

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING - CYBER SECURITY

COURSE MODULE OF THE SUBJECT TAUGHT FOR THE SESSION 2026-27 – (ODD SEM)

Faculty Name: Mrs. Suhasini			Academic Year: 2026 - 2027				
Department: Computer Science & Engineering - Cyber Security							
Course Code	Course Title	Core / Elective	Prerequisite	Contact Hours			Total Hrs/
				L	T	P	Sessions
BIC703	Machine Learning	Core		4	0	0	50T
Course Objectives	<						

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING - CYBER SECURITY

Regression Analysis: Introduction to Regression, Introduction to Linear Regression, Multiple Linear Regression, Polynomial Regression, Logistic Regression.

Decision Tree Learning: Introduction to Decision Tree Learning Model, Decision Tree Induction Algorithms.

Chapter-4 (4.2-4.5), Chapter-5 (5.1-5.3, 5.5-5.7), Chapter-6 (6.1, 6.2)

Module-4

Bayesian Learning: Introduction to Probability-based Learning, Fundamentals of Bayes Theorem, Classification Using Bayes Model, Naïve Bayes Algorithm for Continuous Attributes.

Artificial Neural Networks: Introduction, Biological Neurons, Artificial Neurons, Perceptron and Learning Theory, Types of Artificial Neural Networks, Popular Applications of Artificial Neural Networks, Advantages and Disadvantages of ANN, Challenges of ANN.

Chapter-8 (8.1-8.4), Chapter-10 (10.1-10.5, 10.9-10.11)

Module-5

Clustering Algorithms: Introduction to Clustering Approaches, Proximity Measures, Hierarchical Clustering Algorithms, Partitional Clustering Algorithm, Density-based Methods, Grid-based Approach.

Reinforcement Learning: Overview of Reinforcement Learning, Scope of Reinforcement Learning, Reinforcement Learning as Machine Learning, Components of Reinforcement Learning, Markov Decision Process, Multi-Arm Bandit Problem and Reinforcement Problem Types, Model-based Learning, Model Free Methods, Q-Learning, SARSA Learning.

Chapter -13 (13.1-13.6), Chapter-14 (14.1-14.10)

Textbooks:

S Sridhar, M Vijayalakshmi, "Machine Learning", OXFORD University Press 2021, First Edition.

Reference Books

1. Murty, M. N., and V. S. Ananthanarayana. Machine Learning: Theory and Practice, Universities Press, 2024.
2. T. M. Mitchell, "Machine Learning", McGraw Hill, 1997.
3. Burkov, Andriy. The hundred-page machine learning book. Vol. 1. Quebec City, QC, Canada: Andriy Burkov, 2019.

Web links and Video Lectures (e-Resources):

- Machine Learning Tutorials: <https://www.geeksforgeeks.org/machine-learning/>
- Machine Learning Tutorials: https://www.tutorialspoint.com/machine_learning/index.htm
- Python for Machine Learning: https://www.w3schools.com/python/python_ml_getting_started.asp
- Introduction to Machine Learning: https://onlinecourses.nptel.ac.in/noc22_cs29/preview

Course outcomes: The students should be able to:

- Describe the machine learning techniques, their types and data analysis framework.
- Apply mathematical concepts for feature engineering and perform dimensionality reduction to enhance model performance.
- Develop similarity-based learning models and regression models for solving classification and prediction tasks.
- Build probabilistic learning models and design neural network models using perceptrons

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING - CYBER SECURITY

and multilayer architectures.

- Utilize clustering algorithms to identify patterns in data and implement reinforcement learning techniques.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING - CYBER SECURITY

Course Code:	BIC703	TITLE: Machine Learning						Faculty Name:	Mrs. Suhasini			
List of Course Outcomes	Program Outcomes											Total
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	
CO-1	3	2	-	-	-	-	-	-	-	-	-	5
CO-2	3	3	2	2	-	-	-	-	-	-	-	10
CO-3	2	3	3	2	-	-	-	-	-	-	-	10
CO-4	2	3	3	3	-	-	-	-	-	-	-	11
CO-5	2	3	2	3	-	-	-	-	-	-	-	10
Total	12	14	10	10	-	-	-	-	-	-	-	46

Note: 3 = Strong Contribution, 2 = Average Contribution, 1 = Weak Contribution, - = No Contribution

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Course Code:	BIC703	TITLE: Machine Learning	Faculty Name:	Mrs. Suhasini	
List of Course Outcomes	Program Specific Outcomes				Total
	PSO-1	PSO-2	PSO-3		
CO-1	2	-	-		2
CO-2	2	-	-		2
CO-3	2	-	-		2
CO-4	2	-	-		2
CO-5	2	-	-		2
Total	10	-	-		10

Course Co-ordinator

HoD