

**MASTER OF SCIENCE
(INFORMATION SECURITY)
(MSCIS)**

MSCIS/ASSIGN/2023

**ASSIGNMENTS
JULY 2023**

Semester-III

MSE-029, MSE-030, MSE-031, MCS-226 and MSEL-032

**SCHOOL OF VOCATIONAL EDUCATION AND TRAINING
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

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Guidelines regarding submission of assignments

1. It is compulsory for the students to submit the prescribed assignments. They will not be allowed to appear for the term-end examination of a course if they do not submit the assignments in time for that course.
2. The assignment responses should be complete in all respects. Before submission, the students should ensure that they have answered all the questions in all assignments. Incomplete answer sheets bring poor grades.
3. The University/ Regional Centre have the right to reject the assignments received after the due date. Therefore, the students are advised to submit their assignments before the due date.
4. Students should submit before the last dates prescribed for submission of assignments.
5. In case the students have already done some assignments prescribed in a course, they are required to do the **left-over assignments before taking the Term-end Examination**. If they have qualified in a course on the basis of lesser number of assignments and Term-end Examination, they will **not be eligible to re-do the assignments** with a view to improve the overall qualifying score of that course.
6. In case any student fails to submit the assignments or fails to score minimum qualifying marks, s/he has to wait for fresh assignments meant for the current batch of students.
7. For their own record, students should retain a copy of all the assignment responses, which they submit.
8. Once the students get the pass marks in an assignment, they can not re-submit it for improvement of marks. If the student secured requisite marks in Term-End Examination and Assignments, but did not get requisite overall percentage, then the student can either resubmit the assignment or reappear for the term-end examination for securing the requisite overall percentage.
9. Assignments are not subject to re-evaluation.

Instructions for Doing Assignments

While answering Assignments, the following guidelines are required to be observed:

1. The student should write their Complete correct Enrolment Number, Name, Full Address, Signature and Date on the top right hand corner of the first page of the response sheet.
2. The students should write the Programme Title, Course Code and Course Title on the left hand corner of the first page of their response sheet. Course code may be reproduced from the assignment.

The top of the first page of your response sheet for each assignment should look like this:

PROGRAMME TITLE: ENROLMENT No.:
COURSE CODE: NAME :
COURSE TITLE:
ADDRESS:.....
SIGNATURE:
DATE:

3. The students should write the responses in their own hand. **They should not print or type the answers. They should not reproduce their answers from the units sent to them by the University. If they reproduce from units, they will get poor marks for the respective question.**
4. The students should write each assignment separately. All the assignments should not be written in continuity.
5. The students should write the question number with each answer.
6. The students should use only foolscap size paper for their response and tie all the pages carefully. Avoid using very thin paper. They should allow a 4 cm. margin on the left and at least 4 lines in between each answer. This may facilitate the evaluator to write useful comments on the margins at appropriate places.
7. The students should not copy from the response sheets of other students. If copying is noticed, the assignments of such students will be rejected, and disciplinary action can be taken against the students as per rules of the University.
8. **Please remember that it is compulsory to send scanned copies of handwritten assignments through email to the respective Regional Centre email or upload on the link provided on the respective Regional centre's website or the hard copy of handwritten assignments to your concerned Regional centre/Study centre before you can take the Term End Exams or else you will not be issued hall tickets.**

Under no circumstances should they be sent to the (SED) for evaluation.

Course Code	:	MSE-029
Course Title	:	Cyber Attack: Use of Technology in Cyberspace
Maximum Marks	:	100
Weightage	:	30%
Last date of Submission	:	31st October, 2023 (For latest update, Pl. check IGNOU's Website)

Attempt any five questions out of seven questions. Each question carries 20 marks. 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: Explain the importance of Confidentiality, Integrity and Availability of a typical networked IT system.

Q2: Explain cyber security at network and application layer of a typical IT system in detail.

Q3: Write and explain any five strategies for mitigating cyber attacks.

Q4: Explain Cyber Attack Recovery Procedure in detail with example.

Q5: Explain OSI Reference Model in detail.

Q6: What do you mean by server threats? Discuss any four threats with an example.

Q7: Explain advantages and disadvantages of Open Source Intelligence in Cyber Security with respect to OS.

Course Code	:	MSE-030
Course Title	:	Cloud and Infrastructure Security
Maximum Marks	:	100
Weightage	:	30%
Last date of Submission	:	31st October, 2023 (For latest update, Pl. check IGNOU's Website)

Attempt any five questions out of seven questions. Each question carries 20 marks. 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: What is Cloud Computing ? How Cloud Computing differs from Cluster Computing , Grid Computing ? Explain the characteristics of Cloud Computing. Also, give benefits & applications of Cloud Computing.

Q2: Explain the following types of network connectivity in cloud computing:

1. Public Inter cloud Networking
2. Private Inter cloud Networking
3. Public Intra cloud Networking
4. Private Intra cloud Networking

Q3: Explain the importance of virtualization in cloud computing? How security is achieved through virtualization? Emulation and isolation are important features of virtualization. Justify the statement.

Q4: What is Tenancy in context of cloud computing ? Compare Multi-Tenancy model and Single Tenancy model of resource sharing. Explain the various ways through which Multi-Tenancy can be implemented.

Q5: What is an Hypervisor? Compare the functionality of Type-1 and Type-2 Hypervisor with the help of suitable block diagram for each, also give advantages and disadvantages of each.

Q6: Explain the term Resource Provisioning in context of cloud computing. Also, explain the various approaches used for Resource Provisioning. Discuss the problems of Over-provisioning and Under- provisioning.

Q7: Explain scaling strategies.

Course Code	:	MSE-031
Course Title	:	Cyber Security using Python
Maximum Marks	:	100
Weightage	:	30%
Last date of Submission	:	31st October, 2023 (For latest update, Pl. check IGNOU's Website)

Attempt any five questions out of seven questions. Each question carries 20 marks. 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: Write stepwise procedure to install python and write minimum system resources required. Also write and explain any five features of Python.

Q2: What do you mean by Python Libraries? Give illustration. Also What is a graphical user interface? Discuss its common elements.

Q3: Explain the use of Python for web scraping.

Q4: What is social media analysis for information gathering? Explain it with an example.

Q5: Write and explain in detail any five vulnerabilities in a website procedure to prevent.

Q6: Write and explain in detail any five attacks on wi-fi networks scripting (XSS).

Q7: Describe cross-site attacks with examples.

Course Code	:	MCS-226
Course Title	:	Data Science and Big Data
Maximum Marks	:	100
Weightage	:	30%
Last date of Submission	:	31st October, 2023 (For latest update, Pl. check IGNOU's Website)

This assignment has sixteen questions of 5 Marks each, 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:** Describe data science. What uses does it have? In the context of data analysis, define the terms descriptive, exploratory, and predictive.
- Q2:** Discuss the need for Statistical Hypothesis Testing with the help of an example. Explain types of Errors in Hypothesis Testing.
- Q3:** Why do we need Data Preprocessing? Explain different Quality Measures in Data Preprocessing. Discuss the different strategies for Data Handling.
- Q4:** A class has 25 students. Create a data set of marks of the students in Mathematics out of a maximum of 50 marks. Discuss and draw, which chart will be best for Visualization & Interpretation. Justify your reasons in support of your answer.
- Q5:** What is the need for Big data? Explain 3 V's. Discuss the master/slave Hadoop architecture with the help of an example.
- Q6:** Explain the concept of Map-Reduce with the help of an example.
- Q7:** What is the purpose of using Apache SPARK, HIVE and HBASE, explain with supporting example.
- Q8:** What is NoSQL database? Discuss how does a Column Database and Document database Work? List and briefly discuss Graph database examples.
- Q9:** Explain the Jaccard similarity of sets with the help of an example. What are the ways of finding similarity between two documents? Also, define the term collaborative filtering.
- Q10:** Explain Data Stream Bloom filter with the help of an example. Why do we need for Bloom filter? Discuss the working of Bloom filter. Explain the Flajolet-Martin algorithm.
- Q11:** What is PageRank? Discuss the basic principle of flow model in PageRank. Explain different mechanisms of finding pagerank?

- Q12:** Explain the process and issues of the following:
Advertising on web, Recommendation system, Mining of social networks.
- Q13:** Discuss different data structures in R. Write program using R for the following tasks:
- (i) Computation of income tax of a vector of size 10, consisting of the total annual income of 10 different persons. The tax computation should be 10%, if annual income is below 5 lakhs and 20% if it is above 5 lakhs.

 - (ii) Matrix addition, subtraction and multiplication

 - (iii) Finding inverse of a matrix
- Q14:** Create a sample data of the marks of 20 students in five different subjects using MS Excel. Discuss the different chart and graphing library packages supported by R programming language. Write programs using R programming language to create four different plots using this data.
- Q15:** Discuss the function supported in R language to differentiate between linear regression and multiple regression. Write programs using R programming language to support your answer with any sample data.
- Q16:** Discuss the Classification, Clustering and Association Rules with different examples. Explain, where we can use Random Forest Algorithm? Use R programming language to discuss Random Forest Algorithm.

Course Code	:	MSEL-032
Course Title	:	Practical (Cyber Attacks, Cloud Security and Data Recovery etc)
Maximum Marks	:	100
Weightage	:	30%
Last date of Submission	:	31st October, 2023 (For latest update, Pl. check IGNOU's Website)

This assignment has two Questions, answer all questions. Each Question is of 20 marks. Your Lab Records will carry 40 Marks (20 Marks for each Question). 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.

Note: 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.

Q1: Explain the scanning of network using NMAP. (20 marks)

Q2: Generate a Decision Tree (C4.5) using weka. Write all steps. (20 marks)

Note: Make necessary assumptions if any.