



Integral University, Lucknow

Effective from Session: 2016-2017							
Course Code	CA210	Title of the Course	Software Engineering and Project Management	L	T	P	C
Year	II	Semester	IV	3	1	0	4
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> To develop knowledge of phases in software development To develop good quality software and able to maintain quality of software To know the team required for project management. To develop knowledge of tools available for software development. Knowledge of testing and maintain robustness of software 						

Course Outcomes	
CO1	To understand about designing model and practical implementation.
CO2	To take decision of project planning on the basis of cost evaluation.
CO3	To understand risk identification and management.
CO4	To use various tools for software design development.
CO5	To understand importance of quality of software.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Software Product and SDLC	Software Engineering Fundamentals, Definition of Software Products, Phases of Software Development Life Cycle, Software Development Paradigm, Software Life Cycles Models: Build and Fix Model, Waterfall Model, Prototype Model, Iterative Model, Evolutionary Model, Spiral Model, Software Requirements Analysis and Specification: SRS, Characteristics of SRS.	8	CO1
2	Software Design Principles	Software Design, Design Process, Design Principles: Abstraction, Refinement, Modularity, Information Hiding, Modular Design: Effective Modular Design and Functional Independence, Cohesion, Coupling, Top down and Bottom up Strategies, Coding: Coding Standard and Guidelines, Testing: Black Box Testing and White Box Testing.	8	CO2
3	Software Configuration Management	Concept of Configuration Management. Software Maintenance: Categories of Maintenance, Software Reliability: Reliability, Reliability Metrics, Quality Concept: Quality Control, Quality Assurance, Software Quality, Scheduling Tools, Time Estimation, Resource Allocation, Differentiate Projects, Programs and Business Process, Elements of Proposal Process.	8	CO3
4	CASE Tools	Relevance of CASE Tool: Building block for CASE Tools, Integrated Case Tool Environment, Generation of CASE Tool, High End and Low End CASE Tools. Project Management Fundamentals: Definition of Project, Project Specification and Parameters, Principles of Project Management, Project Management Life Cycle, Program Management Plan: Concept, Elements, Planning Issues, Benefits of Program Management.	8	CO4
5	Software Project Management, Project Activities	Engineering Task, Management Task, Work Break down Structure: Concept of WBS, Meaning of Product Oriented Deliverable, Features of WBS, Comparison of Functional based vs. product Oriented Deliverability, Resource and Cost Requirements, Software Project Plans, Software Project Estimation, Project Monitoring and Progress Control, Risk Management: Risk Management Plan, Risk Mitigation Strategies, Software Measurement, Project Metrics, Project Audit: Data Collection, Analysis.	8	CO5

Reference Books:	
1.	R. Pressman, "Software Engineering", TMH.
2.	Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa.
3.	Rajib Mall, "Fundamental of Software Engineering", PHI.
4.	Pankaj Jalote, "Software Project Management in Practice", Person Education.
e-Learning Source:	
1.	https://nptel.ac.in/courses/106105182
2.	https://onlinecourses.nptel.ac.in/noc19_cs70/preview

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1	2		1		1	1					3	1				
CO2	1	2	1	1		2		1					2	2				
CO3	3	2		1	1	1							3	1				
CO4		1	3		1	2	2	1					2	2				
CO5	2	1	1	1		2							2	1				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2023-2024							
Course Code	CA213	Title of the Course	Principles of Operating System	L	T	P	C
Year	II	Semester	IV	3	1	0	4
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> To understand various operating system types, Architecture design of OS and their services. To study process management concepts and various scheduling algorithm. To understand process synchronization concepts and dead lock handling mechanism. To learn various memory management schemes. To study various disk scheduling algorithms and Process Management in UNIX 						

Course Outcomes	
CO1	Know different OS types and basic component of OS Architecture.
CO2	Analyze issues in process management and evaluations of various scheduling algorithms.
CO3	Understand process synchronization problem and provide solution for critical section problem and deadlock management.
CO4	Analyze and implement various memory management techniques.
CO5	Understand various disk scheduling algorithms and Process Management in Unix.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction	Definition and types of Operating systems, Batch Systems, Multiprogramming, Time Sharing, Parallel, Distributed and Real-Time Systems, Operating System Structure, Operating System Components and Services, System Calls, System Programs, VirtualMachines.	8	CO1
2	Process Management	Process Concept, Process Scheduling, Cooperating Processes, Threads, Interprocess Communication, CPU Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling and Algorithm evaluation.	8	CO2
3	Process Synchronization And Deadlocks	The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors, Deadlocks-System Model, Characterization, Deadlock Prevention, Avoidance and Detection, Recovery from Deadlock, Combined approach to Deadlock Handling.	8	CO3
4	Memory Management	Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with Paging, Virtual Memory, Demand Paging and its performance, Page Replacement Algorithms, Allocation of Frames, Thrashing, Page Size and other considerations, Demand Segmentation.	8	CO4
5	Disk Scheduling and Process Management in UNIX	File concept, Access methods, Directory Structure, Disk scheduling, UNIX overview, Processes in UNIX, Process Fundamentals, Creating a New Process, Parent Child Process, Connecting Processes with Pipes, Background Process, Managing Multiple Processes, Process Related Commands, Changing Process Priority. Process Scheduling: Scheduling of Processes, Process Daemon, And Process Scheduling Commands.	8	CO5

Reference Books:	
1.	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne "Operating System Concepts", 9th Edition, Wiley 2018
2.	D M Dhamdhare, "Operating Systems: A Concept-Based Approach", 3rd edition, McGraw Hill Education, 2017
3.	Thomas Anderson and Michael Dahlin, "Operating Systems: Principles and Practice", 2014
4.	William Stallings, "Operating Systems: Internals and Design Principles", 7e (Old Edition), Pearson Education India, 2013
5.	Gary J Nutt, "Operating Systems: A Modern Perspective". 1997
e-Learning Source:	
1.	https://nptel.ac.in/courses/106106144
2.	https://nptel.ac.in/courses/106105214

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
	CO1	3	1			1	1							3	1			
CO2	1	3	1	2	1								2	3				
CO3	2	3		2	1	1		1					3	1				
CO4	1	2	2	1		2	1						2	3				
CO5		3	1	2	1	2		1					2	2				

1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation



Integral University, Lucknow

Effective from Session: 2016-2017							
Course Code	CA214	Title of the Course	Java Programming	L	T	P	C
Year	II	Semester	IV	3	1	0	4
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> To learn the various features of Java and comparing with C++. To learn the Java environment for writing programs and Java program structure. To learn the various Objects oriented features with Java. To learn the Array, String, Exception Handling concepts To learn the concepts of Thread, Package, Applet and implementing them in creating a web page. 						

Course Outcomes	
CO1	Able to understand the features of Java Programming Language with Syntax and structure of Java Programs and how to use various operators in Java.
CO2	Able to understand that how to implement the Object oriented features by writing Java programs.
CO3	Ability to define Arrays, Strings, Vectors, Packages etc. in Java and implementing the Exception handling Mechanism in Java.
CO4	Ability to understand the different concepts to create and use Threads and Packages in Java.
CO5	Ability to understand the different concepts of applets and adding them to a HTML File.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Java Basic	Comparison of C++ and JAVA, JAVA and Internet, JAVA support systems, JAVA environment, JAVA program structure, Tokens, Statements, JVM, Constant and Variables, Data Types, Declaration of variables, Scope of variables, Symbolic constants, Type Casting. Operators: Arithmetic, Relational, Logical assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions and its evaluation.	8	CO1
2	Inheritance	Defining a Class, Adding variables and Methods to classes, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods. Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract Methods and Classes, Visibility Control.	8	CO2
3	Arrays	One Dimensional and Two Dimensional, Strings, Vectors, Wrapper Classes. Interface: Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variable. Exception Handling: Concepts of Exceptions, Types of Exception, Try and Catch keyword, Nested Try and Catch.	8	CO3
4	Threads	Creating Threads, Extending Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization. Package: System Packages, Using System Package, Adding a Class to a Package, Hiding Classes	8	CO4
5	Applets	Local and Remote Applets, Writing Applets, Applets life cycle, Creating an executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing parameters to Applets, Aligning the display, HTML Tags and Applets, Getting input from the user.	8	CO5

Reference Books:	
1.	E. Balagurusamy, "Programming in Java", TMH Publications.
2.	Peter Norton, "Peter Norton Guide to Java Programming", Techmedia Publications.
3.	Naughton, Schildt, "The Complete Reference JAVA 2", TMH.
4.	Dustin R. Callway, "Inside Servlets", Addison Wesley.
e-Learning Source:	
1.	https://nptel.ac.in/courses/106105191
2.	https://onlinecourses.nptel.ac.in/noc22_cs47

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1		1	1								3	1				
CO2	2		1		1	2		2					3	1				
CO3	2	1	3	1		1	2	1					2	2				
CO4	1	1	2	1		3	1	2					3	1				
CO5	1	1	2	1		2	1						2	1				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2023-2024

Course Code	CA225	Title of the Course	Full Stack Web Development-I	L	T	P	C
Year	II	Semester	IV	3	1	0	4
Pre-Requisite	None	Co-requisite	CA228				
Course Objectives	<ul style="list-style-type: none"> To understand how Mern Stack makes things perform. To build applications mainly using the JavaScript language only. Enable students with a comprehensive understanding of the MERN Stack, encompassing MongoDB, Express.js, React, and Node.js. To learn how to design user-friendly interfaces with React, develop server-side applications with Node.js, and manage data using MongoDB. Students will learn about the most advanced web-app development environments with immense exposure on practicality 						

Course Outcomes

CO1	Able to understand HTML5 Basics and its applications in Full Stack web development
CO2	Designed to enable responsive development of mobile-first websites
CO3	Understand Features of ECMAScript 6 and in what way ES6 makes JavaScript coding easier and more maintainable.
CO4	Able to understand and use the AngularJS Framework
CO5	Able to understand and use the React Framework

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	HTML5	HTML syntax to structure websites, HTML boilerplate and HTML doctypes, HTML tags, HTML lists, Display images, create hyperlinks, multi-page websites, HTML best practices Introduction to HTML5, Semantic Elements, Form Elements, Form Input Types, Form Attributes, Media Elements, Canvas Element, video and audio elements, SVG, Drag and Drop, Geolocation, Web Storage, App Cache, Web Workers, SSE	8	CO1
2	Bootstrap	Introduction to Bootstrap, native CSS tools and external frameworks, installation of Bootstrap framework, Need of Bootstrap, History of Bootstrap, Advantages of Bootstrap Framework, Responsive Design, Major Features of Bootstrap, Bootstrap components: buttons, carousels, cards and navigation bars, Access and incorporate designer icons Bootstrap Grid - Advantages of Bootstrap Grid, 12 column layout system, Bootstrap Typography, Bootstrap Themes, Bootstrap Tables, Bootstrap Form Layout, Bootstrap CSS, Bootstrap Plugins	8	CO2
3	JavaScript ES6, Typescript, AJAX	JavaScript ES6: const keyword, let keyword, arrow functions, Template literal, Object and Array, destructure objects in JavaScript, Default Parameters, Classes, Rest parameter and spread operator, for/of Loop, JavaScript Maps and Sets, Promises, Symbol, String Methods, Array Methods, Object Entries, JavaScript Modules Typescript: Introduction, installation of TypeScript, variables, Identifiers and Keywords, Data types, Numbers, String, Interfaces, Class, Enums, Tuples, Union, aliases, assertions, function, modules, TypeScript Arrays Ajax Development: Create XMLHttpRequest, Request Object, Manage Ajax Requests	8	CO3
4	AngularJS	Introduction, Installation, project setup, Angular CLI, Components and modules, Data binding and Event binding, Dependency Injection, Templates and Directives, Pipes, Routing, Validators, RxJs, Parent child communication, Services, Asynchronous event handling, HTTP Service and HTTP Client, Forms, Angular animations and materials, AngularJS and REST Services.	8	CO4
5	ReactJS	Introduction, Installation, Environment Setup, project setup, Features, Angular vs ReactJS, JSX, Components, Functional component, Class component, Render Lists, Conditional render, State and Props, Component lifecycle, React Forms and Form Validation, Controlled components, overwhelm rest apis via axios, Events, Routing - React router, Redux, Deploy React App to the Web, Test React apps with JEST	8	CO5

Reference Books:

- Eddie Pickford, "Full Stack Development with MERN", Eddie Pickford
- Eddy Wilson Iriarte Koroliova, "MERN Quick Start Guide", Packt Publishing
- Nabendu Biswas, "Ultimate Full-Stack Web Development with MERN", AVA Technical Books

e-Learning Source:

- Institutional Learning Management System i.e Integral Learning Initiative (ILI)
- NPTEL Video Lectures

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1	1		1													
CO2	3	1	1	1		1												
CO3	2	2	3	1		2												
CO4	3	1	1		1	1												
CO5	3	1	1	1		1												

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2023-2024							
Course Code	CA226	Title of the Course	Data Communication and Computer Networks	L	T	P	C
Year	II	Semester	IV	3	1	0	4
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> Build an understanding of the fundamental concepts of Data communication. Familiarize the student with the basic taxonomy and terminology of signals. To learn about the Modulation and Data Encoding methods. To study about the Multiplexing Techniques and different switching technique. Get knowledge about the Network and its application. Study about the different Network Topologies. Introduce the student to OSI Model, preparing the student for entry Advanced courses in computer networking. To understand the concepts of TCP/IP protocol suite. Build an understanding of the various data link layer protocol and its applications. Understanding of the various the various internetworking devices. To study the IEEE 802 Project. 						

Course Outcomes	
CO1	Understand the basic data communication network System. Identify the different types of signals. Able to understand Microwave Transmission System. Distinguish between the concepts and principles behind various data transmission Techniques.
CO2	Able to understand about the Data Modulation and Data Encoding methods. Able to understand about the Multiplexing Techniques. Able to understand about the Switching techniques.
CO3	Understand the basic idea of network. Able to understand virtual circuit network. Familiar with the layers of the OSI model. Identify the different types of network topologies and protocols.
CO4	Understand about the TCP/IP protocol suite. Able to understand various types of Flow control technique. Distinguish between the concepts behind various protocols
CO5	Able to identify and correct use of various types of communication channels. Able to demonstrate knowledge and understanding of relevant data communications standards.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Data Communication	Introduction, Communication Systems, Types of Data: Analog and Digital, Types of Signals: Analog and Digital, Communication Channel and its Characteristics, Transmission Modes, Synchronous and Asynchronous Transmission, Bit Rate and Baud, Radio Transmission Systems: Medium Wave, Short Wave, Microwave Transmission System, Terrestrial and Satellite (VSAT), Infrared Transmission.	8	CO1
2	Data Modulation and Data Encoding	Concept of Modulation, Analog Data Analog Signal, Analog Data Digital Signal, Digital Data Analog Signal, Digital Data Digital Signal. Introduction to Multiplexing: Space Division Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing. Switching techniques: Circuit and Packet switching.	8	CO2
3	Networking	An Overview, Network Goals, Application of Networks. Network Structure Services: Datagram, Virtual Circuit and Permanent Virtual Circuit, Connectionless and Connection Oriented Communication. Network Topologies: Bus, Ring, Star Topologies. OSI Model: Introduction to ISO-OSI Reference Model and its Layers, Network Architectures, Protocol Hierarchy and Layering Concepts. OSI Terminology: Interface, Protocol, Service Primitives.	8	CO3
4	ITCP/IP Suite	Introduction to TCP/IP Protocol, Brief Overview of TELNET, FTP, TFTP, SMTP, NFS, SNMP, DNS. Data Link Layer Design Issues: Services Provided to Network Layer Training: Necessity and Techniques, Error Control Features and Review of Techniques. Flow control: Sliding Window Protocols, Go Back N, Selective Repeat, Examples of Data Link Protocols (BSC, HDLC).	8	CO4
5	Local Area Network (LAN)	IEEE Standard 802 for LAN, IEEE Standard 802.3: CSMA/CD LAN and Ethernet LAN, IEEE Standard 802.4: Token BUS LAN, IEEE Standard 802.5: Token Ring LAN, FDDI, Repeaters, Bridges, Router, Gateways, Switching and Hubs, LAN H/W, LAN Operating System, Transmission Media, Baseband vs Broadband, Implementation using Co-Axial, Twisted Pair, Fibre Optic Cables, Wireless Technology, Introduction to MAN and WAN.	8	CO-5

Reference Books:	
1.	B. Forouzan, "Data Communication and Networking", Tata McGraw Hill.
2.	W. Stallings, "Data and Communication", Prentice Hall of India.
3.	Lin and Chlatmac, "Wireless and Mobile Network Architecture", John Wiley and Sons.
e-Learning Source:	
1.	https://www.tutorialspoint.com/computer_network_basics/index.asp
2.	https://nptel.ac.in/courses/106105183

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
	CO1	2	2	1	1	1			1					1	1			
CO2	3	1	2	1		1	1						1	2				
CO3	2	2	1	1		2							1	1				
CO4	3	2	1	1		1							2	2				
CO5	1	3	2	1		2	1						3	2				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2016-2017							
Course Code	CA216	Title of the Course	Java Programming Lab	L	T	P	C
Year	II	Semester	IV	0	0	3	3
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> ● To learn the object oriented concepts and apply them in solving problems in java. ● To learn the concepts of Inheritance and Polymorphism. ● To learn the concepts of Packages and Interfaces in Java. ● To learn the concepts of Exception handling and Multithreading. ● To learn the concepts of Graphical User Interface using Applets and AWT Controls. 						

Course Outcomes	
CO1	Able to implement classes, objects, members of a class and relationships among them needed for a specific problem.
CO2	Able to implement programs using concepts of Inheritance and Polymorphism.
CO3	Able to implement the concepts of Packages and Interfaces in Java.
CO4	Able to develop Java Programs using the concepts of Exception Handling and Multithreading.
CO5	Able to develop the GUI based web applications using Applets and various AWT controls.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Classes and Objects	Program illustrating Classes and Objects.	2	CO1
2	Overloading	Program illustrating Method Overloading and Method Overriding.	2	CO1
3	Interface	Program illustrating concept of Interface.	2	CO2
4	Inheritance	Program illustrating use of Final and Super keyword	2	CO2
5	Packages	Program that illustrates the following a) Creation of simple package. b) Accessing a package.	2	CO3
6	Threads	Program for creating multiple threads a) Using Thread class. b) Using Runnable Interface.	2	CO4
7	Exceptions	Program that illustrates the following a) Handling predefined exceptions. b) Handling user defined exceptions.	2	CO4
8	Applets	Program to illustrate the concept of Applets.	2	CO5

Reference Books:	
1.	E. Balagurusamy, "Programming in Java", TMH Publications.
2.	Peter Norton, "Peter Norton Guide to Java Programming", Techmedia Publications.
e-Learning Source:	
1.	https://onlinecourses.nptel.ac.in/noc22_cs47

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	2	1	3	1	1		1						1	2				
CO2	2	1	3		1	1							1	2				
CO3	1	1	2	1		2	2						2	1				
CO4	1	1	3	1		1	1						2	1				
CO5	2	1	3	1		2	1						2	1				

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	CA227	Title of the Course	Operating System Lab	L	T	P	C
Year	II	Semester	IV	0	0	3	2
Pre-Requisite	None	Co-requisite	CA213				
Course Objectives	<ul style="list-style-type: none"> To describe the UNIX Operating System and commands.. To differentiate between Internal and External Commands. To Write a Shell Script for specific problem definition. To apply specific UNIX fork() command. To Demonstrate User Input and working with Conditional Statements and Loops. To demonstrate the use of string operations. 						

Course Outcomes	
CO1	To familiarize the Students with the UNIX Operating System commands
CO2	To gain an understanding of important aspects related to the Shell Programming.
CO3	To make student learn fundamentals of System Programming.
CO4	To develop the ability to implement loops.
CO5	To give a Comprehensive Introduction to perform String operations

Exper iment No.	Title of the Experiment	Content of Unit	Contact Hrs.	Mapped CO
1.	Unix Commands	Miscellaneous Command, File Management Command, Communication Command, Storage Command, System Status Command	2	CO1
2.	Shell Programming	Shell Script to accept two numbers and perform all arithmetic operations on it. Menu Based Shell Script. Shell Script to calculate the Gross Salary Shell Script through case statement. Shell Script to find the largest among numbers using positional parameters.	2	CO2
3.	System Programming	Use the fork() to create the Process. Use the fork() to create the Child Process.	2	CO3
4.	Loops	Shell Script to illustrate While ,Until and For Loop. Write a shell script to find the factorial of a given number. Write a shell script to check whether the given number is prime or not. Write a shell script to print the Fibonacci series.	2	CO4
5.	Strings	Shell Script to perform String operations.	2	CO5

Reference Books:	
1.	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne "Operating System Concepts", 9th Edition, Wiley 2018
2.	D M Dhamdhare, "Operating Systems: A Concept-Based Approach", 3rd edition, McGraw Hill Education, 2017
3.	Thomas Anderson and Michael Dahlin, "Operating Systems: Principles and Practice", 2014
4.	William Stallings, "Operating Systems: Internals and Design Principles", 7e (Old Edition), Pearson Education India, 2013
5.	Gary J Nutt, "Operating Systems: A Modern Perspective". 1997
e-Learning Source:	
1.	https://www3.cs.stonybrook.edu/~amione/CSE114_Course/materials/resources/unix_lab.html
2.	https://unixlabnyuad.github.io/

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2		1	1		1						1	1				
CO2	3	1	1			1	2						2	1				
CO3	2	2	1	1	1		1						1	2				
CO4	1	2	3	1		1	1						2	2				
CO5	2	1		1	2	1							1	1				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2023-2024							
Course Code	CA228	Title of the Course	Full Stack Web Development-I Lab	L	T	P	C
Year	II	Semester	IV	0	0	3	2
Pre-Requisite	None	Co-requisite	CA225				
Course Objectives	<ul style="list-style-type: none"> To learn and apply the basic tags of HTML5 for creating web pages. To learn and create responsive web page(s) using Bootstrap. To learn and implement Client-Side scripting using JavaScript. To learn and implement Client-Side scripting using AngularJS framework To learn and create web-based projects using ReactJS 						

Course Outcomes	
CO1	Able to create web page(s) using HTML5 tags.
CO2	Able to create responsive web page(s) using Bootstrap
CO3	Able to implement Client-Side scripting using JavaScript.
CO4	Able to implement Client-Side scripting using AngularJS framework
CO5	Able to create web-based projects using ReactJS

Experiment No.	Title of the Experiment	Content of Unit	Contact Hrs.	Mapped CO
1	HTML5	Create a web with the following information and structure using HTML5 tags like: <header>, <footer>, <nav>, <aside>, <section> and article>	2	CO1
2	HTML5	Make a button with a text "start download", when click in start download a progress bar must be initialized with value 0 then increase by 10 in each second then at the end of downloading process alert the message ("Download completed") try to change the color of progress bar after every three seconds.	2	CO1
3	Bootstrap	Design a nice simple responsive web form for a workshop event registration. It needs to be mobile first, but it also needs to look nice for tablet / desktop. Some key fields for attendees to submit: Name, phone number, email address, address, profession. You can add more if you wish.	2	CO2
4	Bootstrap	Add 2 content segments to the above form that need to be responsive. Add in a synopsis, and also a speaker profile. Mock up content using ipsum lorem text. Add in an image or icon represent the speaker.	2	CO2
5	JavaScript	Write a JavaScript program to convert a 2D array to a comma-separated value (CSV) string.	2	CO3
6	JavaScript	Write a JavaScript program to remove HTML/XML tags from strings.	2	CO3
7	Angular JS	Using Angular JS develop code to Shape Size using Range bar	2	CO4
8	Angular JS	Using Angular JS develop code for Rupee to Dollar & Dollar to Rupee Convertor	2	CO4
9	ReactJS	React code to build a simple search filter functionality to display a filtered list based on the search query entered by the user.	2	CO5
10	ReactJS	React exercise to create an image slide, where users can view multiple images with next/previous buttons. Additionally, there is also an option to select an image from any index of the list through a click-on option circle.	2	CO5

Reference Books:	
1.	Eddie Pickford, "Full Stack Development with MERN", Eddie Pickford
2.	Eddy Wilson Iriarte Korolova, "MERN Quick Start Guide", Packt Publishing
3.	Nabendu Biswas, "Ultimate Full-Stack Web Development with MERN", AVA Technical Books

e-Learning Source:	
1.	Institutional Learning Management System i.e Integral Learning Initiative (ILI)
2.	NPTEL Video Lectures

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
	CO1	1	1	3			1											
CO2	2		3	1	1	2	1											
CO3	2	1	3	1		1	2											
CO4	1	1	3		1	2												
CO5	1	2	3	1		2												

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation