Semester- III

Management Information Systems			
Course Code	**MMCD311A**	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning objectives:

- Understand the role and impact of information systems in global business environments.
- Analyse how organizations leverage information systems for strategic advantage.
- Evaluate the components and infrastructure of information systems, including databases and networking.
- Assess the applications of enterprise systems, e-commerce, and knowledge management in business processes.
- Apply principles of system development and project management to real-world scenarios.

Module-1

Foundations of Management Information Systems: Role of Information Systems in Business Today Global E-Business and Collaboration Information Systems, Organizations, and Strategy Ethical and Social Issues in Information Systems

Module-2

Information Technology Infrastructure: IT Infrastructure and Emerging Technologies Foundations of Business Intelligence: Databases and Information Management Telecommunications, the Internet, and Wireless Technology Securing Information Systems

Module-3

Enterprise Applications and E-Commerce: Achieving Operational Excellence and Customer Intimacy: Enterprise Applications E-commerce: Digital Markets, Digital Goods Managing Knowledge and Artificial Intelligence

Module-4

Decision Making and System Development: Enhancing Decision Making Building Systems Managing Projects

Module-5

Managing Global Systems: The Growth of Global Business and Information Systems, Challenges of Global Information Systems, Organizing Global Business and Systems, Managing Global Systems Development, Strategies for Implementing Global Systems**,**Case Studies and Real-World Examples

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of two tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Pearson - Management Information Systems: Managing the Digital Firm
2. "Management Information Systems" by Raymond McLeod & George Schell
3. "Information Systems for Managers" by Gabriele Piccoli & Federico Pigni
4. "Essentials of Management Information Systems" by Kenneth C. Laudon & Jane P. Laudon

Weblinks and Video Lectures (e-Resources):

1. https://youtu.be/QrLZfvGJ5pw
2. https://youtu.be/dZP2J2tzSwc
3. https://www.youtube.com/watch?v=QrLZfvGJ5pw&list=PLim9gWjsjN-MpFDCjM5n2HfI9NFrsoDe6

Skill Development Activities Suggested

1. Conduct a business simulation where students run a virtual company.
2. Students act as CIOs, System Analysts, or Database Managers and solve a business problem collaboratively.
3. Students prepare posters, presentations, or videos promoting information security best practices.
4. Analyze real-world business cases involving successful or failed MIS implementations

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Understand the fundamental concepts and types of Management Information Systems.	L1
CO2	Analyze how MIS supports decision-making and strategic business goals.	L2
CO3	Examine the components of IT infrastructure including databases, networks, and cloud.	L3
CO4	Evaluate enterprise systems, e-commerce, and knowledge-based systems in practice.	L3,L4
CO5	Design and manage system development processes and global information systems.	L4,L5

Mapping of COS and POs

CLOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CLO1	3	2						
CLO2	3	3	2	2				
CLO3	2	3	3	2				
CLO4	2	3	2	3		2		
CLO5	2	2	3	3		3		

Semester- III

Database Design & Applications			
Course Code	**MMCD311B**	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning objectives:

- Understand database system concepts and data models.
- Design effective databases using ER models and normalization techniques.
- Write SQL queries for data manipulation and retrieval.
- Implement databases using popular RDBMS tools.
- Apply PL/SQL constructs to develop application-level logic.

Module-1

Introduction to Databases : File systems vs Database systems, Characteristics of database systems, DBMS architecture & data independence, Data models: Hierarchical, Network, Relational, Object-oriented, Database users & DBA roles.

Module-2

ER Modeling and Relational Model: Entity-Relationship model: Entities, attributes, relationships, ER diagrams, cardinality, participation, Mapping ER to relational schema, Relational algebra basics, Integrity constraints: Key, domain, referential integrity.

Module-3

SQL and Advanced SQL: Basics of SQL: DDL, DML, DCL, SQL queries: Selection, projection, joins, grouping, Sub-queries, nested queries, Views, indexes, sequences, Triggers and stored procedures.

Module-4

Normalization and Database Design : Functional dependencies, 1NF, 2NF, 3NF, BCNF, Multivalued dependencies, 4NF, 5NF, Decomposition and lossless joins, Case study: Designing a university database.

Module-5

PL/SQL and Applications : Introduction to PL/SQL, Cursors, loops, exception handling, Procedures and functions, Packages and triggers, Database connectivity using programming language (e.g., Python or Java)

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of two tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. **"Database System Concepts"** by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGraw Hill Education
2. **"Fundamentals of Database Systems"** by Ramez Elmasri and Shamkant B. Navathe, Pearson Education
3. **"SQL, PL/SQL: The Programming Language of Oracle"** by Ivan Bayross
4. **"Modern Database Management"** by Jeffrey A. Hoffer, V. Ramesh, Heikki Topi
5. **"Learning SQL"** by Alan Beaulieu, O'Reilly

Weblinks and Video Lectures (e-Resources):

- https://sqlzoo.net/
- https://mode.com/sql-tutorial/
- https://oracle-base.com/

Skill Development Activities Suggested

- **Mini Project**: Design and develop a database-backed web/mobile application (e.g., Library, Hostel, Inventory Management).
- **Hands-on Lab**: Write complex SQL queries including joins, nested queries, and views.
- **ER Design Challenge**: Analyze a real-world system and model it using ER diagrams.
- **Normalization Lab**: Decompose messy schemas into normalized forms.
- **PL/SQL Hackathon**: Implement procedures, triggers, and error handling for a chosen application.

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Explain database concepts and architectures	L1,L2
CO2	Design ER models and convert them into relational schemas	L3
CO3	Write SQL queries to retrieve and manipulate data	L3
CO4	Apply normalization techniques for effective schema design	L3
CO5	Develop PL/SQL programs and integrate with front-end applications	L4

Mapping of COS and Pos

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1	1						
CO2			1	2				
CO3					2	3		
CO4			1	2				3
CO5			2	2				

Semester- III

Software Architectures			
Course Code	**MMCD311C**	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning objectives:

- Describe the foundational concepts, components, and the significance of software architecture in the software lifecycle.
- Identify and apply appropriate architectural styles and patterns to different software system requirements.
- Analyze software architectures based on quality attributes such as performance, modifiability, and scalability.
- Use UML and architecture description languages (ADLs) to model and document software architectures.
- Critically evaluate real-world software architectures and understand their evolution and trade-offs through case studies.

Module-1

Introduction to Software Architecture Definition and significance, Architectural structures and views,Role of software architect,Architecture vs Design

Module-2

Architectural Styles and Patterns : Layered, Client-Server, Pipe-and-Filter, Event-driven, Microservices,Common architectural patterns: MVC, Broker, Blackboard, Service-Oriented,Design patterns review relevant to architecture

Module-3

Quality Attributes and Architecture Evaluation : Quality attributes: Performance, Security, Availability, Modifiability,Attribute-Driven Design (ADD),Architecture Tradeoff Analysis Method (ATAM),Tactics to achieve quality attributes

Module-4

Architecture Design and Documentation : Architecture modeling with UML,Views: Logical, Development, Process, Physical (4+1 view model),Documenting architecture (ADL, SAD),Case study-driven design

Module-5

Architecture in Practice : Architecture recovery and reengineering,Architecture and Agile development,Cloud-native and Microservices architectures ,Case studies of large-scale systems

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of two tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Len Bass, Paul Clements, Rick Kazman, "Software Architecture in Practice," 4th Edition, Addison-Wesley, 2021
2. **Documenting Software Architectures: Views and Beyond** – *Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers*
3. **Software Architecture: Foundations, Theory, and Practice** – *Richard N. Taylor, Nenad Medvidovic, and Eric M. Dashofy*

Web links and Video Lectures (e-Resources):

- https://resources.sei.cmu.edu/library/subject-areas/software-architecture/
- https://www.tutorialspoint.com/software_architecture_design/index.htm
- https://learn.microsoft.com/en-us/azure/architecture/
- https://www.visual-paradigm.com/guide/uml-unified-modeling-language/

Skill Development Activities Suggested

1. Analyze architecture documentation of open-source projects (e.g., Apache Kafka, Spring Framework) to understand architecture decisions.
2. Implement mini-projects using common architectural styles such as MVC, Microservices, Layered Architecture, and Client-Server.
3. Use UML tools (like StarUML, Lucidchart) to model system architecture including component, deployment, and sequence diagrams.

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Define and explain key software architecture concepts and their importance in the software development process.	L1
CO2	Identify and analyze various architectural styles and patterns and their applicability to different software applications.	L2
CO3	Evaluate software architectures based on quality attributes such as performance, security, and modifiability, and make informed decisions.	L3
CO4	Model, design, and document software architectures using appropriate tools, including UML and other architectural description languages (ADLs).	L3,L4
CO5	Apply software architecture principles through practical case studies, demonstrating the ability to solve real-world software architecture problems.	L4,L5

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1	2						
CO2	1	2	3	4				
CO3		2	3		5			
CO4		2	3		5			
CO5		2			5	6		

Semester- III

Computer Organization and Software Systems			
Course Code	**MMCD311D**	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning objectives:

- Acquire fundamental knowledge of computer architecture..
- Gain practical skills in assembly language programming.
- Analyze the interplay between hardware and software components.
- Develop and optimize software with an understanding of system constraints.

Module-1

Introduction to Computer Architecture: Overview of computer organization and architecture, Evolution of architectures (CISC, RISC, MIPS), Performance measures: CPI, MIPS, MFLOPS, Instruction sets and types, Structure of the CPU: ALU, CU, registers, Memory hierarchy: cache, main memory, virtual memory, Instruction pipelining and hazards, Memory addressing modes.

Module-2

Basics of Assembly Language: Assembly language structure and syntax, Data representation: binary, hexadecimal, Instruction formats and encoding, Arithmetic and logical operations,Data transfer instructions: MOV, LOAD, STORE, Stack operations: PUSH, POP, CALL, RET.

Module-3

Operating System Fundamentals: OS structure and functions, Process management and scheduling, Memory management techniques: paging and segmentation, Linkers and loaders: role and functionality, Device driver basics: kernel mode, user mode, Interaction between drivers and hardware.

Module-4

Storage Devices and Interfaces: Overview of primary and secondary storage, HDD, SSD, RAID configurations, Interfaces: SATA, SCSI, NVMe, Virtual memory concepts: paging and page replacement.

Module-5

Hardware-Software Co-Design and case study: Hardware-software partitioning, Performance optimization in co-design, Characteristics of embedded systems, Real-time operating system (RTOS) basics, Case study: Embedded systems development

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of two tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

- **Title:** Computer Organization and Design: The Hardware/Software Interface **Authors:** David A. Patterson, John L. Hennessy **Edition:** 6th Edition **Publisher:** Morgan Kaufmann
- **Computer Organization and Architecture: Designing for Performance** Author: **William Stallings** Edition: **11th Edition** Publisher: **Pearson.**

Weblinks and Video Lectures (e-Resources):

- https://youtu.be/j8NnE1YeSN0?si=eP7qF3bv-92ps0tG
- https://youtu.be/-qyM8XJVnxg?si=Rks1jpJEcd0F_c_y

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Understand the basic concepts of computer organization and architecture.	L1
CO2	Analyze the functioning of software systems and their interaction with hardware.	L2
CO3	Develop problem-solving skills using assembly language and low-level programming.	L2
CO4	Integrate concepts from computer architecture to design efficient software systems.	L3
CO5	Demonstrate the ability to apply software concepts in real-world scenarios.	L4

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2							
CO2	3							
CO3			3					
CO4	3	2	3		2			
CO5	2	2	3			2		

Semester- III

Software Design and Patterns			
Course Code	MMCD311E	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning objectives:

- Understand the importance and role of design patterns in software development.
- Learn how to implement various creational, structural, and behavioral design patterns.
- Analyze software design problems and apply appropriate design patterns to solve them.
- Develop reusable and maintainable object-oriented software.

Module-1

Fundamentals and Design Principles: Introduction to Design Patterns, Definition, purpose, and history, Benefits and limitations of design patterns, Classification: Creational, Structural, Behavioral. Principles of Object-Oriented Design, SOLID principles, Coupling and Cohesion, UML for patterns.

Module-2

Creational Design Patterns: Singleton and Factory Method, Singleton: ensuring a single instance, Factory Method: object creation interface, Abstract Factory: related object families, Builder: step-by-step complex object creation.

Module-3

Structural Design Patterns: Adapter and Decorator, Adapter: interface compatibility, Decorator: dynamic behavior extension, Composite and Proxy, Composite: tree-like structure, Proxy: controlling object access.

Module-4

Behavioral Design Patterns: Observer and Strategy, Observer: publish-subscribe systems, Strategy: interchangeable algorithms, Command and Template Method, Command: encapsulate requests, Template Method: algorithm skeleton

Module-5

Case Studies and Pattern Integration: State and Chain of Responsibility, State: dynamic behavior changes. Chain of Responsibility: passing request chains, Pattern combination in real systems, Anti-patterns and refactoring using patterns.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of two tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. **Title:** *Design Patterns: Elements of Reusable Object-Oriented Software*
   Authors: Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides
   Publisher: Addison-Wesley Professional
2. **Design Patterns: Elements of Reusable Object-Oriented Software**
   Authors: Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides (Gang of Four – GoF)

Reference book:

1. Head First Design Patterns *Authors:* Eric Freeman, Elisabeth Robson, Bert Bates, Kathy Sierra
Publisher: O'Reilly Media, 2004 / 2020 (2nd Ed. covers modern Java and updated patterns)

Weblinks and Video Lectures (e-Resources):

- https://youtu.be/4Dtv16aaNLQ?si=aaDLJtJHEx7xdGEy
- https://youtu.be/T9zbvi8eUW0?si=qCucZA4uFYSd-6Q8

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Understand fundamental concepts and classifications of design patterns.	L1
CO2	Apply creational patterns to construct flexible and reusable objects.	L2
CO3	Demonstrate the use of structural patterns for building scalable architectures.	L3
CO4	Implement behavioral patterns for effective communication among objects.	L3
CO5	Integrate multiple design patterns into a real-world software solution.	L3

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2						
CO2	3		2					
CO3			2	2				
CO4	3	3	3		3			
CO5	3	2	3		3			

Semester- III

Object Oriented Analysis & Design			
Course Code	**MMCD311F**	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning objectives:

- Understand the fundamental concepts of object-oriented software development.
- Apply object-oriented principles such as abstraction, encapsulation, inheritance, and polymorphism in designing software systems.
- Analyze and model real-world problems using object-oriented analysis techniques.
- Develop design solutions applying object-oriented design patterns and principles.
- Evaluate and refine object-oriented design to meet quality attributes and software architecture standards.

Module-1

Introduction to OOAD : Evolution of software development methodologies, Introduction to Object-Oriented Software Development, Benefits and limitations of OOAD Comparison with Structured Analysis and Design, Key Concepts: Objects, Classes, Attributes, Methods, Messages, State, and Behaviour.

Module-2

Object-Oriented Principles: Abstraction and Encapsulation, Inheritance and Generalization, Polymorphism and Dynamic Binding, Object Reuse and Reusability, Aggregation and Composition, Coupling and Cohesion in OO Design.

Module-3

Object-Oriented Analysis: Gathering Requirements from the perspective of OO, Identifying Classes and Objects from problem statements, Responsibility Assignment, Identifying Relationships and Interactions, Class Responsibility Collaborator (CRC) Cards, Domain Modelling and Object Discovery.

Module-4

Object-Oriented Design: Principles of good OO Design (GRASP), Design for Change and Reuse, Applying Object Design Patterns (Factory, Singleton, Adapter, Strategy, Observer – Basic Understanding), Layered Architecture and Design Components, Design Metrics and Evaluation.

Module-5

Implementation and Case Studies: Translating Design to Code – Best Practices, Testing in OO Systems: Unit Testing, Integration Testing, Common Pitfalls in OOAD, Case Study: University Course Management & Evaluation System, Healthcare Appointment & Prescription System

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of two tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. .**Grady Booch** – *Object Oriented Analysis and Design with Applications*, Pearson Education.
2. .**Craig Larman** – *Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development*, Pearson.
3. .**Ali Bahrami** – *Object Oriented Systems Development*, McGraw Hill.
4. .**James Rumbaugh, Michael Blaha** – *Object-Oriented Modeling and Design with UML*, Pearson Education.
5. Grady Booch "Object-Oriented Analysis and Design with Applications"
6. **Erich Gamma et al.** – *Design Patterns: Elements of Reusable Object-Oriented Software*, Addison Wesley.

Weblinks and Video Lectures (e-Resources):

- https://refactoring.guru – Design Patterns explained with examples
- https://sourcemaking.com/design_patterns – Comprehensive guide to patterns
- https://martinfowler.com – Software design and architecture blogs
- https://www.geeksforgeeks.org – Object-oriented programming and design tutorials
- https://www.tutorialspoint.com – OOAD topics simplified

Skill Development Activities Suggested

1. Mini project: Design an object-oriented system (e.g., Library Management, E-commerce).
2. Identify classes, responsibilities, and relationships in real-life applications.
3. Case study analysis of existing OO-based software.
4. Peer review of object-oriented design diagrams.
5. Write class diagrams and responsibility charts for a given use case

Course outcome (Course Skill Set)

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

Sl. No.	Description	Blooms Level
CO1	Describe fundamental concepts and principles of object-oriented software development.	L1
CO2	Identify objects and classes from real-world problems and model them using OOA concepts.	L2
CO3	Apply object-oriented principles in the design of software systems.	L3
CO4	Use appropriate design patterns for building flexible and reusable systems.	L3
CO5	Analyze object-oriented solutions and apply best practices in coding and testing.	L4

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1					
CO2		3	2	1				
CO3			3	2	1		3	
CO4	3	3	3	2	2			3
CO5	3				2	1		3