M.Tech

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2025
(**M.Tech.**) Program: **Artificial Intelligence** Scheme: **II**
Regular Examination: **FY** Semester: **II**
Course Code: **PCEDLC2041** Course Name: **Artificial Intelligence in Bioinformatics**
Date of Exam: **09/06/25** Duration: 2.5 Hours Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
	Explain Bioinformatics **Objectives as well as Components** in detail		CO1	U
	Illustrate **'Social Challenges'** of electronic health information(EHI).		CO4	U
	Discuss a recent advancement where deep learning was applied in cancer detection using genomic or medical imaging data.		CO6	U
2	Solve any **two** questions out of three: (05 marks each)	10		
	Discuss in detail about the topic **'Protein Structural Prediction'**.		CO3	U
	Explain types of **'Sequence Alignment'** in detail?		CO2	U
	What is **Telesurgery**? Illustrate it in detail.		CO5	U
3	Solve any **two** questions out of three. (10 marks each)	20		
	'How different species differ' explains it from a Bioinformatics perspective.		CO1	U
	Discuss in detail about the topic **'Public Access to Anatomic Images'.**		CO4	U
	What is **'Telemedicine'**? Discuss any one of the AI based solutions that can be used to address any telemedicine issue.		CO6	U
4	Solve any **two** questions out of three. (10 marks each)	20		
	Apply the **'TDM'** Vector Space model on given documents, and based on their ranking find the relevance. D1: **"Hypertension is a chronic condition"** D2: **"Diet and exercise are effective in managing hypertension"** D3: **"Hypertension requires long-term monitoring and care"** and Query Q:-**"Hypertension treatment"**.		CO3	Ap

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b)	How to construct the **BLOSUM Scoring** matrix for similarity search ? apply the BLOSUM 62 matrix on following sequences for score calculation. **Seq.1 ARDFSHGLLENKLLGCDSMRWE** **Seq.2 GRDYKMALNEQW-ILGCD-MRWD** Analyze this **with or without gap** penalty.		CO2	An
c)	Apply the FP- Growth Algorithm on the following data, do generate the **frequent patterns** (itemsets) and the **Association rules** that describe relationships between items with **Minimum Support** threshold >=**2** , **Confidence Threshold = 75%.** Txn ID — Items T1 — I1, I3, I4 T2 — I2, I3, I5, I6 T3 — I1, I2, I3, I5 T4 — I2, I5 T5 — I1, I3, I5		CO5	Ap

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