CBCS SCHEME

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MCS101

First Semester M.Tech. Degree Examination, Dec.2024/Jan.2025
Artificial Intelligence

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	**M**	**L**	**C**
Q.1	**a.**	Distinguish between standardized and real-world problems. Explain each with examples.	**10**	**L1**	**CO1**
	b.	With an algorithm, explain the Best First search.	**10**	**L2**	**CO1**
		OR			
Q.2	**a.**	Describe informed search strategies and explain the A^* search algorithm with an example.	**10**	**L2**	**CO1**
	b.	Explain Heuristic function with 8-puzzle problem as an example, and explain how the accuracy of a heuristic affects the search performance.	**10**	**L1**	**CO1**
		Module – 2			
Q.3	**a.**	With an example, explain the different ways of approaches to knowledge representation.	**10**	**L3**	**CO2**
	b.	With suitable example, explain the knowledge representation using frames.	**10**	**L3**	**CO2**
		OR			
Q.4	**a.**	With an example, illustrate the ontologies, its characteristics and applications.	**10**	**L2**	**CO3**
	b.	Interpret the probabilistic reasoning and Bayesian networks to represent the knowledge in an uncertain domain.	**10**	**L2**	**CO3**
		Module – 3			
Q.5	**a.**	Define and explain the machine learning and its different forms.	**10**	**L2**	**CO3**
	b.	Explain the concept of decision tree learning model with an example.	**10**	**L2**	**CO3**
		OR			
Q.6	**a.**	Explain the concept of support vector machines and derive the necessary expressions.	**10**	**L3**	**CO3**
	b.	Explain the working of Artificial Neural networks with a neat diagram.	**10**	**L3**	**CO3**

		Module – 4			
Q.7	**a.**	Define the Natural Language Processing (NLP). Mention the three reasons for computer to use NLP, mention the different language models and explain any two language models.	**10**	**L2**	**CO4**
	b.	Define the term robot, mention the most common types of robots and explain the different sensors used for perceiving the world.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Explain the cell decomposition using the randomized motion planning algorithm.	**10**	**L3**	**CO4**
	b.	Illustrate the trajectory tracking control with reference to the P, PD and PID controller.	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the ethical considerations in AI development.	**10**	**L2**	**CO4**
	b.	Illustrate the fairness and bias in AI algorithm.	**10**	**L3**	**CO4**
		OR			
Q.10	**a.**	Interpret the Accountability and transparency in AI systems.	**10**	**L3**	**CO4**
	b.	Explain the future of AI and its impact on society.	**10**	**L2**	**CO4**

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First Semester M.Tech. Degree Examination, Dec.2024/Jan.2025

Data Science and Management

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is Data Science? Explain the data science process?	10	L1	CO1
	b.	What is looping functions in R explain with example? Write a MIMO function to calculate volume and surface area of cylinder.	10	L3	CO1
		OR			
Q.2	a.	Explain SELECT, INSERT, UPDATE, DELETE operation in SQL.	10	L2	CO1
	b.	What are the steps to execute a R Script? Write a R Script to find the sum of natural numbers from 1 to 100 use sequence component in R for loop.	10	L3	CO1
		Module – 2			
Q.3	a.	Define Rank, Null space and Nullity of matrix. Calculate the Rank of matrix. $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 0 \\ 3 & 6 & 0 \end{bmatrix}$ Also state the advantages of finding rank of matrix in data science.	10	L4	CO2
	b.	What do you mean by overdetermined and underdetermined set of equations explain with example.	10	L2	CO2
		OR			
Q.4	a.	What is Pseudo Inverse? Explain with example.	10	L2	CO2
	b.	What is Eigen value decomposition, explain with example.	10	L3	CO2
		Module – 3			
Q.5	a.	Explain the following: i) Types of data ii) Quantitive data iii) Qualitative data	10	L2	CO3
	b.	What is descriptive statistic, explain its commonly used measure i.e. measure of central tendency?	10	L2	CO3

		OR			
Q.6	**a.**	What is univariate and multivariate distribution?	**10**	**L2**	**CO3**
	b.	Define hypothesis testing and discuss how to test the assumptions made regarding a population parameter.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	What is Optimization? Explain the types of optimization?	**10**	**L2**	**CO4**
	b.	List and explain the different problems of data science.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Explain Gradient (steepest) descent (or) learning rule.	**10**	**L4**	**CO4**
	b.	Explain nonlinear unconstrained multivariate optimization.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	What is regression and explain its classification types?	**10**	**L2**	**CO4**
	b.	List the different model assessment techniques and briefly explain them.	**10**	**L2**	**CO4**
		OR			
Q.10	**a.**	Explain logistic regression with example.	**10**	**L2**	**CO4**
	b.	What are the different classification techniques explain?	**10**	**L2**	**CO4**

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MCS103

First Semester M.Tech. Degree Examination, Dec.2024/Jan.2025

Data Structures and Algorithms for Problem Solving

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	**M**	**L**	**C**
Q.1	**a.**	Discuss two models of search trees with suitable examples.	**10**	**L3**	**CO1**
	b.	How do you convert trees into Lists? Explain.	**10**	**L2**	**CO1**
		OR			
Q.2	**a.**	Explain about Balanced Search Tree.	**10**	**L2**	**CO1**
	b.	Briefly explain Red-Black Trees.	**10**	**L2**	**CO1**
		Module – 2			
Q.3	**a.**	Discuss about Range-Counting and the semi-group model in detail.	**10**	**L3**	**CO2**
	b.	Summarize Kd-Trees and Related structures.	**10**	**L3**	**CO2**
		OR			
Q.4	**a.**	Explain about Trees for the union of intervals and trees for sums of weighted interval.	**10**	**L2**	**CO2**
	b.	Discuss orthogonal Range trees with suitable example.	**10**	**L2**	**CO2**
		Module – 3			
Q.5	**a.**	Explain Double-Ended Heap structures and multidimensional heaps.	**10**	**L2**	**CO3**
	b.	Write about heaps of optimal complexity.	**10**	**L2**	**CO3**
		OR			
Q.6	**a.**	Discuss Heap-ordered Trees and Half ordered Trees.	**10**	**L2**	**CO3**
	b.	Define Heap. Explain, how changing keys in heaps.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Write Bellman-Ford Algorithm and explain with suitable example.	**10**	**L2**	**CO3**
	b.	Discuss single source shortest paths in a DAG with example.	**10**	**L3**	**CO3**
		OR			
Q.8	**a.**	Write and explain Johnson's algorithms for sparse graphs.	**10**	**L3**	**CO3**
	b.	Explain the Representation of Polynomials.	**10**	**L2**	**CO3**
		Module – 5			
Q.9	**a.**	What is String Matching Algorithm? Write Naïve String Matching.	**10**	**L4**	**CO3**
	b.	Write and explain Knuth-Morris-Pratt algorithm.	**10**	**L4**	**CO3**
		OR			
Q.10	**a.**	Explain Boyer-Moore algorithm with an example.	**10**	**L3**	**CO3**
	b.	Discuss string matching with finite automata.	**10**	**L3**	**CO3**

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MCS104E

First Semester M.Tech. Degree Examination, Dec.2024/Jan.2025
Software Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	**a.**	What is software engineering? Explain software engineering concepts with a neat diagram.	**10**	**L2**	**CO1**
	b.	Explain the following software engineering development activities: (i) Requirements elicitation (ii) System design and object design	**10**	**L2**	**CO1**
		OR			
Q.2	**a.**	With a neat sketch, explain the following use case diagram, class diagram, interaction, state machine and activity diagram.	**10**	**L2**	**CO1**
	b.	Explain the project communication concepts in software engineering.	**10**	**L2**	**CO1**
		Module – 2			
Q.3	**a.**	Briefly explain requirements elicitation concepts in object oriented software engineering.	**10**	**L2**	**CO1**
	b.	Explain managing requirement elicitation in software engineering.	**10**	**L2**	**CO1**
		OR			
Q.4	**a.**	List out and explain concepts of analysis in software engineering.	**10**	**L2**	**CO1**
	b.	Explain the managing of analysis in detail.	**10**	**L2**	**CO1**
		Module – 3			
Q.5	**a.**	Explain the concept of system design with an example: (i) Coupling and cohesion (ii) Layers and partition	**10**	**L2**	**CO2**
	b.	Explain different architectural styles in system design	**10**	**L2**	**CO2**
		OR			
Q.6	**a.**	Explain different activities of system design: (i) Identifying and storing persistent data (ii) Identifying services (iii) Providing access control (iv) Indentifying boundary conditions (v) Reviewing system design	**10**	**L2**	**CO2**
	b.	Explain the following management of system design: (i) Assigning responsibilities (ii) Communicating over system design	**10**	**L2**	**CO2**

		Module – 4			
Q.7	**a.**	What is delegation? Explain the Liskov substitution principle and delegation and inheritance in design patterns.	**10**	**L2**	**CO2**
	b.	Explain interface specification concepts in object design.	**10**	**L2**	**CO2**
		OR			
Q.8	**a.**	What is transformation in mapping? Explain the transformation that occurs during object design and implementation activities.	**05**	**L2**	**CO2**
	b.	Explain the following: (i) Mapping concepts (ii) Refactoring	**05**	**L2**	**CO2**
	c.	Explain managing implementation in object design.	**10**	**L1**	**CO2**
		Module – 5			
Q.9	**a.**	What is software maintenance? List out the factors that mandate the change.	**10**	**L1**	**CO2**
	b.	List out the Lehman's law of system evolution and types of software maintenance.	**10**	**L1**	**CO2**
		OR			
Q.10	**a.**	What is software re-engineering and explain its process.	**10**	**L1**	**CO2**
	b.	What is software configuration management? List and explain software configuration management functions.	**10**	**L1**	**CO2**

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MCS105D

First Semester M.Tech. Degree Examination, Dec.2024/Jan.2025

Internet of Things

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	**M**	**L**	**C**
Q.1	**a.**	Discuss the scope of IoT.	**10**	**L3**	**CO1**
	b.	List the advantages of IPv6 deployment.	**05**	**L2**	**CO1**
	c.	Write a short note on advanced smart metering.	**05**	**L1**	**CO1**
		OR			
Q.2	**a.**	What is an object in IoT? Explain the characteristics and classification of objects in IoT.	**08**	**L1**	**CO1**
	b.	Discuss the typical requirements of distributed control M2M.	**08**	**L3**	**CO1**
	c.	With respect the M2M communication, explain traffic flow management system in city automation.	**04**	**L3**	**CO1**
		Module – 2			
Q.3	**a.**	Explain with block diagram M2M in 3 GPP architecture.	**10**	**L2**	**CO2**
	b.	Write a short note along with neat sketch: i) Smart card ii) RFID Tags	**10**	**L1**	**CO2**
		OR			
Q.4	**a.**	List out main features of coap. Explain the request / response model used by coap.	**10**	**L2**	**CO2**
	b.	Explain structural aspects of IoT in detail.	**10**	**L2**	**CO2**
		Module – 3			
Q.5	**a.**	Enlist and explain IEEE802.15.4 frame formats.	**12**	**L2**	**CO3**
	b.	Write a short note on IPv6 tunnelling technique, illustrating with neat diagram both direction.	**08**	**L1**	**CO3**
		OR			
Q.6	**a.**	Describe the architecture of Bluetooth system with HDP and application.	**10**	**L3**	**CO3**
	b.	Discuss with sketch, comparison between IPv6 and IPv4 protocol.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain smart lighting IoT system.	**10**	**L2**	**CO4**
	b.	Write a program in Python for controller native service for smart parking system.	**10**	**L2**	**CO2**
		OR			
Q.8	**a.**	Briefly explain the IoT for Agriculture.	**10**	**L2**	**CO4**
	b.	Write a program in Python for controller native service for home instrusion detection	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Write a short note on : i) Hadoop Map Reduce Programming Model ii) Hadoop cluster set up	**10**	**L2**	**CO5**
	b.	Discuss the role of Apache Hadoop and Apache spark in data analytics for IoT.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	What are various high level tools for data analysis supported by apache spark? Explain briefly.	**10**	**L1**	**CO5**
	b.	What is Hadoop YARN? Explain the key components of YARN.	**10**	**L2**	**CO5**