Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (Artificial Intelligence & Machine Learning) (Sem–1)

PROGRAMMING IN PYTHON

Subject Code : UGCA1914

M.Code : 79005

Date of Examination : 16-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION - A

1. **Write briefly :**

   a) How do you install Python on your system?

   b) What is indentation in Python? Why is it important?

   c) Write the syntax of an if - elif - else statement.

   d) How is a set different from a dictionary?

   e) What is the purpose of the return statement?

   f) What is the difference between a module and a package?

   g) Define exception. What are built – in exceptions in Python?

   h) What are the various file opening modes in Python?

   i) What is object - oriented programming?

   j) Define Python and mention two of its key features.

SECTION - B

2. Describe the various data types available in Python. Provide suitable examples for each.

3. Develop a Python program that swaps the values of two variables without using a third variable.

4. Differentiate between for and while loops in Python. Support your explanation with examples.

5. Explain the concept of recursion in Python. Illustrate it with a practical example.

6. How do you create, write to, and read from files in Python? Demonstrate each operation with examples.

7. Write a Python program that demonstrates how to handle a division by zero exception using appropriate exception handling.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI&ML) (Sem.–1)

FUNDAMENTALS OF COMPUTER AND IT

Subject Code : UGCA-1902

M.Code : 79004

Date of Examination : 20-06-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write briefly :**

   a) Explain the principles of user-centered design and their significance in HCI.

   b) How does the control unit differ from the Arithmetic Logic Unit (ALU) in a computer system?

   c) What is cache memory and how does it contribute to a computer's speed and performance?

   d) What is ASCII and how is it used to represent characters in digital form?

   e) What is a scripting language and in what scenarios is it commonly used?

   f) Explain the purpose of features like spell check and grammar check in word processing applications.

   g) Describe the significance of pivot tables in spreadsheet software.

   h) How have computers influenced education and the workplace and what are the benefits and challenges associated with this impact?

   i) What is the primary function of a spreadsheet and how are formulas and functions used in spreadsheet applications?

   j) Discuss the ways in which computers have revolutionized communication in our society.

SECTION-B

2. Discuss the concept of usability testing in HCI and provide an example of a scenario where it would be essential.

3. What are the primary responsibilities of the control unit in a computer system, and how does it contribute to the execution of instructions?

4. How does a Graphics Processing Unit (GPU) differ from a Central Processing Unit (CPU) in terms of function and application?

5. Differentiate between SRAM (Static Random-Access Memory) and DRAM (Dynamic Random-Access Memory) in terms of structure, speed and use cases.

6. How are floating-point numbers represented in binary form and what challenges can arise from this representation?

7. Compare and contrast compiled languages and interpreted languages, highlighting the advantages and disadvantages of each.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

Bachelor of Science (Artificial Intelligence & Machine Learning)(Sem.–1)

MATHEMATICS

Subject Code : UGCA1901

M.Code : 79003

Date of Examination : 03-07-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION - A

1. **Explain the following :**

   a) Show that $A \subset B$ iff $B^C \subset A^C$.

   b) Give an example of a tautology and a contradiction.

   c) Find the inverse of a matrix $A = \begin{bmatrix} 1 & 2 \\ -3 & 5 \end{bmatrix}$.

   d) Determine the contra positive of the statement, If an iron rod is heated then it can be stretched.

   e) Define the addition and product of two matrices.

   f) Find the sum of the series $62 + 68 + 58 + \ldots\ldots\ldots + 20$.

   g) Difference between A.P. and G.P. series.

   h) If a set A is of rational numbers and $B = \{x : x^2 - 4x + 2 = 0\}$ then find $A \cap B$, $A - B$ and $B - A$.

   i) Show that $(p \vee q) \wedge (\sim p \wedge \sim q)$ is a contradiction.

   j) If $\begin{bmatrix} x+3 & 4 \\ y-4 & = y \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 3 & 9 \end{bmatrix}$ find the value of x and y.

SECTION - B

2. a) For what value of x the numbers $\frac{-2}{7}, x, \frac{-7}{2}$ are in G.P.

   b) Insert the three G.M. between numbers 1 and 256.

3. a) Which of the following sets are null sets and why : $A = \{x : x < 1 \text{ and } x > 3\}$ and $B = \{x : x^2 = 9 \text{ and } 3x = 7\}$.

   b) Prove that $A^C - B^C = B - A$ where A and B are sets.

4. a) Prove that $p \rightarrow (\sim q \vee r) = (p \wedge q) \rightarrow r$.

   b) Prove that if a man is a bachelor, he is unhappy. If a man is unhappy, he dies young. Therefore bachelors die young. Test the validity of the argument.

5. a) If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. Show that $A^2 - (a+d)A = (bc - ad)I$

   b) If $A = \begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & -1 \\ 1 & 1 & 1 \end{bmatrix}$ $C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \end{bmatrix}$.

6. Find the values x, y, z if the matrix $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ obey the law $A'A = I$

7. a) If $x = 1 + a + a^2 + \ldots\ldots\ldots \infty$ $y = 1 + b + b^2 + \ldots\ldots\ldots \infty$

   Prove that $1 + ab + (ab)^2 + \ldots\ldots\ldots \infty = \frac{xy}{x + y - 1}$.

   b) If the p^{th} term of an A.P. is a q^{th} term is b. Show that sum of $(p+q)^{th}$ term is $\frac{p+q}{2}\left[a + b + \frac{a-b}{p-q}\right]$

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc.(AI &ML)(Sem–2)

FUNDAMENTAL OF STATISTICS

Subject Code : UGCA-1907

M.Code : 79856

Date of Examination : 05-05-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION - A

1. **Write briefly :**

   a) Scope of statistics.

   b) Rounding off data.

   c) Classification of numerical data.

   d) Disadvantages of diagrammatic presentation.

   e) Data Tabulation

   f) Demerits of arithmetic mean.

   g) Significance of harmonic mean.

   h) Characteristics of a good average.

   i) Meaning of dispersion.

   j) Coefficient of variance

SECTION - B

2. List and discuss the different methods of collecting data.

3. What is meant by statistical errors? Discuss its different types.

4. Discuss the different ways of presenting data graphically.

5. a) What are the components of a statistical table?

   b) Explain the rules for construction of data tables.

6. **Find out the median for the given data :**

X	5-15	15-25	25-35	35-45	45-55	55-65
f	3	7	9	13	8	4

7. **Calculate standard deviation for the following :**

X	10	20	30	40	50	60	70	80
f	2	5	11	14	19	13	9	4

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI and ML) (Sem.–2)

OPERATING SYSTEMS

Subject Code : UGCA 1923

M.Code : 79857

Date of Examination: 19-05-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Answer briefly:**

   a) What is the difference between a kernel and a shell?

   b) What is the difference between a program and a process?

   c) Define PCB.

   d) What is turnaround time in CPU scheduling?

   e) Why do we need process synchronization?

   f) What is page fault?

   g) Define term thrashing.

   h) What is seek time?

   i) What is soft and hard real time operating systems?

   j) List different file operations.

SECTION-B

2. Explain in detail the functions of an operating system, covering process management, memory management, and file management.

3. Consider the following set of processes with their arrival times and burst times:

Process	Arrival Time (ms)	Burst Time (ms)
PI	0	8
P2	1	4
P3	2	9
P4	3	5

   Calculate avg waiting time and turnaround time for the FCFS, SJF preemptive and non-preemptive, For RR of time quantum of 3 ms.

4. Explain the detailed conceptual difference between paging and segmentation memory management techniques.

5. Explain the different page replacement algorithms with the help of suitable examples.

6. Explain about the characteristics and architecture of distributed operating systems. Give real life example to discuss about distributed operating System.

7. What is file management? Discuss different file access methods used by the operating system.

NOTE: Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem–2)

DATA STRUCTURES

Subject Code : UGCA-1915

M.Code : 79858

Date of Examination : 22-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write short notes on :**

   a) What is a flowchart and why is it used in algorithm design?

   b) How do one dimensional and multi-dimensional arrays differ?

   c) What is recursion and how does it work in function calls?

   d) Define a priority queue and its primary use case.

   e) How does a stack follow the Last In, First Out (LIFO) principle?

   f) What makes a circular linked list different from a singly linked list?

   g) Identify the key properties of an AVL tree.

   h) How does a Binary Search Tree (BST) maintain order?

   i) What is the role of a collision resolution technique in hashing?

   j) Which searching algorithm performs best on a sorted dataset?

SECTION-B

2. Compare different algorithm complexities with real-world examples.

3. Demonstrate stack implementation using both arrays and linked lists.

4. Illustrate the working of doubly linked lists and their operations.

5. Outline the structure of a B-tree and a B+ tree with diagrams.

6. Differentiate between Depth First Search (DFS) and Breadth First Search (BFS) with suitable examples.

7. Analyze various hashing techniques and their impact on search efficiency.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/AI&DS/Block Chain/CE/CSE/CS/ DS/IOT/CSD/EEE/EE/ECE/ETE/ECS/FT/IT/ME/Robotics & Artificial Intelligence/CSE(Internet of Things and Cyber Security including Block Chain Technology) (Sem.–2)

ENGINEERING MATHEMATICS-II

Subject Code : BTAM201-23

M.Code : 93811

Date of Examination : 30-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION - A

1. **Answer the following :**

a) If $A^t = A^{-1}$, then show that the eigen values of A are of magnitude 1.

b) State the conditions for consistency of the non-homogeneous system of equations AX = B.

c) Let V be a vector space in R^3. Examine whether $W = \{(a, b, c) : c \in \not\in\}$ is a subspace of V.

d) State Cayley-Hamilton theorem.

e) Determine the column rank of the matrix $\begin{pmatrix} 1 & 3 & 5 \\ 2 & -1 & 4 \\ -2 & 8 & 2 \end{pmatrix}$.

f) Form the differential equation for the family of curves $y = ce^{3x} + 5$, where c is an arbitrary constant.

g) Solve the differential equation $\frac{dy}{dx} = y \cos x$.

h) Check if the differential equation $(2x + y)dx + (x + 3y)dy = 0$ is exact.

i) Given the first-order PDE $y\frac{\partial z}{\partial x} + x\frac{\partial z}{\partial y} = z$, identify the characteristic equations for Lagrange's method.

j) From the given function $u(x, y) = x^2y + xy^2$, form a second-order partial differential equation.

SECTION - B

2. Solve the following linear system of equations using Gauss-Jordon method : $x - y + z = 4$; $2x + y - 3z = 0$; $x + y + z = 2$.

3. Find the eigen values and eigen vectors of the matrix $A = \begin{pmatrix} 3 & 1 & -1 \\ -2 & 1 & 2 \\ 0 & 1 & 2 \end{pmatrix}$.

4. Find a Linear transformation $T : R^4 \rightarrow R^3$ whose null space is generated by (1, 2, 3, 4) and (0, 1, 1, 1).

5. Prove that the homogeneous system of equations AX = O, where A is n × n matrix, has a non-trivial solution if and only if the $|A| = 0$.

SECTION - C

6. Use the method of undetermined coefficients to solve $y'' + Ay = 12 \cos(2x)$.

7. Find the equation of the orthogonal trajectories for the family of curves $y = \frac{k}{x}$, where k is a constant.

8. Given the surfaces defined by $z = x^3 + y^3$ and $z = xy$, find their normals and determine if they are orthogonal at the point (1, 1, 2).

9. Find the solution of the nonlinear PDE $\frac{\partial z}{\partial x} = \frac{1}{2}z^2 + y$ using Charpit's method.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

Bachelor of Science (AI & ML) (Sem.–3)

INTERNET TOOLS AND APPLICATIONS

Subject Code : UGCA1959

M.Code : 90355

Date of Examination : 20-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION - A

I. **Write short notes on :**

a. Internet Protocols

b. E-mail

c. Domain name

d. HTML Body element

e. Purpose of URLs.

f. Hyper Link

g. WWW

h. Purpose of Server.

i. HTML Script element

j. Telnet

SECTION - B

2. What do you understand by internet? Explain its advantages and disadvantages in detail.

3. How client side and server side works for web browsing and locating information on the web?

4. Create a web page of resume of your own using various HTML Tags.

5. Explain in detail about the architecture of Email, its aspects and privacy concerns.

6. Write a note on Table Layout and Presentations.

7. Explain the purpose of using Hyperlinks and Anchors in detail

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/AI&DS/DS/CS/Block Chain Technology/Cyber Security/CSD/IOT including Block Chain Technology/CSE/ECE) (Sem.–3)

DEVELOPMENT OF SOCIETIES

Subject Code : HSMC-101-18

M.Code : 76439

Date of Examination : 27-06-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. **Write briefly :**

   a) Define family.

   b) What is human being?

   c) Explain the political system.

   d) Explain governing system.

   e) What is socialism?

   f) Define economic development?

   g) What is history?

   h) What is regulation of society?

   i) What do you understand by the term capitalism?

   j) Define social structures.

SECTION - B

2. Explain the concept of Gandhian idea of development.

3. Explain the different idea of development in current context.

4. Explain the different models of governing system and their comparative study.

5. Explain the meaning and scope of Buddhist economics.

6. Explain the criteria of different social systems.

SECTION - C

7. Explain the implications of E. F. Schumacher's idea of development.

8. Explain the relation between human being and society.

9. Explain the comparative studies on different models of social structures and their evolution.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | |

Total No. of Pages :02

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem.–3)

ARTIFICIAL INTELLIGENCE

Subject Code : UGCA1973

M.Code : 90349

Date of Examination : 03-07-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write briefly :**

   a) What is Artificial Intelligence (AI)?

   b) What is the Turing Test?

   c) What is the role of algorithms in AI decision-making?

   d) What is the impact of AI on industries like healthcare?

   e) Describe the challenges of AI in its current state

   f) What are chatbots?

   g) What is an inference engine in an expert system?

   h) How scripts are used to represent the knowledge?

   i) What is learning by induction?

   j) What is probabilistic reasoning?

SECTION-B

2. Explain the AO* algorithm. Under what situations it can be used?

3. What is an expert system? What are the main advantages in keeping the knowledge base separate from the control module in knowledge based systems?

4. Under what conditions would it make sense to use both forward and backward chaining?

5. What are the various characteristics of production system?

6. What are the characteristics of a AI problem. Discuss with the help of travelling salesman problem.

7. Explain state space approach in solving any AI problem. Discuss this for water jug problem. How branch and bound technique can be used to find the shortest solution to the water jug problem?

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem.–4)

MACHINE LEARNING

Subject Code : UGCA1977

M.Code : 91706

Date of Examination : 06-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION - A

1. **Write briefly :**

   a) What is supervised learning?

   b) What is temporal difference learning?

   c) What is overfitting in machine learning?

   d) What is a perceptron?

   e) Let us suppose that there are 200 pages available on Internet for machine learning. The search on this term returns total 210 pages, out of which 190 belongs to Machine Learning, calculate precision and recall for our algorithm.

   f) What are univariate trees?

   g) Write some applications of Genetic Algorithms.

   h) What is hypothesis search space?

   i) What is recall?

   j) State Bayes theorem.

SECTION - B

2. Explain basic decision tree learning algorithm in detail.

3. Explain the working principle of Reinforcement Learning.

4. What is Artificial Neural Network? Explain back propagation algorithm in detail.

5. Discuss various types of learning systems used in machine learning.

6. State the operators of Genetic Algorithm.

7. **Write a short notes on :**

   a) Recurrent Networks

   b) Bayesian Learning

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI and ML) (Sem.–4)

DATA SCIENCE

Subject Code : UGCA1978

M.Code : 91707

Date of Examination : 20-05-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION - A

1. **Write briefly :**

   a. What are the stages in a data science project life cycle?

   b. What role does a data scientist play?

   c. What is the purpose of data cleaning in data preparation?

   d. What is meant by scalability in the context of data management?

   e. Differentiate between qualitative and quantitative data visualizations.

   f. Describe the concept of retinal variables with the help of an example.

   g. What is the purpose of a residual plot in regression analysis?

   h. What does the term overfitting refer to in machine learning?

   i. What is the role of pipelines in model development?

   j. What is the purpose of data parsing in the context of data preparation?

T

SECTION - B

2. Discuss the data security issues faced in data science projects and how are these issues addressed?

3. Describe various data formats and explain how parsing and transformation are used to prepare data for analysis.

4. Explain the role of data encodings and visual encodings in data visualization. Describe with the help of an example how different encodings are used and discuss their impact on the effectiveness of visualizations.

5. Explain the concept of polynomial regression and its application in model development. Discuss how pipelines can enhance the efficiency of polynomial regression models.

6. Describe the process of cross-validation and its role in estimating the performance of regression models. Discuss how cross-validation helps mitigate overfitting and improve the generalization of models.

7. Describe the life cycle of a data science project discussing various stages involved in it.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI and ML) (Sem.–4)

IMAGE PROCESSING

Subject Code : UGCA-1974

M.Code : 91708

Date of Examination : 23-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Answer briefly:**

   a. What is the purpose of 2D transformations in computer graphics?

   b. Name any two color models used in computer graphics.

   c. What are the main components of an image processing system?

   d. Define image quantization and its significance.

   e. How does histogram equalization enhance an image?

   f. What is the role of spatial filtering in image processing?

   g. Name two commonly used frequency domain filters.

   h. What is the function of noise models in image restoration?

   i. How does edge linking help in boundary detection?

   j. Define region-based segmentation in image processing.

SECTION-B

2. Compare different 2D transformation techniques with suitable examples.

3. Discuss various color models in image processing mid their applications.

4. Explain the importance of histogram processing and its role in contrast enhancement.

5. Analyze different spatial filtering techniques for image smoothing and sharpening.

6. Describe various noise models and their impact on image restoration.

7. Examine different image segmentation techniques with a focus on contour-based and region-based approaches.

NOTE: Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI&ML) (Sem–4)

ADVANCE PYTHON PROGRAMMING

Subject Code : UGCA1983

M.Code : 91712

Date of Examination : 27-05-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Answer the following :**

   a) Describe the process of executing queries.

   b) What is MySQL and why is it commonly used in database management?

   c) What is the difference between a Series and a DataFrame in Pandas?

   d) What does reindexing mean in the context of Pandas data structures?

   e) What is the purpose of the Ndarray object in NumPy?

   f) Define array slicing in NumPy. Provide an example.

   g) Write a short note on data types in Python.

   h) What is array iteration?

   i) What is the primary purpose of the SciPy library in Python?

   j) Write a short note on Seaborn.

SECTION-B

2. Describe the process of connecting to a MySQL database including key parameters. Explain the importance of error handling and provide strategies for robust error management during connection.

3. Describe in detail the process of working with statistical functions in Pandas, including window functions, aggregations, handling missing data, and visualization with example.

4. Discuss the process of setting up a Pandas environment creating a DataFrame and performing descriptive statistics with visualization.

5. Describe the advanced functionalities of NumPy for matrix operations and linear algebra.

6. Discuss how Scikit-learn support machine learning and Seaborn's role in visualizing results.

7. **Discuss briefly the following terms :**

   a) Indexing

   b) Matplotlib

   c) Numpy

   d) Array attributes

   e) Counting functions

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI&ML) (Sem.–5)

R PROGRAMMING

Subject Code : UGCA 1946

M.Code : 92411

Date of Examination : 17-06-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Write briefly :**

a) Discuss different modes to run R on your system on Windows **OR** Linux **OR** Both.

b) Give one example to use array() with data of your choice and sort in any order.

c) How seq() and rep() functions are used? Discuss use of each with suitable data sets?

d) Discuss various features of R in data analysis and visualization.

e) Discuss usage of decision making and control flow structures in predictive analysis in R.

f) Give examples to apply logical and relational operators to a 5 × 5 matrix of integers between 1 to 20.

g) Discuss t-distribution. Explain any two of its application with R examples.

h) Discuss the similarity and dissimilarity between bar charts and pie charts. How these are plot created in R?

i) Which library package(s) are used to plot a scatter graph and histogram chart? Give example of each in R to plot each.

j) What is a primary difference between a 2D and 3D ploting? Justify with examples.

SECTION - B

2. Discuss the use of list in R and give examples to store data using lists. Apply various list functions to access data elements to perform various operations with suitable examples.

3. How 2D matrix data is represented in computer memory and how each data element is indexed? How you can define a same structure for storing your numeric data in a matrix using R? Justify with examples.

4. What is different between a vector and a matrix? Give example of each. Is a multiplication operation possible between both. If yes, how? If not, why? Justify both condition with suitable example in R with data of your choice.

5. Define an object-oriented program in R to store departments and students information into two relations **Deptts** and **Students** as given below:

Deptts: [DeptID, DeptName] **Students:** [StudentID, StudName, FatherName, DepttID, Year] Create classes and object for the same and display the following attributes data:

StudentName	FatherName	DeptName	Year

6. Discuss various data visualization methods available in R. What is the difference between labels, captions, titles and legends elements used with any types of visualization method?

7. How data frames are created from lists and data files stored in other file formats? How data summarized from a data frame. Justify your answer with suitable examples.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI&ML) (Sem.–5)

WEB MINING & RECOMMENDER SYSTEM

Subject Code : UGCA 1991

M.Code : 92417

Date of Examination : 19-06-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION - A

1. **Write briefly :**

   a) What are the challenges in Web Mining?

   b) What is the goal of information retrieval?

   c) Define Deep Web.

   d) Name any two tools used for Web Usage mining.

   e) What do you understand by Web Crawler?

   f) What is a data collection?

   g) What are web server log files?

   h) What is Tokenization?

   i) What is in-degree and out-degree in web structured mining?

   j) What is n-gram analysis?

SECTION - B

2. What is click stream analysis? Explain using suitable example.

3. a) What is HITS? Explain with example.

   b) Explain the Page Rank Algorithm.

4. What are the three main areas of Web mining? Explain in detail.

5. a) What is a data collection? Explain Data Pre-processing.

   b) Discuss Vector space Model.

6. Discuss in detail about clustering based on required attributes.

7. **Write a short note on :**

   a) Web as Graph

   b) Applications of Web Data Mining.

   c) Heatmaps

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (Artificial Intelligence & Machine Learning) (Sem.–5)

CLOUD COMPUTING

Subject Code : UGCA1936

M.Code : 92418

Date of Examination : 21-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Write briefly :**

a) What is utility computing?

b) Define virtualization and what are its benefits?

c) Discuss Cloud Computing vs. Cluster Computing.

d) What is the importance of cloud in science?

e) Write pros and cons of Virtualization.

f) What is auditing in cloud computing?

g) Is Google App Engine a PaaS offering?

h) Why do we need cloud automation?

i) Differentiate vertical and horizontal scaling.

j) Is Facebook a PaaS or SaaS?

SECTION - B

2. Discuss the seven steps model of migration into cloud.
3. What are the three metrics to measure cloud performance?
4. Discuss the architecture of Hyper-V. Discuss its use in cloud computing.
5. What are the five phases involved in SLA management in cloud with flowchart?
6. **Write short note on:**

   a. Brokered cloud storage access

   b. Storage location and tenancy

7. Discuss the features of SQL Azure and Windows Azure.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (Artificial Intelligence & Machine Learning) (Sem.–5)

DEEP LEARNING

Subject Code : UGCA 1997

M.Code : 92423

Date of Examination : 05-07-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Write briefly :**

   a) What do you mean by underfitting?

   b) What is the difference between deep learning and machine learning?

   c) What are the applications of deep learning?

   d) What do you mean by Multi-task Learning?

   e) What do you mean by hidden units?

   f) What are the deep learning Frameworks?

   g) Explain unsupervised deep learning procedure.

   h) How many layers in the neural network?

   i) What do you mean by Pooling?

   j) What is an RNN?

SECTION-B

2. What are the issues faced while training in Recurrent Networks?
3. Compare the ensemble based methods bagging and boosting.
4. What do you understand by a convolutional neural network? Explain briefly.
5. Draw and explain the architecture of convolutional network.
6. Explain the following variant of Gradient Descent : Stochastic, Batch and Mini-batch.
7. What is the use of Deep learning in today's age and how is it adding data scientists?

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem.–6)

BUSINESS INTELLIGENCE

Subject Code : UGCA2016

M.Code : 93651

Date of Examination : 05-05-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Write briefly :**

   a) What role does knowledge play in BI?

   b) Why is ethical consideration important in BI?

   c) What are some common applications of a DSS in healthcare?

   d) What is the primary goal of data mining in BI?

   e) Why is data validation crucial in the data mining process?

   f) How does clustering differ from classification?

   g) What is sales force management?

   h) What is an optimization model in logistics?

   i) Define knowledge management.

   j) How do end-users contribute to the success of BI systems?

SECTION-B

2. What are the main components of a business intelligence system?

3. Describe how mathematical models underpin predictive analytics within BI systems and their impact on operational efficiency.

4. Differentiate between descriptive and prescriptive models in BI.

5. Detail the end-to-end data mining process, from data collection to model deployment, within a BI framework.

6. Explain how the CCR model can be applied to evaluate the performance of different branches of a bank in terms of operational efficiency.

7. Detail the development process of an expert system from knowledge acquisition to system evaluation, using a specific case study in finance.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (Artificial Intelligence & Machine Learning) (Sem.–6)

INTELLIGENT SYSTEMS

Subject Code : UGCA2010

M.Code : 93652

Date of Examination : 19-05-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Answer briefly :**

   a) What are radial basis functions, and how are they used in function approximation and pattern recognition?

   b) Define the concept of formal logic in the context of knowledge representation and inference.

   c) How do fuzzy neural networks combine fuzzy logic and neural networks to solve complex problems?

   d) What are the principles of structured representation in AI and how do semantic networks and conceptual graphs fit into this framework?

   e) Define the main components of a knowledge-based system:- an inference engine and a knowledge base.

   f) State the principles of evolutionary algorithms.

   g) What is the iterative deepening search strategy, and when is it advantageous in solving search problems?

   h) What is the concept of best-first search?

   i) How does optimization play a role in search algorithms, and what are some common optimization techniques used in AI?

   j) State the role of learning and evolutionary algorithms in the development of intelligent systems, including statistical learning and induction learning.

SECTION - B

2. Provide an overview of search methods in artificial intelligence, including graph and tree search algorithms, their advantages, and limitations.

3. Explore the principles and applications of knowledge-based systems, focusing on the components and architecture of such systems.

4. Discuss the role of logical inference in AI, including formal logic and the challenges associated with logical reasoning.

5. Explain the principles of reasoning under uncertainty, including Bayesian reasoning, certainty factors, and the Dempster-Shafer theory.

6. Describe the concept of learning in intelligent systems and the use of learning algorithms to improve system performance and adapt to changing environments.

7. Explore the various components and architecture of knowledge-based systems, including the blackboard architecture. How does the selection of architecture impact the performance and functionality of these systems?

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (AI & ML) (Sem.–6)

BIG DATA ANALYTICS

Subject Code : UGCA-2006

M.Code : 93655

Date of Examination : 26-05-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. **Answer briefly :**

   a. What are the key sources of Big Data?

   b. Name an application area of Big Data analytics.

   c. Explain the components of the Hadoop ecosystem.

   d. What is HDFS and what is its architecture?

   e. List advantages and disadvantages of HDFS.

   f. Describe HDFS blocks and their significance.

   g. What is the role of the NameNode in Hadoop HDFS?

   h. What are some basic Hadoop FS commands?

   i. How can Pig be used to analyze data in HDFS?

   j. Name some Pig operators used in data analytics.

SECTION - B

2. Explore the significance of Hadoop clusters in Big Data analytics. Discuss the key factors to consider when configuring a Hadoop cluster for optimal performance.

3. Provide an in-depth explanation of the Hadoop MapReduce programming model. Describe how Map and Reduce tasks work together to process data in Hadoop.

4. Discuss the challenges and solutions related to fault tolerance in Hadoop. Explain how Hadoop handles failures and maintains data reliability in distributed environments.

5. Describe the basics of Apache Sqoop and its role in the Hadoop ecosystem. Explain how Sqoop facilitates data transfer between Hadoop and relational databases.

6. Explain the concept of data partitioning and bucketing in Apache Hive. Discuss their importance in optimizing query performance in Hive.

7. Discuss the principles and advantages of using Apache Oozie for workflow management in Hadoop. Provide examples of scenarios where Oozie is beneficial.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 07

Bachelor of Science (AI & ML) (Sem-6)

WEKA - OPEN SOURCE SOFTWARE TOOL

Subject Code : UGCA2014

M.Code : 93689

Date of Examination : 29-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. **Answer the following :**

   a) Define data mining.

   b) List the steps in data mining.

   c) What do you mean by unsupervised learning?

   d) What is Weka?

   e) List the features of weka open source software fool.

   f) What situations are scatter plots used?

   g) Why data understanding is important in preprocessing?

   h) What are the applications of Weka?

   i) Write the steps for loading the dataset in Weka.

   j) What is clustering?

SECTION - B

2. **Answer the following :**

   a. Differentiate between classification and clustering.

   b. Compute the accuracy from given confusion matrix.

	Predicted No	Predicted Yes
Actual No	100	60
Actual Yes	40	200

3. **Answer the following :**

   a. How do you load the data from web into weka? Explain.

   b. How do you apply filters in data preprocessing step? Explain.

4. What is random forest? Does Weka support random forest classifier? Explain in detail.

5. Write a short note on visualizing the data using scatter plot.

6. What are the clustering methods available in weka? List the steps to be followed to, implement clustering algorithm in weka? Explain in detail.

7. **Write a short note on the following :**

   a. ARFF Header section

   b. ARFF data section

   c. Generate ARFF file

   d. Sparse ARFF Files

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/AI&ML/AI&DS) (Sem.–7)

COMPUTER VISION

Subject Code : BTAIML701-20

M.Code : 94006

Date of Examination : 21-06-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION - A

1. **Write briefly :**

   a) Define sampling and quantization in digital images.

   b) What is log transformation? Write its mathematical expression.

   c) Write and explain the formula for 2D Discrete Fourier Transform.

   d) What is Gaussian noise in image processing?

   e) What is the difference between RGB and CMY colour models?

   f) What is an image pyramid?

   g) What is the Haar wavelet transform?

   h) What is the primary goal of stereo reconstruction in computer vision?

   i) What does a disparity map represent in stereo vision?

   j) Define a pattern in the context of object recognition.

SECTION - B

2. Explain the concepts of neighborhood, adjacency and connectivity in digital images.

3. How the 2-D DFT represents an image in terms of its frequency components? Explain.

4. Explain the RGB and CMY color models. How are they related to each other in image processing?

5. Explain the process of stereo reconstruction. How depth is estimated using two or more camera views?

6. Explain template matching as an object recognition method. What are its advantages and limitations?

SECTION - C

7. How image sharpening is performed in the spatial domain. Derive the mathematical formula for the Laplacian sharpening filter and explain how it enhances edges.

8. Describe the erosion and dilation operations in morphological image processing. Provide their mathematical formulation and illustrate their effects with suitable examples.

9. a) What is image negation? Give its formula and explain how it enhances image features.

   b) Describe the Haar Transform and its basic steps. How is it useful in image compression?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) / (AI&ML/AI&DS/DS) (Sem.–7)

COMPILER DESIGN

Subject Code : BTCS 601-18

M.Code : 93988

Date of Examination : 28-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Define the following :**

   a) Interpreter

   b) Loader

   c) Analysis Phase

   d) DFA

   e) Tokens

   f) Incremental Compilers

   g) Pre-processor

   h) Stack

   i) Triples

   j) r-value.

SECTION-B

2. Explain the working of Syntax Analysis phase.
3. Differentiate between LL and LR parser.
4. Discuss why code optimization is needed.
5. Write a note on semantic analysis.
6. Describe global data flow analysis.

SECTION - C

7. Explain various phases of compilers in detail.
8. Write a detailed note on error handling mid recovery techniques available in compiler.
9. What is symbol table? Explain its contents and data structures.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.