IT3EPHC600 Reg. No.: | | | | | | | | |

**St Aloysius (Deemed to be University)**

**Mangaluru**

**School of Information Science and Technology (PG Programme)**

**Semester III-PG Examination- MCA**

**November-2025**

**Cloud Computing with Amazon Web Services**

**Time: $2^1/_2$ Hours** **Max Marks: 60**

**Note: i) Answer all the questions**

**ii) Draw diagrams wherever necessary**

**SECTION – A**

**Answer any FIVE of the following.** **(5x2=10)**

1. a. What is Virtual Machine Migration?
   b. What do you mean by the term XaaS?
   c. What do you mean by the term IPC?
   d. What is Distributed Computing?
   e. What is Green Cloud Computing?
   f. What is Cloud-CoXCS?
   g. What is AWS Auto Scaling?

**SECTION - B**

**Answer any SIX of the following.** **(6x5=30)**

2. Describe the key features of Amazon EBS in simple words.
3. Explain in detail the main features of Amazon RDS.
4. How does cloud computing help in processing satellite remote sensing data for GIS applications?
5. Explain the hardware architecture of SIMD systems.
6. Write a short note on Economics of the Cloud.
7. Explain the architecture of InterCloud.
8. Explain cloud-based multitier architecture used in AWS.
9. How is Data-at-Rest Security ensured at both the tenant level and the end-user level in AWS?

**SECTION-C**

**Answer any TWO of the following.** **(2x10=20)**

10. Explain the different strategies and AWS services available for managing and optimizing costs in the AWS Cloud.
11. Explain how AWS Certificate Manager (ACM) helps in managing SSL/TLS certificates.
12. Explain Google App Engine (GAE) in detail as a cloud platform.

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# St Aloysius (Deemed to be University), Mangaluru

## School of Information Science and Technology (PG Programme)

## Semester III-PG Examination- MCA

## November-2025

## Web Development with Angular, Node.js

**Time: $2^1/_2$ Hours** **Max Marks: 60**

**Note: i) Answer all the questions**

**ii) Draw diagrams wherever necessary**

### SECTION – A

**Answer any FIVE of the following.** **(5x2=10)**

1. a. Explain the basic structure of an HTML page with an example.
   b. Explain any two commonly used string methods in JavaScript with examples.
   c. Explain the MVVM architecture.
   d. Write a note on Angular.
   e. Write a note on Angular Pipes?
   f. Write a note on Angular Service
   g. Define asynchronous programming in Node.js.

### SECTION - B

**Answer any SIX of the following.** **(6x5=30)**

2. Write a Node.js program to create a new file and write data into it using the File System module.
3. Write a Node.js program to create a MySQL table named Courses with the following columns: CourseID, CourseName, Duration, Instructor.Insert 5 courses, delete one course based on CourseID, and display the remaining courses
4. What is a function in JavaScript? Explain function declaration, function expression, and arrow function with examples.
5. Explain Two-way binding in angular with example
6. What is TypeScript? Explain the key features of TypeScript.
7. What are Structural Directives? Explain *ngSwitch with examples.
8. Explain Angular Modules , Types and Benefits
9. Write a Node.js program to convert and display a given string in uppercase letters using the uppercase package.

### SECTION-C

**Answer any TWO of the following.** **(2x10=20)**

10. Describe the types of modules in Node.js. Write an example program to create and use a Local module.
11. Develop a complete Express.js application that demonstrates routing and sending responses to different HTTP methods (GET, POST, PUT, DELETE).
12. Write an HTML form to create a registration form that collects the following details: Name, Address, Age , Gender, Email, and Phone. Include Submit and Reset buttons using appropriate form controls. Provide the complete HTML code and briefly explain the purpose of each form element used.

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# St Aloysius (Deemed to be University)

## Mangaluru

## School of Information Science and Technology (PG Programme)

## Semester III-PG Examination- MCA

## November-2025

## Artificial Intelligence and Machine Learning

**Time: $2^1/_2$ Hours** **Max Marks: 60**

**Note: i) Answer all the questions**

**ii) Draw diagrams wherever necessary**

### SECTION – A

**Answer any FIVE of the following.** **(5x2=10)**

1. a. Mention one limitation of hill climbing.
   b. What is a production system?
   c. Define a discriminant function.
   d. Give one example of a Machine Learning application.
   e. What is meant by generalizing the linear model?
   f. What is pruning in Decision Trees?
   g. What is mean squared error?

### SECTION - B

**Answer any SIX of the following.** **(6x5=30)**

2. Explain the difference between precision and recall.
3. Explain the concept and process of fine-tuning a transformer model.
4. Explain the structure of an intelligent agent with a neat diagram.
5. Describe the working principle of Principal Component Analysis (PCA).
6. Explain regression and its types in supervised learning.
7. Compare K-Means and Hierarchical Clustering.
8. Describe gradient descent and its application in optimization.
9. Discuss the importance of activation functions in neural networks.

### SECTION-C

**Answer any TWO of the following.** **(2x10=20)**

10. Explain the elements of reinforcement learning with suitable examples.
11. Define Retrieval-Augmented Generation (RAG). Explain its architecture and enterprise use.
12. What are the characteristics of a problem? Illustrate with suitable examples.

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IT3EPSC621c Reg. No.: | | | | | | | | |

# St Aloysius (Deemed to be University), Mangaluru

## School of Information Science and Technology (PG Programme)

## Semester III-PG Examination- MCA

## November-2025

## Information Security

**Time: $2^1/_2$ Hours** **Max Marks: 60**

**Note: i) Answer all the questions**

**ii) Draw diagrams wherever necessary**

### SECTION – A

**Answer any FIVE of the following.** **(5x2=10)**

1. a. Define authentication.
   b. State any two principles of security.
   c. Differentiate between stateful and stateless packet filter.
   d. Define diffusion.
   e. Define intrusion.
   f. Define Digital Signature.
   g. What is phishing?

### SECTION - B

**Answer any SIX of the following.** **(6x5=30)**

2. Discuss defense mechanisms against web security threats.
3. Write short notes on attacks in Information Security.
4. Explain characteristics of firewall.
5. Explain DES algorithm briefly.
6. Compare DES and RSA.
7. Explain MD5 algorithm.
8. Discuss private key management in PKI.
9. Describe attacks for obtaining website data.

### SECTION-C

**Answer any TWO of the following.** **(2x10=20)**

10. Discuss IPSec protocol suite and its applications.
11. Explain properties of hash functions with examples.
12. Write a detailed note on current trends and challenges in Information Security

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IT3EPSC622a Reg. No.: | | | | | | | | |

# St Aloysius (Deemed to be University)

## Mangaluru

## School of Information Science and Technology (PG Programme)

## Semester III-PG Examination- MCA

## November-2025

## Big Data Analytics

**Time: $2^1/_2$ Hours** **Max Marks: 60**

**Note: i) Answer all the questions**

**ii) Draw diagrams wherever necessary**

### SECTION – A

**Answer any FIVE of the following.** **(5x2=10)**

1. a. Define big data.
   b. Define data.
   c. List the examples for graph-based databases.
   d. What is the function of combiner in MapReduce.
   e. What is the main purpose of HDFS.
   f. Explain GFS.
   g. Define the term "schema" in serialization.

### SECTION - B

**Answer any SIX of the following.** **(6x5=30)**

2. Explain why MapReduce is not well-suited for real-time applications.
3. Compare and contrast business intelligence and data science.
4. Explain the process used in business intelligence (BI).
5. Describe a real-world scenario where Pig would be more suitable than Hive.
6. Explain Master-Slave replication.
7. Explain Apache Kafka and Apache Flume.
8. Explain Hadoop Distributed File System.
9. Describe the role of searching in MapReduce applications.

### SECTION-C

**Answer any TWO of the following.** **(2x10=20)**

10. Explain Mapreduce programming in detail.
11. Analyze the case study of how Pig was utilized at Yahoo!, explaining the architecture, the problem addressed, the solution using Pig, and its advantages over alternative methods like MapReduce.
12. List the benefits of NoSQL.

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IT3EPSC622b Reg. No.: | | | | | | | | |

# St Aloysius (Deemed to be University)

## Mangaluru

## School of Information Science and Technology (PG Programme)

## Semester III-PG Examination- MCA

## November-2025

## Neural Networks and Deep Learning

**Time: $2^1/_2$ Hours** **Max Marks: 60**

**Note: i) Answer all the questions**

**ii) Draw diagrams wherever necessary**

### SECTION – A

**Answer any FIVE of the following.** **(5x2=10)**

1. a. What is activation function?
   b. What is a Stochastic Encoder?
   c. What is associate memory network?
   d. What is Fuzzy set?
   e. What is Defuzzification?
   f. List the defuzzification methods?
   g. What is the Convolution Operation?

### SECTION - B

**Answer any SIX of the following.** **(6x5=30)**

2. Describe the architecture of a Recurrent Neural Network.
3. Explain the working of Kohonen Self-Organizing Feature Map.
4. Explain structure of Biological Neuron
5. Consider set X = [2, 4, 6, 8, 10]. Find its power set, cardinality and cardinality of power set.
6. Explain brain in the box model
7. Explain the concept of Multiperson Decision Making in fuzzy systems.
8. Consider the following two fuzzy sets: A={0.3/x1+0.7/x2+1/x3} and B={0.4/y1+0.9/y2}.Perform cartesian product over these given fuzzy sets.
9. How is Probability useful in Machine Learning?

### SECTION-C

**Answer any TWO of the following.** **(2x10=20)**

10. Explain the role of Regularization techniques like Data Augmentation, Bagging, and Dropout in improving model performance.
11. Explain Deep Generative Models in detail
12. Explain the different types of modes in ANN

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