



SRI VENKATESWARA UNIVERSITY
II Year Syllabus for 4-Year UG Honours in BCA. (Artificial Intelligence & Data Science) as Major
in consonance with the Curriculum framework w.e.f. AY 2026-27
II Year IV Semester

Sl. No.	Category	Course No.	Course Name	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
				Theory	Practical		Theory	Practical	
1	Major-Core	8	Python Programming	3	2	5	3	1	4
2	Major-Core	9	Big Data & Machine Learning	3	2	5	3	1	4
3	Major-Core	10	Software Engineering	3	2	5	3	1	4
4	Minor	2		4	0	4	4	0	4
5	MDC	3	-	2	0	2	2	0	2
6	SEC	4	SEC: Design Thinking/Problem solving/ others	2	0	2	2	0	2
				17	6	23	17	3	20

Note:

The number of instructional hours shall be five (5) for courses involving problem-solving, and four (4) for courses comprising only theory.


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Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	IV	8	Python Programming	3	3
			Python Programming – Practical	2	1
		9	Big Data & Machine Learning	3	3
			Big Data & Machine Learning – Practical	2	1
		10	Software Engineering	3	3
			Software Engineering – Practical	2	1


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SEMESTER-IV
BCA Artificial Intelligence and Data Science Honours
II Year IV Semester

COURSE 9 : Big Data and Machine Learning

Theory

Credits: 3

3 hrs/week

Course Objective

1. Provide understanding of Big Data concepts and ecosystem.
2. Explain scalable data architecture and distributed computing models.
3. Develop knowledge of advanced machine learning techniques.
4. Apply machine learning algorithms in Big Data environments.
5. Enable students to implement ML models using Hadoop, Spark, R, and Python.

Course Outcomes

After completing this course, the student will be able to:

1. Understand Big Data characteristics, storage models, and distributed processing frameworks.
2. Design scalable data architectures for analytics applications.
3. Apply advanced machine learning algorithms for structured and unstructured data.
4. Evaluate and optimize machine learning models using performance metrics.
5. Implement scalable ML solutions using Hadoop/Spark and programming tools.

UNIT-I

BIG DATA: big data types, big data classification, big data handling techniques, Big data applications (Marketing, Healthcare, Banking)

SCALABILITY AND PARALLEL PROCESSING: Analytics Scalability to big data, massively Parallel processing, cloud computing.

UNIT- II

DESIGNING DATA ARCHITECTURE: Data architecture design, managing data for analysis

DATA STORAGE AND ANALYSIS: Big data storage, big data platform, big data analytics

USE CASES: Pattern for big data deployment, the fraud detection pattern, social media pattern, big data analysis in Facebook and Amazon

UNIT- III

INTRODUCTION OF MACHINE LEARNING: Overview of Machine learning, machine learning types (Supervised, unsupervised, semi supervised), issues in machine learning.

CLASSICAL DATA ANALYSIS: Mean, variance, correlation, Linear Regression

UNIT-IV

CONCEPT LEARNING: Introduction, a concept learning task, learning as search, version Space and candidate elimination algorithm. **DECISION TREE LEARNING:** - introduction, Representation, basic decision tree learning algorithm.

UNIT-V

Hadoop for Big Data: Definition, Features, comparison with RDBMS, Hadoop Ecosystem, HDFS architecture. **R for Machine Learning-** Introduction, features of R, data structure in R, performing data operations, performing data modeling in R. **Python for Machine Learning –** Introduction, features of Python, data structure in python.

Text Books:

1. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj Kamal, Preeti Saxena 2019, McGraw-Hill Education
2. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge University Press.


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References Books:

1. Chris Eaton, Dirk Deroos et al., "Understanding Big Data", McGraw Hill , 2012.
2. "BIG DATA IN PRACTICE" BY Bernard Marr.published by Wiley,1st Edition,2016
3. Tom Michel, Machine Learning, McGraw Hill, 1997
4. Tom White, "HADOOP" : The definitive Guide", O Reilly 2012.
5. Boris lublinsky, Kevin t. Smith Alexey Yakubovich, "Professional Hadoop

SEMESTER-IV

COURSE 9: Big Data and Machine Learning

Practical

Credits: 1

2 hrs/week

List of Experiments:

1. Steps to Installation of Apache Hadoop in windows.
2. Draw the Diagram for HDFS Architecture.
3. Implement Candidate Elimination Algorithm in Machine learning.
4. Implement Decision Tree classification Algorithm in Machine learning.
5. Write a program in R to find the mean value given from the list of values.
6. Write a program in R to find the variance value given from the list of values.

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BCA Artificial Intelligence and Data Science Honours

II Year IV Semester

COURSE 9 : Big Data and Machine Learning

Time : 3 Hrs

Max Marks : 75

SECTION - A

Answer any FIVE of the following

5 X 3= 15 Marks

1. Short answer question from unit-I
2. Short answer question from unit-I
3. Short answer question from unit-II
4. Short answer question from unit-II
5. Short answer question from unit-III
6. Short answer question from unit-III
7. Short answer question from unit-IV
8. Short answer question from unit-IV
9. Short answer question from unit-V
10. Short answer question from unit-V

SECTION-B

Answer FIVE of the following.

5 X 12=60 Marks

11. a) Essay question from Unit-I
OR
b) Essay question from Unit-I
12. a) Essay question from Unit-II
OR
b) Essay question from Unit-II
13. a) Essay question from Unit-III
OR
b) Essay question from Unit-III
14. a) Essay question from Unit-IV
OR
b) Essay question from Unit-IV
15. a) Essay question from Unit-V
OR
b) Essay question from Unit-V


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