Central University of Rajasthan

Center for Distance and Online Education (CDOE)

Dear Learner,

Greetings from the CDOE!

As you are aware, every student enrolled in the ODL Programme is required to write and submit assignments for each course. These assignments form an important component of the continuous assessment and carry **30% weightage** of the overall grade for each course.

Please carefully note the following instructions:

General Instructions

1. Please remember to attach the designated cover page on every assignment you submit. The format of cover page is attached for your reference.
2. All sections of the assignment are compulsory in nature. All questions are to be attempted, except for those where options are provided.
3. Please write the answer mentioning the correct corresponding question number given in the assignment.
4. Please write on continuous pages and number each page.
5. All assignments should be handwritten. Typed or printed assignment will not be accepted.
6. it is strongly recommended to keep a copy (photocopy or scanned) of the assignment sent by you for your record.
7. **The last date for submitting assignments is 30.11.2026.** Submission of assignments is required to appear in the End Semester Examination.
8. Assignments can be deposited at CDOE, Curaj or sent through post to **Director, Centre for Distance and Online Education (CDOE), Room 102, Administration Building, Central University of Rajasthan, Bandarsindari, District: Ajmer – 305817, Rajasthan**.

Director

Centre for Distance and Online Education (ODL & OP)

राजस्थान केन्द्रीय विश्वविद्यालय

CENTRAL UNIVERSITY OF RAJASTHAN

Assignment

Open and Distance Learning Programme

Academic Year : 2026-2027 **Session : July, 2026**

Learner's Name: _____

Enrollment Number: _____

Programme Name and Code: _____

Course Code: _____

Course Title: _____

_____

Learner's Signature

Centre for Distance and Online Education (CDOE)

Room 102, Administration Building, Central University of Rajasthan

N.H. 8, Bandarsindari, District: Ajmer – 305817, Rajasthan

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Central University of Rajasthan

Centre for Distance and Online Education

Open and Distance Learning Programme

Assignment

Programme Name: M.Sc (Computer Science) **Programme Code: ODLMSCS**

Second Semester

Instructions:

1. In the M.Sc (Computer Science) programme, two assignments have been planned for the continuous evaluation of the learner in each course.
2. The learner can appear in the term-end examination of the concerned course only after completing both assignments and submitting them within the stipulated time period.
3. Each assignment carries 15 marks. Thus, a total of 30 marks are allocated for assignments for each course.
4. The assignments must be written in the learner's own handwriting. Typed or printed assignments will not be accepted.
5. The learner should complete the sessional assignments within the stipulated time and send them by post or submit them in person at the following address:

Address for Submission of Sessional Assignments:

Director, Centre for Distance and Online Education (CDOE), Room - 102, Administration Building, Central University of Rajasthan, Bandarsindari, Jaipur – Ajmer highway, District - Ajmer – 305817, Rajasthan.

Title of the Course: Natural Language Processing
Course Code: 6.0 ODLCSC05
Assignment: 01

Maximum Marks: 15

Short Answer type Questions: (attempt all Questions) **(Word Limit: 80 - 100)**

1. What is Natural Language Processing? Give some applications of NLP. [2]
2. Analyze the usage of feature structures of NLP. [2]
3. What do you mean by the semantics of a natural language, and how does this differ from pragmatics? [2]
4. Differentiate between top-down parsing and bottom-up parsing. [2]
5. Identify and describe the ambiguity in the following sentences: [2]
   (i) The man kept the dog in the house.
   (ii) Book that flight through Delhi.

Long Answer type Questions: **(Word Limit: 300 - 400)**

1. Explain the different levels of language analysis. [5]

Assignment: 02

Maximum Marks: 15

Short Answer type Questions: (attempt all Questions) **(Word Limit: 80 - 100)**

1. What is a Context-Free Grammar (CFG) and what are its primary components? [2]
2. What is an Augmented Transition Network? [2]
3. Differentiate between a stemmer and a Part-of-Speech (POS) tagger. [2]
4. Give one text-based and one dialogue-based applications of NLP with examples. [2]
5. Differentiate between pragmatic and discourse knowledge level. [2]

Long Answer type Questions: **(Word Limit: 300 - 400)**

1. Consider the following grammar: [5]

   S → ADJSN
   S → N
   ADJS → ADJS ADJ
   ADJS → ADJ

   Lexicons:

   ADJ: red
   N: house

a) What happens to the top-down depth first parser operating on this grammar trying to parse the input “red red”? State whether the parser succeeds, fails or never stops.
b) How about a bottom-up parser operating on the same input “red house"?

Title of the Course: Machine Learning
Course Code: 6.0 ODLCSC06
Assignment: 01

Maximum Marks: 15

Short Answer type Questions:(attempt all Questions) **(Word Limit: 80 - 100)**

1. Define Machine Learning and state its primary objective. [2]
2. Differentiate between supervised learning and unsupervised learning. [2]
3. How does Lasso regression differ from Ridge regression? [2]
4. What is Instance-Based Classification? Give an example. [2]
5. What is the purpose of the back-propagation algorithm in neural networks? [2]

Long Answer type Questions: **(Word Limit: 300 - 400)**

1. What is the use of the activation function? Explain any four. [5]

Assignment: 02

Maximum Marks: 15

Short Answer type Questions: (attempt all Questions) **(Word Limit: 80 - 100)**

1. Define Precision and Recall? [2]
2. What is activation function? [2]
3. What are Loss Functions and Cost Functions? [2]
4. Define the Regression and Classification tasks. [2]
5. Differentiate between the Bagging and Boosting Algorithms? [2]

Long Answer type Questions: **(Word Limit: 300 - 400)**

1. Construct a decision tree using ID3 considering the Fig. training example. [5]

Weekend (Example)	Weather	Parents	Money	Decision (Category)
W1	Sunny	Yes	Rich	Cinema
W2	Sunny	No	Rich	Tennis
W3	Windy	Yes	Rich	Cinema
W4	Rainy	Yes	Poor	Cinema
W5	Rainy	No	Rich	Stay in
W6	Rainy	Yes	Poor	Cinema
W7	Windy	No	Poor	Cinema
W8	Windy	No	Rich	Shopping
W9	Windy	Yes	Rich	Cinema
W10	Sunny	No	Rich	Tennis

Title of the Course: Big Data Analytics
Course Code: 6.0 ODLCSC07
Assignment: 01

Maximum Marks: 15

Short Answer type Questions: (attempt all Questions) **(Word Limit: 80 - 100)**

1. Define Big Data and list the V's associated with it. [2]
2. What is the role of HDFS in the Hadoop architecture? [2]
3. Differentiate between structured, semi-structured, and unstructured data. [2]
4. Differentiate between the name node, data node. and secondary node in HDFS. [2]
5. What are the main components of Hive architecture? [2]

Long Answer type Questions: **(Word Limit: 300 - 400)**

1. How does Hadoop differ from traditional RDBMS systems? [5]

Assignment: 02

Maximum Marks: 15

Short Answer type Questions: (attempt all Questions) **(Word Limit: 80 - 100)**

1. What is Apache Spark? [2]
2. How do Spark Data Frames differ conceptually from RDDs? [2]
3. Differentiate between Hive and Hbase in terms of data model and use cases. [2]
4. What is YARN, and why did it replace classic MapReduce job tracking? [2]
5. How do HDFS and YARN work together to process large scale-data? [2]

Long Answer type Questions: **(Word Limit: 300 – 400)**

1. Below is an 'emp.json' file available in Spark's current directory. Write a Spark SQL command to perform the following operations: [5]

i. Read and show the contents of this file
ii. Display schema
iii. Display the contents of the name column
iv. Group content by age
v. Apply a filter operation on age'

```
{
{"id": "1001", "name": "Michael", "age": "30", "address": "New York"},
{"id": "1002", "name": "David", "age": "36", "address": "London"},
{"id": "1003", "name": "Sam", "age": "27", "address": "Paris"},
{"id": "1004", "name": "Eliana", "age": "33", "address": "Berlin"},
{"id": "1005", "name": "Mia", "age": "41", "address": "Sydney"}
}
```

Title of the Course: Cyber Security
Course Code: 6.0 ODLCSC17
Assignment: 01

Maximum Marks: 15

Short Answer type Questions: (attempt all Questions) **(Word Limit: 80 - 100)**

1. Define information security and list the core objectives of the CIA triad. [2]
2. Differentiate block cipher and stream cipher. [2]
3. Differentiate between symmetric and asymmetric encryption schemes. [2]
4. State the role of the Data Encryption Standard (DES) block size. [2]
5. What is the primary purpose of digital certificates in public key cryptography? [2]

Long Answer type Questions: **(Word Limit: 300 - 400)**

1. Explain the **Diffie-Hellman Key Exchange** protocol step-by-step, including a mathematical example of how two parties establish a shared secret over an insecure channel. [5]

Assignment: 02

Maximum Marks: 15

Short Answer type Questions:(attempt all Questions) **(Word Limit: 80 - 100)**

1. What is cyberwarfare? [2]
2. What is the primary function of a network firewall? [2]
3. Differentiate between signature-based and anomaly-based Intrusion Detection Systems (IDS). [2]
4. What is the difference between a vulnerability, a threat, and a risk? [2]
5. What is a Message Authentication Code (MAC) and how does it differ from a digital signature? [2]

Long Answer type Question: **(Word Limit: 300 - 400)**

1. Compare RSA-based digital signatures with El Gamal signatures, analyzing their generation and verification processes. [5]

OR

Discuss the cybercrime and punishment according to Indian Act.

Title of the Course: Cloud Computing
Course Code: 6.0 ODLCSC19
Assignment: 01

Maximum Marks: 15

Short Answer type Questions: (attempt all Questions) **(Word Limit: 80 - 100)**

1. Define cloud computing and list out its characteristics. [2]
2. What are the key requirements of cloud storage systems? [2]
3. What is distributed file system architecture? [2]
4. What is a Virtual Machine (VM)? [2]
5. What is a NoSQL database, and why is it preferred in cloud applications over traditional RDBMS? [2]

Long Answer type Questions: **(Word Limit: 300 - 400)**

1. Describe the layered cloud architecture consisting of Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) with suitable examples. [5]

Assignment: 02

Maximum Marks: 15

Short Answer type Questions: (attempt all Questions) **(Word Limit: 80 – 100)**

1. What is DDoS attack in cloud architecture? [2]
2. Define cloud compliance and regulatory frameworks. [2]
3. What do you understand by virtualization security management? [2]
4. Write short note on following: [2]
   i) Microsoft Azure
   ii) Google App Engine
5. What is Edge Computing, and how does it complement cloud computing? [2]

Long Answer type Questions: **(Word Limit: 300 - 400)**

1. Describe data security and privacy measures in the cloud. [5]

OR

Examine the intersection of Cloud Computing with emerging technologies like Internet of Things (IoT) and Edge/Fog Computing.