

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

***MSCIS/ASSIGN/2025***

**ASSIGNMENTS  
JULY 2025**

**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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<b>Course Code</b>	<b>:</b>	<b>MSE-029</b>
<b>Course Title</b>	<b>:</b>	<b>Cyber Attack: Use of Technology in Cyberspace</b>
<b>Maximum Marks</b>	<b>:</b>	<b>100</b>
<b>Weightage</b>	<b>:</b>	<b>30%</b>
<b>Last date of Submission</b>	<b>:</b>	<b>31<sup>st</sup> October, 2025 (For latest update, Pl. check IGNOU's Website)</b>

**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 cyber security at network and application layer of a typical IT system in detail.

**Q2:** Explain the importance of Confidentiality, Integrity and Availability of a typical networked IT system.

**Q3:** Write and explain any five vulnerabilities in software application.

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

**Q5:** What do you mean by Indicators of Compromise (IoCs). Explain with an example.

**Q6:** Explain penetration testing with processes and methods.

**Q7:** Describe types of computer networks with a diagram with merits and limitations of each.

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<b>Course Code</b>	<b>:</b>	<b>MSE-030</b>
<b>Course Title</b>	<b>:</b>	<b>Cloud and Infrastructure Security</b>
<b>Maximum Marks</b>	<b>:</b>	<b>100</b>
<b>Weightage</b>	<b>:</b>	<b>30%</b>
<b>Last date of Submission</b>	<b>:</b>	<b>31<sup>st</sup> October, 2025 (For latest update, Pl. check IGNOU's Website)</b>

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**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:** How to choose appropriate deployment model?

**Q4:** 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.

**Q5:** What is an Hypervisor? Describe various hypervisor based virtualization approaches like full virtualization, para virtualization and h/w-assisted virtualization.

**Q6:** 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.

**Q7:** H 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.

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<b>Course Code</b>	<b>:</b>	<b>MSE-031</b>
<b>Course Title</b>	<b>:</b>	<b>Cyber Security using Python</b>
<b>Maximum Marks</b>	<b>:</b>	<b>100</b>
<b>Weightage</b>	<b>:</b>	<b>30%</b>
<b>Last date of Submission</b>	<b>:</b>	<b>31<sup>st</sup> October, 2025 (For latest update, Pl. check IGNOU's Website)</b>

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- Q1:** Write and explain in detail any five attacks on wi-fi networks scripting (XSS).
- Q2:** Write stepwise procedure to install python and write minimum system resources required. Also write and explain any five features of Python.
- Q3:** What are web vulnerabilities? Describe the various types of Injection attacks as web vulnerabilities. Also, list the top ten security vulnerabilities as per OWASP.
- Q4:** Explain the term Packet Sniffing. Differentiate between Active Sniffing and Passive Sniffing. Why is passive sniffing ineffective?
- Q5:** What is social media analysis for information gathering? Explain it with an example.
- Q6:** What do you mean by Python Libraries? Give illustration. Also discuss the operating system modules in Python.
- Q7:** Describe cross-site attacks with examples.

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<b>Course Code</b>	<b>:</b>	<b>MCS-226</b>
<b>Course Title</b>	<b>:</b>	<b>Data Science and Big Data</b>
<b>Maximum Marks</b>	<b>:</b>	<b>100</b>
<b>Weightage</b>	<b>:</b>	<b>30%</b>
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**This assignment has ten questions of 8 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: Define the term data science. Describe its applications in two industries of your choice (e.g., healthcare, finance, e-commerce). What role does the data science lifecycle play in managing data projects?

Q2: Explain Exploratory Data Analysis (EDA) and its importance. What are the main steps in performing EDA on a new dataset? Describe two methods for detecting outliers and how handling outliers impacts data analysis.

Q3: Describe the role of statistical hypothesis testing in data analysis. What are Type I and Type II errors, and how do they affect decision-making? Provide an example of hypothesis testing in a real-world scenario.

Q4: Discuss the 4 Vs of big data (Volume, Velocity, Variety, and Veracity). Provide a real-world example of each, explaining how these characteristics create challenges in big data management.

Q5: Explain the Hadoop architecture with a focus on HDFS and the master/slave architecture. How do NameNode and DataNodes work together to store and manage large datasets? Provide a basic example of this storage process.

Q6: Compare Apache Spark, Hive, and HBase in terms of functionality, data processing methods, and use cases. When would Spark be preferred over traditional MapReduce, and why?

Q7: Describe the purpose and functionality of a \*Bloom filter\* in data stream processing. How does the Bloom filter efficiently check for element presence? Describe the Flajolet-Martin algorithm for cardinality estimation in data streams.

Q8: What is the PageRank algorithm, and how is it used in link analysis? Describe the concept of “flow of rank” in PageRank. Explain how the PageRank of a web page is calculated using the flow model.

Q9: Discuss the challenges of online advertising and recommendation systems. Explain the concept of collaborative filtering with an example, and discuss the role of clustering

in social network analysis.

Q10: What is the Random Forest algorithm? Explain how it can be applied to classification problems. Write a program in R to implement a Random Forest classifier on a sample dataset and explain its output.

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### **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:

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

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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** : **MSEL-032**  
**Course Title** : **Practical (Cyber Attacks, Cloud Security and Data Recovery etc)**  
**Maximum Marks** : **100**  
**Weightage** : **30%**  
**Last date of Submission** : **31<sup>st</sup> October, 2025 (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.**