IT Infrastructure and Management

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22CST36A	3:0:0:0	3	CIE:50 SEE:50	3 Hours	PCC

Pre-Requisites: Computer hardware platforms, Operating system platforms, Software applications, Data management and storage, Networking and telecommunications platforms, Internet, Consulting and system integration services.

Course Objcetives :
The Student will:

1. Understanding the role of IT infrastructure with its functions and services.(Understanding)

2. Recognize the research, reporting and presentation approach using the latest ICT tools.

3. Study the combination of the technical and management issues in contemporary infrastructure management.

4. Learn the concepts related with Deadlock to solve Problems.

5. Familiarize the Protection and Security Mechanism in Operating System.

Syllabus

Module I

Infrastructure management overview: Introduction, IS components, Services of IT infrastructure, welfare of IT, Roles and responsibilities, challenges.

Organizing for Infrastructure management: IT infrastructure design factors, model of IT management, Elucidation methods, Documentation.

08 Hours

Module II

Staffing for system management: Introduction, Determining Required Skill Sets and S kill Level Assessing the Skill Levels of Current Onboard Staff.

Customer Service: Introduction, Key Elements of Good Customer Service: Key Customers, Identifying Key Services, Identifying Key Processes that Support Key Services, Key Suppliers, Integrating the Key Elements of Good Customer Service, Cardinal Sins that Undermine Good Customer Service**.**

08 Hours

Module III

Performance and Tuning: Introduction, Performance and Tuning Applied to the Five Major Resource Environments: Server Environment, Disk Storage Environment, Database Environment, Network Environment and Desktop Computer Environment**.**

Problem management: The role of service desk, segregating and integrating service desk, Developing a Problem Management Process, client issues with problem management.

08 Hours

Module IV

Storage Management: Storage Management Capacity, Storage Management Performance, Storage Management Reliability, Storage Management Recoverability. **Network Management:** Key Decisions about Network Management, business IT networks and components, digital transmission, IS vulnerabilities and threats. **08 Hours**
Module V
Strategic Security: Introduction, Developing a Strategic Security Process, IT Strategic planning process, Tools & methodologies of IT strategic planning, Business system planning approach. **Facilities management:** Introduction, Major Elements of Facilities Management, Tips to improve facilities management process. **08 Hours**

Text Books

1. Rich Schiesser, IT Systems Management, Pearson Second Edition.
2. IT for Management Turban Volonino.

Reference Books:

- E Turban, E Mclean and James Wetherbe, ―Information Technology for Management
- Kenneth C Laudon, Jane P Laudon, ―Management Information Systems
- Roger S Pressman, ―Software Engineering: A Practitioner's Approach
- James A O'Brien, ―Management Information Systems
- Walker Royce, ― Software Project Management: A Unified Framework

E - Resources:

1. https://www.scribd.com/doc/45079962/IT-Infrastructure-Management
2. **https://www.scribd.com/document/509694935/IT-Infrastructure-Management-eI9RGuDM0m**

Course outcomes:

The Student will be able to:

- Investigate, critically analyze and evaluate the impact of new and current ICT services to an organization;
- Demonstrate the technical and communications skills that contribute to the operation of ICT services in an organization;
- Reflect critically on the role of an enterprise architect in an organization;
- Gain Knowledge on theoretical, technical and management issues that deliver ICT services to an organization
- Analyze how effective IT Infrastructure Management requires strategic planning with alignment from both the IT and business perspectives in an organization.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO10	PO11	PO 12	PSO1	PSO2	PS
CO1	2	3	3	3	1					1		2	2		2
CO2	1	1	2	2	3					2	1	2	2		2
CO3	2	2	2	2	2					2		2	2		2
CO4	2	1	1	1	2	2				2	1	2	2	1	2
CO5	1	3	1	1	2					2	1	2	2	1	2
Avg	1.6	2.0	1.8	1.8	2.0	0.4				1.8	0.6	2.0	2.0	0.4	2.

Object Oriented Programming Using Java (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22CSI33	3:0:2:0	4	CIE:50 SEE:50	3 Hours	IC

Course Objectives:
This course will enable the students to:
- Learn the basic concepts of object-oriented programming.
- Understand the basics of JAVA Programming using classes and objects.
- Gain the knowledge of Inheritance and Interfaces.
- Expose to the concepts of Packages and Exceptions that occur while programming in JAVA.
- Acquire the knowledge of multi-threaded programming and string handling in JAVA.

Module – 1
Introduction to Object Oriented Concepts: Procedure Oriented Programming, Object-oriented Programming, Comparison of Object-Oriented Language with C. Introduction to Java, Java Buzzwords, The Byte code, Java Development Kit (JDK), Data types, Variables and arrays, Operators, Control statements, Simple Java programs.   **08 Hours**

Module – 2
Classes, Methods: Classes fundamentals, Declaring objects, Reference variables, this keyword, garbage collection. **Methods:** Method Prototyping, Member functions and Data members, Constructors, Objects and methods, Method Overloading, Objects and arrays, Access modifiers, Setters and getters, Nested classes.   **08 Hours**

Module – 3
Inheritance, Interfaces: Inheritance basics, using super, creating multi-level hierarchy, method overriding, using Abstract classes, using final, **Interfaces**: Defining an Interface, Implementing an Interface, Nested Interfaces, Applying an Interface, variables in Interface, Interfaces can be extended.   **08 Hours**

Module – 4
Packages, Exceptions: Access Protection, Importing Packages. **Exceptions**: Exception handling fundamentals, Exception types, uncaught exceptions, using try and catch, using multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions.   **08 Hours**

Module – 5
Multi-Threaded Programming, String Handling: What are threads? How to make the classes threadable, Extending threads, Implementing runnable, Synchronization. **String Handling**:

String Constructors, String Operations, Character Extraction, String Comparison.   **08 Hours**

Lab Programs

1)

    A. Develop a Java program for an advanced arithmetic calculator that takes two integer operands and an operator from the user. The program should be capable of performing addition, subtraction, multiplication, and division. Ensure that the program handles input validation, including checking for the validity of the operator and non-negative values for the operands. After each calculation, ask the user if they want to perform another operation and provide a history of previous calculations upon request.

    B. Write a Java program to generate the first 'n' terms of the Fibonacci series and determine the following:
       1. Calculate the sum of all even terms in the series.
       2. Find the product of all odd terms in the series.
       3. Check and display the largest prime number within the series.
       4. Calculate the average of the entire series.

2)

    A. Develop a Java program showcasing method overloading with a base class "Phone" containing the dial() method, and two subclasses "CameraPhone" and "SmartPhone" that inherit from the base class and enhance its features. The program should demonstrate and print the results of these enhancements.

    B. Develop a Java program illustrating constructor overloading for calculating the area of a rectangle and a circle using appropriate constructors.

3)

    A. Create a Java program with a vehicle hierarchy, including Vehicle, Car, SportsCar, and Truck classes. Implement methods for starting and stopping in the base class and specialized methods for accelerating, adding turbo boost, and loading cargo in the subclasses, with appropriate method overrides.

    B. Create a Java program that models electronic devices (e.g., smartphones, laptops, and tablets) using a common interface for power management. The program should allow users to interact with the devices and control their power state.

4)

    A. Develop a Java program that emulates a library system. Create two packages, `library` and `patron`. In the `library` package, define a `Book` class with a private title field. In the `patron` package, implement a `Patron` class that can borrow books. Demonstrate the use of packages, access protection, and class imports. Ensure that the book title remains inaccessible from outside the `library` package due to the `private` access modifier. Create a scenario where a patron, Alice, borrows a book from the library.

B. Develop a Java lab program that handles exceptions for division by zero and invalid input. Use `try-catch` blocks to catch `ArithmeticException` for division by zero and `InputMismatchException` for non-integer input and provide user-friendly error messages.

5)
A. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer for every 1 second; second thread computes the square of the number and prints; third thread will print the value of cube of the number.

B. Design a Java lab program to demonstrate string handling, including creating strings using constructors and literals, concatenating strings, extracting characters at a specified index, and comparing strings for equality.

Course Outcomes:

After studying this course, students will be able to

- Demonstrate a strong understanding of the fundamental concepts of object-oriented programming, including classes, objects, encapsulation, and abstraction.
- Implement object-oriented design principles in their code.
- Design class hierarchies, implement interfaces, and apply polymorphism effectively in their Java applications.
- Apply knowledge of organizing code into packages and handle exceptions for modularity and maintainability.
- Demonstrate the programs by using multithreaded concepts & string handling.

Text Books:

1. Herbert Schildt, "Java The Complete Reference", 7th Edition, TataMcGrawHill, 2013, ISBN 13:978-0072263855, (Chapters 1-11).

Reference Books:

1. E Balagurusamy, "Programming with Java-A primer", 2nd Edition, Tata McGraw Hillcompanies,2009, ISBN-13:978-9351343202.

E-Resources:

1. www.geeksforgeeks.org/java/
2. www.tutorialspoint.com/java/

Internet of Things (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI71	3:0:2:0	4	CIE:50 SEE:50	3 Hours	IC

Course Objectives:

This course will enable the students to:

- Gain the knowledge about IOT concepts.
- Know different Application protocols for IOT.
- Understand methods of deploying smart objects and connect them to network.
- Know the diverse methods of deploying smart objects and connect them to network.
- Learn about Cloud based IoT services and AWS IOT.

Module – 1

Introduction to Internet of Things: Definition and Characteristics of IOT, Physical Design of IOT – IOT Protocols, IOT communication models, IOT Communication APIs IOT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IOT Levels and Templates.   **08 Hours**

Module – 2

Prototyping IoT Objects: Introduction to Sensors and actuators, Workflow of sensors, types of sensors, Workflow of Actuators, classifications of actuators, interfacing concepts to Embedded Systems, Wireless sensing networks and its technologies- architecture- topologies, issue and challenges, security, Participating Wireless sensing technologies and Case study - Bluetooth, Wi-Fi, Zigbee, RFID.   **08 Hours**

Module – 3

IOT Architecture and Protocols: Architecture Reference Model- Introduction, Reference Model and architecture, IOT reference Model. Protocols- 6LowPAN, RPL, CoAP, MQTT.

08 Hours

Module – 4

Smart Objects: The "Things" in IOT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria.   **08 Hours**

Module – 5

Cloud Services for IOT: What is Cloud IoT?, Few key ways for Cloud IoT is different from traditional or non-cloud-based IoT, How does cloud IoT work?, Cloud Services for IoT, Amazon Web services for IOT, What is AWS IoT?, AWS IoT core, AWS IoT analytics .

08 Hours

Lab Programs

Part - A

1. Familiarize the concept of Arduino, Raspberry Pi. Write an application to blink the light in a loop.
2. Develop an LED Knight rider application to display in the loop.
3. Construct a simulator to display whole numbers in a loop using 7 segment cathode in Arduino.
4. Display 3 LED to turn on and reset then using button for smart home appliances.

Part -B

5. The connectivity of Raspberry-PI circuit with temperature sensor and write an application to read the environment temperature and display using LCD.
6. GPS Module Interfacing with Raspberry-Pi.
7. Make a report to measure the distance of the obstacles in both centimeters and inches.
8. Understanding and connectivity of Raspberry-Pi with camera. Write an application to capture the image.

Course Outcomes:

After studying this course, students will be able to

- Explain IOT architectural components.
- Analyze the interface of the sensor and actuator with the Arduino development board and Raspberry Pi board.
- Implement different protocols used for communication in IoT devices.
- Design smart applications in different domain and analyze their performance.
- Analyze the use of cloud based IoT services in different applications.

Text Books:

1) "Internet of Things (A Hands-on-Approach)" by Vijay Madisetti and Arshdeep Bahga, 1st Edition, VPT, 2014. ISBN 13: 9780996025515

2) Srinivasa K G, "Internet of Things", CENGAGE Leaning India, 2017 ISBN: 9789386858955

3) David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IOT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743)

Reference Books:

1) Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014. (ISBN: 978-8173719547)

2) Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224)

3) "TheInternet of Things – Key applications and Protocols" by Olivier Hersent, David Boswarthick, Omar Elloumi , , Wiley, 2012 ISBN: 978-1-119-99435-0

E-resources:

1) www.coursera.org/specializations/IOT

2) www.futurelearn.com/courses/internet-of-things

3) https://dgtlinfra.com/amazon-web-services-aws-iot/

CO-PO-PSO Mapping

PO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	1	-	-	-	-	-	-	1	-	-
CO2	-	3	-	-	-	1	-	-	-	-	-	-	2	-	-
CO3	3	-	-	-	-	1	-	-	2	-	2	-	3	3	-
CO4	-	3	3	-	-	1	-	-	2	-	2	-	-	3	-
CO5	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-

Course Coordinator,

Ms. BHOOMIKA K S

Assistant Professor,

Department of Computer Science and Engineering