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

Supplementary

~~Nov - Dec. 2025-26~~ Jan - Feb 2026

Course Code: HDSC701

Date of Exam: 21/11/2025
10/02/2026

B.Tech. Program: **DS**   Scheme : **II** ß
Examination: **Honors**   Semester: **VII**
Course Name: **Data Science for Health and Social Care**
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		
a)	Draw and explain **BAN** communication system in detail		CO6	U
b)	Apply and discuss in detail how to eliminate noise from ECG readings using the following signal processing techniques: i) Electrode Contact Noise and Motion Artifacts Signal Analysis ii) Algorithm for QRS Detection		CO2	Ap
c)	What do you mean by Retrieval Model? Describe the content of Knowledge-Based Information Resources.		CO5	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Discuss the concept of **'Clinical Text Corpora and Evaluation Metrics'**.		CO3	U
b)	Describe in detail about **'Association Analysis'** w.r.t. medical events.		CO5	U
c)	Explain different types of approaches to identify fraudulent claims.		CO6	U
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	Discuss in detail about the applications and practical systems for Healthcare.		CO1	U
b)	Explain the **'Object Detection and Image segmentation'** concepts in detail.		CO2	U
c)	Describe **'Image Formation and data visualization'** in detail.		CO6	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	Using the following corpus to apply the Topic Model-LDA algorithm, compute the Topic-Word and Document-Topic matrices. d1: "Patient admitted with chest pain and elevated troponin."		CO4	Ap

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	d2: "Patient presented with fever and productive cough; started antibiotics." discuss this strategy in depth.		
b)	Explain Sequential Pattern Mining (SPM) in detail. What is the Time-Interval Pattern Mining analysis? Build the Time-interval relations as well as inverted relations using Allen's temporal operators, for the following event.	CO5	Ap
c)	Examine how the challenges and ethical provocations arising from NLP research in the health insurance fraud detection area influence the accuracy and fairness of predictive health analytics. Analyze the underlying factors contributing to these effects.	CO3	An

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