MASTER OF COMPUTER APPLICATIONS (MCA_NEW)

> **ASSIGNMENTS**
> **OF MCA_NEW (2Yrs) PROGRAMME**
> **SEMESTER-II**

(July - 2024 & January - 2025)

MCS-218, MCS-219, MCS-220, MCS-221

MCSL-222, MCSL-223

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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.

2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to Programme Guide of MCA (2Yrs).

3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the Programme Guide of MCA (2yrs).

4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	:	**MCS-218**
Course Title	:	**Data Communication and Computer Networks**
Assignment Number	:	**MCA_NEW(II)/218/Assign/2024-25**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last Dates for Submission	:	**31st October, 2024 (For July, 2024 Session)**
		15th April, 2025 (For January, 2025 Session)

Note: Answer all the questions in the assignment which carry 80 marks in total. 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the formatof presentation.

Q1: What is Guided Transmission Media? How does it differ from Unguided Transmission Media? Give examples of both Guided and Unguided transmission media. **(30 Marks)**

Q2: Explain the process of detecting transmission errors and correcting them. **(30 Marks)**

Q3: Explain Shortest Path Routing Algorithm. **(20 Marks)**

Course Code	:	**MCS-219**
Course Title	:	**Object Oriented Analysis and Design**
Assignment Number	:	**MCA_NEW(II)/219/Assign/2024-25**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last date of Submission	:	**31st October, 2024 (For July, 2024 Session)**
		15th April, 2025 (For January, 2025 Session)

Note: This assignment has eight questions of 80 Marks. Answer all questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the formatof presentation.

Q1: Explain basic philosophy of object orientation. Explain basic constructs of object orientation with example. **(10 Marks)**

Q2: Draw class diagram for Online Learning System. Make necessary assumptions. **(10 Marks)**

Q3: Explain briefly object modeling , dynamic modeling and functional modeling with the help of suitable diagrams. **(10 Marks)**

Q4: Draw state diagram for Online Shopping System. Also, list the assumptions made. **(10 Marks)**

Q5: What is aggregation? How is it related to composition? Explain role of abstract class in system design with the help of example. **(10 Marks)**

Q6: What is system design? What are the major tasks performed during system design? Explain.

(10 Marks)

Q7: Map the object classes created in *Question 2* above into database tables. Make necessary assumptions. **(10 Marks)**

Q8: Write short notes on following (minimum in 250 words): **(10 Marks)**

      i)   Mapping designs to code

      ii)   Design Optimization

Course Code	:	**MCS-220**
Course Title	:	**Web Technologies**
Assignment Number	:	**MCA_NEW(II)/220/Assign/2024-25**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last date of Submission	:	**31st October, 2024 (For July, 2024 Session)**
		15th April, 2025 (For January, 2025 Session)

This assignment has nine questions of 80 Marks. Answer all questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: **(a)** What is need of design pattern? Explain the use of Repository Design Pattern with the help of an example. **(5 Marks)**

(b) What is the difference between JAR and WAR files? Describe the process of creation, deployment and extraction of WAR files. **(5 Marks)**

Q2: **(a)** What is Servlet interface? Differentiate between GenericServlet and HTTPServlet? **(5 Marks)**

(b) Briefly explain servlet life cycle. Also, explain the request and response in the context of HTTP? **(5 Marks)**

Q3: **(a)** Explain the advantages of Java Server Pages over the servlet. Also, write a JSP program for Fibonacci Series. **(5 Marks)**

(b) Explain the various components of JSP with suitable code. **(5 Marks)**

Q4: What do you mean by JDBC? Explain how we retrieve data from database using suitable JSP program. **(5 Marks)**

Q5: What are the Strut2 core components? Explain the working and flow of Struts 2 with the help of suitable diagram. **(5 Marks)**

Q6: **(a)** Explain process of creating records using Spring Boot and Hibernate. **(5 Marks)**

(b) Explain how testing of custom login form can be performed with the help of an example.
(5 Marks)

Q7: Explain how CRUD operations are mapped to SQL statements, with suitable example. **(5 Marks)**

Q8: **(a)** Write the unit test case to execute it as a user with RequestPostProcessor for the URL pattern "/" which returns model attribute with key as "message" and value as "Hello World".
(5 Marks)

(b) What is Role-based Login? Explain how user's access can be restricted using Role-based Login. **(5 Marks)**

Q9: Write short notes on the following: **(15 Marks)**
(a) JSP Standard Tag Library (JSTL)
(b) Spring Framework
(c) Cross Site Request Forgery (CSRF)

Course Code	:	**MCS-221**
Course Title	:	**Data Warehousing and Data Mining**
Assignment Number	:	**MCA_NEW(II)/221/Assign/2024-25**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last Date of Submission	:	**31st October, 2024 (For July, 2024 Session)**
		15th April, 2025 (For January, 2025 Session)

This assignment has ten questions. All the questions are compulsory and there is no choice. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide.

Q1: Discuss the role of ETL (Extract, Transform, Load) processes in data warehousing. Provide a detailed explanation of each phase and its importance. Illustrate your answer with examples of common tools used in ETL and the challenges that may arise during these processes. **(8 Marks)**

Q2: **(a)** Explain the concept of Data Warehousing architecture. Compare and contrast the different types of architectures such as Single-tier, Two-tier, and Three-tier. Provide examples of scenarios where each architecture might be most beneficial. **(4 Marks)**

(b) Analyze the concept of OLAP (Online Analytical Processing) and its significance in data warehousing. Describe the differences between MOLAP, ROLAP, and HOLAP. Discuss the advantages and disadvantages of each type with respect to data analysis and querying performance. **(4 Marks)**

Q3: Design a data warehouse schema for a retail company. Include fact tables, dimension tables, and consider the star schema and snowflake schema designs. Justify your design choices and discuss how your schema supports efficient query processing and business intelligence needs.
(8 Marks)

Q4: Explain the use of metadata in data warehousing. Discuss the different types of metadata and their roles. Provide examples of how metadata can enhance the usability, maintenance, and performance of a data warehouse. **(8 Marks)**

Q5: Evaluate the role of data warehousing in supporting business intelligence and analytics. Discuss the process of transforming raw data into actionable insights. Provide examples of business intelligence tools and techniques that leverage data warehousing to enhance decision-making processes. **(8 Marks)**

Q6: Analyze various data pre-processing techniques such as data cleaning, data integration, data transformation, and data reduction. Explain the significance of each technique in improving the quality of data for mining and provide examples of scenarios where each technique would be applied. **(8 Marks)**

Q7: Compare and contrast the various classification algorithms used in data mining, such as Decision Trees, Naive Bayes, Support Vector Machines, and Neural Networks. Discuss the strengths and weaknesses of each algorithm and provide examples of appropriate use cases for each.
(8 Marks)

Q8: Evaluate the different clustering techniques, including K-means, hierarchical clustering and DBSCAN. Explain the underlying principles of each technique, and discuss their advantages, limitations, and practical applications. **(8 Marks)**

Q9: Examine the role of association rule mining in data mining. Describe the Apriori algorithm and its variations. Discuss the challenges associated with association rule mining, such as the generation of large numbers of rules and the need for efficient computation. **(8 Marks)**

Q10: Analyze the role of feature selection and dimensionality reduction in data mining. Discuss techniques such as Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), and feature selection algorithms. Explain how these techniques help in improving model performance and reducing computational complexity. **(8 Marks)**

Course Code	:	MCSL-222
Course Title	:	OOAD and Web Technologies Lab
Assignment Number	:	MCA_NEW(II)/L-222/Assign/2024-25
Maximum Marks	:	100
Weightage	:	30%
Last date of Submission	:	31st October, 2024 (For July, 2024 Session)
		15th April, 2024 (For January, 2024 Session)

Note: This assignment has two sections. Answer all questions in each section. Each Section is of 20 marks. Your Lab Records will carry 40 Marks (20 Marks for each section). Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. You must execute the program and submit the program logic, sample input and output along with the necessary documentation. Assumptions can be made wherever necessary. Please go through the guidelines regarding assignments given in the Programme guide for the format of presentation.

Section 1: OOAD Lab

Q1: **(a)** Draw Class Diagram for Online Examination System. Make necessary assumptions required.
(5 Marks)

(b) Draw Deployment Diagram for Online Banking System. Make necessary assumptions required. **(5 Marks)**

Q2: **(a)** Draw State Chart Diagram for Online Re-registration Fee Payment for IGNOU MCA 3rd Semester. Make necessary assumptions required. **(5 Marks)**

(b) Draw Sequence Diagram for Online Shopping from an E-commerce Shopping Portal. Make necessary assumptions required. **(5 Marks)**

Section 2: Web Technologies Lab

Q1: Write a program using JSP and JDBC to support editing (address modification, mobile number/ email id update) of MCA 1st Semester students of IGNOU. The program should take enrollment number or registered mobile number as input. Make necessary assumptions required. **(10 Marks)**

Q2: Write a program to create simple CRUD (Create, Read, Update, and Delete) application using Spring Boot and Hibernate for Online Registration and Fee Payment for a Workshop on "Web Technologies" to be organized by an IT Training Orgenization . Make provisions for security management in the program. Make necessary assumptions required. **(10 Marks)**

Course Code	:	**MCSL-223**
Course Title	:	**Computer Networks and Data Mining Lab**
Assignment Number	:	**MCA_NEW(II)/L-223/Assign/2024-25**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last Dates for Submission	:	**31ˢᵗ October, 2024 (For July, 2024 Session)**
		15ᵗʰ April, 2025 (For January, 2025 Session)

The assignment has two parts A and B. Answer all the questions. Each part is for 20 marks. Computer Networks and Data Mining lab record carries 40 Marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the MCA(New) Programme Guide for the format of presentation. If any assumptions made, please state them.

PART-I: Computer Networks

Q1: Setup 4 nodes , two TCP client and server pair and two UDP client and server pair. Send packets to respective clients from both the servers. Monitor the traffic for both the pair and plot the number of bytes received. Make necessary assumptions. **(20 Marks)**

PART-II: Data Mining Lab

Q1: Implement simple K-Means Algorithm to demonstrate the clustering rule on the following datasets:

(a) iris.arff **(10 Marks)**

(b) student.arff **(10 Marks)**