Types, Variables and Arrays, Operators, Control Statements.

Classes and Objects: Concepts, methods, constructors, types of constructors, constructor overloading, usage of static, access control, this keyword, garbage collection, finalize()method, overloading, parameter passing mechanisms, final keyword, nested classes and inner classes.

Utility Classes: Date, Calendar, Scanner, Random

UNIT – II **CO2, CO3** **15 Periods**

Inheritance: Basic concepts, access specifiers, usage of super key word, method overriding, using final with Inheritance, abstract classes, dynamic method dispatch, Object class.

Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface and extending interfaces.

Packages: Creating a Package, setting CLASSPATH, Access control protection, importing packages.

Strings: Exploring the String class, String buffer class, Command-line arguments

UNIT – III **CO4, CO5** **12 Periods**

Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, multiple catch clauses, nested try, Built-in exceptions, creating own exception sub classes.

Multithreading: The Java Thread model, thread life cycle, Thread class, Runnable interface, creating multiple threads, Synchronization, Inter Thread Communication, Deadlock.

Applets: Concepts of Applets, life cycle of an applet, creating applets

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events.

UNIT – IV **CO6** **12 Periods**

AWT: AWT Components, , File Dialog boxes, Layout Managers, Event handling model of AWT, Adapter classes, Menu, Menu bar.

GUI with Swing– Swings introduction, JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons. Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables

Generics: Basics of Generic Methods, Generic Classes

Collections: Collection Interfaces, Collection Classes**,** Accessing a Collection via an Iterator

Learning Resources:

Text Book:

1. Java the Complete Reference - Herbert Schildt 11th Edition, Mc Graw Hill Education.

Reference Books:

1. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson
2. JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
3. Cay.S. Horstmann and Gary Cornell, Core Java 2, Vol 1, Fundamentals 7th Edition, Pearson Education.
4. H.M.Dietel and P.J.Dietel, Java How to Program, Sixth Edition, Pearson Education/PHI.
5. Barbara Liskov, Program Development in Java, Addison-Wesley, 2001.
6. Cay Horstmann, John Wiley and Sons, Big Java 2nd Edition, Pearson Education.

CSE(IOT)

CO 251	Technical Communication & Value Science Lab	L	P	C
		0	3	1.5

Course Objectives:

The course aims at making learners:

1. Understand human values and their importance in leading a holistic life
2. Inspect own strengths and opportunities
3. Learn key concepts of technical communication
4. Develop communicative writing and speaking skills

Course Outcomes:

By the end of the course, learners will be able to:

CO1. Imbibe life skills and values in day-to-day Life

CO2. Create a better version of self

CO3. Demonstrate the basic tenets of technical communication

CO4. Apply technical communication practices in real life

List of experiments/demonstrations:

UNIT I: Understanding Human Values CO1

Values to be learnt - leadership, teamwork, dealing with ambiguity, managing stress, motivating people, creativity, result orientation Life Skills-Community service, taking up social initiatives, branding a cause Activity - Narrating a story on values, taking part in an outreach activity, immersion interviews

UNIT II: Knowing Self CO2

Introducing self: Activity on self-introduction, introducing others, SWOT analysis Self-awareness: Identity, body awareness, stress management

Expressing self: Knowing self, visualizing and experiencing purpose Activity: creating vision board, an avataar with describing word

UNIT-III: Overview of Technical Communication CO3

Reflective Listening: Importance and practice

Vocabulary Enrichment: Academic word list (AWL), technical jargon and transitions Communicative Writing: e mails, formal letters and micro blogs

Activity: Drafting micro blogs, emails and letters

UNIT-IV: Communicative Speaking CO4

Communication Prerequisites: Content, tone and body language Celebrity Interviews: Art of questioning and eliciting information Picture Description: Procedure and perception

CSE(IOT)

Group Discussions: Table topics and practice

Activity: Micro teams peer assessment with metric chart

Reference Books:

1. **English vocabulary in use**– Alan Mc'carthy and O'dell
2. **APAART**: SpeakWell1(English language and communication)
3. **Abundance:** The Future is Better Than You Think; Peter H. Diamandis and Steven Kotler; Published: 21Feb,2012; Publisher: Free Press
4. **The Family and the Nation**; Dr. A.P.J Abdul Kalam; Publishing year: 2015; Co-author: Acharya Mahapragya
5. **Business Communication** – Dr. Saroj Hire math

Web References:

6. Train your mind to perform under pressure-Simon sinek https: //curiosity.com /videos/ simon-sinek-on-training-your-mind-to-perform-underpressure-capture-your-flag/
7. Will Smith's Top Ten rules for success https: // www.youtube.com / watch? v=bBsT9omTeh0
8. Examples of Technical Writing for Students: https://freelance-writing.lovetoknow.com/kinds-technical-writing
9. 11 Skills of a Good Technical Writer: https://clickhelp.com/clickhelp-technical-writing-blog/11-skills-of-a-good-technical-writer/

CSE(IOT)

CO 252	Fundamentals of Internet of Things Lab	L	P	C
		0	3	1.5

Course Learning Objectives:

This course will develop students' knowledge in/on…

- fundamentals of IoT board, system & user defined functions and arrays
- basic elements of arduino, i/o functions and interrupts working with LED and buttons
- analog & digital communication with arduino and UART, I2C& SPI communication protocol
- integration of sensors and actuators with arduino

Course Learning Outcomes:

On completion of this course, students will be able to

CO1: develop arduino programming for problem solving

CO2: develop arduino programming with LED, button and Switch

CO3: interpret analog and digital communications with arduino

CO4: develop arduino programming for connecting sensors and actuators to control the applications

List of Experiments

Experiment-1

1. Introduction of Arduino IDE
2. Write an arduino program to demonstrate setup () and loop () functions
3. Write an arduino program to demonstrate serial and serial.begin() statements
4. Write an arduino program to demonstrate serial.print() statement
5. Write an arduino program to demonstrate serial.available() statement
6. Write an arduino program to demonstrate serial.read() and serial.write() statements
7. Write an arduino program to demonstrate serial.analogRead() function
8. Write an arduino program to demonstrate user defined functions

Experiment-II

9. Write an arduino program to demonstrate data types.
10. Write an arduino program to demonstrate variables
11. Write an arduino program to demonstrate constants
12. Write an arduino program to demonstrate operators

Experiment-III

13. Write an arduino program to demonstrate if statements
14. Write an arduino program to demonstrate switch case
15. Write an arduino program to demonstrate loops

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16. Write an arduino program to demonstrate arrays

Experiment-IV

17. Write an arduino program to demonstrate strings
18. Write an arduino program to demonstrate string object
19. Write an arduino program to demonstrate time based functions
20. Write an arduino program to demonstrate random numbers generation

Experiment-V

21. Write an arduino program to demonstrate digital I/O functions
22. Write an arduino program to demonstrate analog I/O functions

Experiment-VI

23. Write an arduino program to demonstrate light an LED
24. Write an arduino program to demonstrate the 7-segment display.
25. Write an arduino program to demonstrate button
26. Write an arduino program to demonstrate switch

Experiment-VII

27. Write an arduino program to demonstrate interrupts
28. Write an arduino program to demonstrate UART communication protocol

Experiment-VIII

29. Write an arduino program to demonstrate I2C communication protocol

Experiment-IX

30. Write an arduino program to demonstrate SPI communication protocol

Experiment-X

31. Write an arduino program for interfacing with potentiometer.
32. Write an arduino program for interfacing with temperature sensor
33. Write an arduino program for interfacing with PIR sensor

Experiment-XI

34. Write an arduino program for interfacing with infrared and ultrasonic sensor
35. Write an arduino program for interfacing with accelerometer
36. Write an arduino program for interfacing with PWM

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Experiment-XII

37. Write an arduino program for interfacing with servo motor
38. Write an arduino program for interfacing with stepper motor
39. Write an arduino program for interfacing with DC motor

Laboratory Manual:

[1] Fundamentals of Internet of Things Laboratory Manual, Dept. of CSE(IoT), KITSW

Reference Books:

[1] Brian Evans, Beginning Arduino Programming, New York: Apress, 2011.
[2] Cornel Amariei, Arduino Development Cook Book, Birmingham: Packt Publishing Ltd., 2015.

CSE(IOT)

CO /CM/CS/IT/CD 253 **Object Oriented Programming Lab** **L P C**
0 3 1.5

Course Objectives:

1. To introduce java compiler, interpreter.
2. To make the students learn an object oriented way of solving problems using java.
3. To make the students write programs using multithreading concepts and exception handling.
4. To make the students understand the usage of Event handling, generics, collections

Course Outcomes:

By the end of this course the students will be able to

CO1. Write simple java programs using java fundamentals and basic OOP concepts.

CO2. Design programs using inheritance and polymorphism.

CO3. Demonstrate inter process communication using multithreading.

CO4. Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).

CO5. Develop Event driven applications and Generic programs

List of Experiments:

The programming concepts to be implemented in the Lab are

Week 1:	Fundamentals of classes and objects
Week 2:	static keyword, this keyword, variable length arguments
Week 3:	inner classes, constructor overloading
Week 4:	Types of inheritances
Week 5:	Method overloading, Method Overriding, usage of final and super
Week 6:	Abstract classes, interfaces, Dynamic method dispatch.
Week 7:	String class and its methods
Week 8:	Packages
Week 9:	Exception Handling Techniques
Week 10:	Multithreading concepts
Week 11:	Applets and event handling
Week 12:	AWT components and delegation event model
Week 13:	MVC architecture in Swing
Week 14:	Generics and collections

	Skill Oriented Course-1	L	P	C
CO SL1	**Web Development**	**1**	**2**	**2**

Course Objectives:

1. To enable students to develop modern web application by leveraging latest technologies
2. To build strong foundation in students making them job ready as per industry requirements
3. To enable them to learn new technologies by applying foundation paradigms
4. To building strong expertise to develop end to end application - web frontend and backend development

Course Outcomes:

After completion of the course, the student should be able to

CO-1: Build static and dynamic web pages with HTML, XML, JSON

CO-2: Create Dynamic web pages using CSS and Java Script

CO-3: Understand the concepts, analyze and build interactive web applications

CO-4: Apply various frameworks of web technologies to optimize the applications

UNIT – I:

Introduction: Concept of website, its need and purpose, Types of websites: Static and dynamic website, Introduction to HTML, XML, JSON, Web Browsers, − Web Servers, Uniform Resource Locator, Tools and Web Programming Languages. Web Standards, Tiered Architecture: Client Server Model, Three Tier Model, Service Oriented Architectures, REST services.

UNIT – II:

Hypertext Mark Up Language: Languages used for website development, HTML5: basic tags, formatting tags, Adding images, Lists, Embedding multimedia in Web pages, Inserting tables, Internal and External Linking, Frames, Forms

UNIT – III:

Cascading Style Sheets (CSS3): Basics of Cascading Style sheets, Advantages of CSS, External Style sheet, Internal style sheet, Inline style sheet, CSS Syntax, color, background, Font, images.

Java Script: Features of JavaScript, extension of JavaScript, Syntax of JavaScript: data types, operators, variables, tag, Document Object Model (DOM) with JavaScript, Selection Statement using if and Switch, Iterative statement: for, for/in, while, do while, break and continue

UNIT – IV:

Front End Framework: Introduction to jQuery - Syntax, Selectors, Events, Traversing, AJAX; Introduction to Bootstrap – Basics, Grids, Themes; Angular JS – Expressions, Modules, Data Binding, Scopes, Directives & Events, Controllers, Filters, Services, Validation

Back End Technologies: Introduction to Restful services, Resources, Messages (Request, Response), Addressing, Methods – (GET, POST, PUT, DELETE)

Text Books:

1. Internet and World Wide Web: How to Program, Deitel P. J., Deitel H. M. and Deitel 5th Edition, Pearson Prentice Hall, 2012
2. HTML & CSS: Design and Build Websites, Jon Duckett, John Wiley & Sons

Reference Books:

1. Programming the World Wide Web, Sebesta R. W, 8th edition, Pearson, 2014
2. Web Engineering: a practitioner's approach, Pressman R. and Lowe D,1st Edition, McGrawHill,2008
3. Web Engineering: The Discipline of systematic Development of Web Applications, Kappel G., et al, 1st Edition, John Wiley & Sons, 2006
4. Web Engineering: Principles and Techniques, SuhW, Idea Group Inc, 2005
5. PHP for the Web: Visual Quick Start Guide, Ullman L, 5th Edition, Peachpit Press, 2016

CSE(IOT)

(R-20)

CO/CM/CS/IT/CD MC3	Design Thinking & Product Innovation	L	P	C
		2	0	-

Course Objectives:

1. Identify the design thinking principles and practices in today's industry.
2. Learn the Planning of research activities to gather and empathize from a user's viewpoint.
3. Study the Ideate techniques to help arrive at the best solution and evaluation.

Course Outcomes:

CO1. Interpret the concepts of Design thinking to real-world activities.
CO2. Investigate a problem to determine its root cause in terms of Design Thinking perspective.
CO3. Apply group thinking methods and experiment with different solutions to a given problem.
CO4. Develop innovative thinking and creative problem solving abilities.

Course Content:

UNIT I **CO1** **12 Periods**

Introduction to Design Thinking – Origin of Design Thinking, Features & Principles of Design Thinking, Applications of Design Thinking, Role of Research in Design Thinking.

UNIT II **CO2** **12 Periods**

Modules of Design Thinking – Inspiration – methods & tools used in Explore and Empathize phases of Design Thinking, Case study-activity.

UNIT III **CO3** **12 Periods**

Modules of Design Thinking – Ideation & Implementation – methods & tools used in Experiment, Engage and Evolve phases of Design Thinking, Case study-activity.

UNIT IV **CO4** **12 Periods**

Design Thinking applied in Business & Strategic Innovation – Ten Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization, Creative Culture, Strategy & Organization Design Thinking approaches.

CSE(IOT)

(R-20)

Learning Resources:

Text Book(S):

1. “Design Thinking for Entrepreneurs and Small Businesses” by Beverly Rudkin Ingle, Apress. [UNIT -1]
2. “Change by design”, Tim Brown, Harper Collins, 2009 [UNIT -1]
3. “Design Thinking- The Guide Book” – Facilitated by the Royal Civil Service Commission, Bhutan. [UNIT –II & III]
4. Idris Mootee, “Design Thinking for Strategic Innovation”, John Wiley & Sons (2013). [UNIT -IV]

Reference Book(S):

1. “Design Thinking Business Innovation”, Rio de Janeiro – 2012 1st edition, MJV press.
2. "Design Thinking- Understanding How Designers Think and Work" by Nigel Cross, Berg publishers.

Web Reference:

1. IDEO: Design Thinking for Educators toolkit https://designthinkingforeducators.com/.
2. https://dschool.stanford.edu/resources/a-virtual-crash-course-in-design-thinking
3. https://dschool-old.stanford.edu/groups/designresources/wiki/4dbb2/ (wallet Project)

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