

<b>Machine Learning SEMESTER – V</b>			
<b>Course Code</b>	<b>M23BCI501</b>	<b>CIE Marks</b>	<b>50</b>
<b>Number of Lecture Hours/Week (L: T: P: S)</b>	<b>(3:0:0:0)</b>	<b>SEE Marks</b>	<b>50</b>
<b>Total Number of Lecture Hours</b>	<b>40 hours Theory</b>	<b>Total Marks</b>	<b>100</b>
<b>Credits</b>	<b>03</b>	<b>Exam Hours</b>	<b>03</b>
<b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. Introduce the fundamental concepts and principles of machine learning.</li> <li>2. Provide hands-on experience with commonly used machine learning algorithms.</li> <li>3. Develop skills in data pre-processing, feature engineering, model building, evaluation, and selection.</li> <li>4. Foster critical thinking about the ethical implications of machine learning.</li> <li>5. Prepare students to apply machine learning techniques to real-world problems.</li> </ol>			
<b>Module -1</b>			
<b>Machine Learning and Data Essentials: Introduction</b> to Machine Learning, Machine Learning in Relation to Other Fields, Types of Machine Learning, Challenges of Machine Learning, Machine Learning Process, Machine Learning Applications, Big Data Analytics and Types of Analytics, Big Data Analysis Framework. Textbook1: Chapter 1, Chapter 2 (Sections 2.1, 2.2, 2.3)			
			8 Hours
<b>Module -2</b>			
<b>Data Analysis and Learning Foundations:</b> Descriptive Statistics, Univariate Data Analysis and Visualization, Bivariate Data and Multivariate Data, Essential Mathematics for Multivariate Data. Textbook1: Chapter 2 (Sections 2.4, 2.5, 2.6, 2.7, 2.8)			
			8 Hours
<b>Module -3</b>			
<b>Learning and its Types,</b> Introduction to Learning and its types, Computation Learning Theory, Design of a Learning System, Introduction to Concept Learning, Induction Biases, Modeling in Machine Learning, Learning Frameworks. Similarity Based Learning, K-Nearest Neighbour Algorithm. Textbook1: Chapter 3 (Sections 3.1,3.2, 3.3, 3.4, 3.5, 3.6, 3.7), Chapter 4 (Sections 4.1, 4.2, 4.3, 4.4)			
			8 Hours
<b>Module -4</b>			
<b>Supervised Learning-Regression and Decision Trees</b> Introduction to Linear Regression, Validation of Regression Methods, Multiple Linear Regression, Polynomial Regression, and Logistic Regression. Introduction to Decision Tree Learning Model, Structure of a Decision Tree, Fundamentals of Entropy, Decision Tree Induction Algorithms including ID3 Tree Construction, C4.5 Construction, Textbook1: Chapter 5 (Sections 5.1- 5.7), Chapter 6 (Sections 6.1, 6.2 [6.2.1, 6.2.2]).			
			8 Hours
<b>Module -5</b>			
<b>Probabilistic Models, Ensemble Methods, and Unsupervised Learning</b> <b>Bayesian Learning:</b> Introduction to Probability-based Learning, Fundamentals of Bayes Theorem, and Classification Using Bayes Model including Naïve Bayes Algorithm, Brute Force Bayes Algorithm, Bayes Optimal Classifier, and Gibbs Algorithm. <b>Ensemble Learning:</b> Introduction to Ensemble Learning, Ensembling Techniques, Parallel Ensemble Models. <b>Unsupervised Learning:</b> Introduction to Clustering Approaches, Proximity Measures, Hierarchical Clustering Algorithms, Partitional Clustering Algorithm. Textbook1: Chapter 8(Sections 8.1 to 8.3) Chapter 12 (Sections 12.1, 12.2), Chapter 13 (Sections 13.1, 13.2, 13.3, 13.4)			
			8 Hours
<b>TEXTBOOK:</b> <ol style="list-style-type: none"> <li>1. S. Sridhar, M Vijayalakshmi, “Machine Learning”. Oxford University Press, 2021.</li> </ol>			
<b>REFERENCE BOOKS:</b> <ol style="list-style-type: none"> <li>1. Tom M. Mitchell, Machine Learning, McGraw Hill Education, India Edition 2013.</li> <li>2. Ethem Alpaydin, Introduction to Machine Learning, Fourth Edition, 2016.</li> </ol>			
<b>VIDEO LINKS:</b> <ol style="list-style-type: none"> <li>1. Machine Learning Course by Andrew Ng (Stanford CS229):  <a href="https://www.youtube.com/playlist?list=PLoROMvodv4rMiGQp3WXShMGgzqpfVfbU">https://www.youtube.com/playlist?list=PLoROMvodv4rMiGQp3WXShMGgzqpfVfbU</a> </li> <li>2. Blue1Brown - Essence of Linear Algebra &amp; Calculus: Linear Algebra:  <a href="https://www.youtube.com/playlist?list=PLZHQQObOWTQDPD3MizzM2xVFItgF8hE_ab">https://www.youtube.com/playlist?list=PLZHQQObOWTQDPD3MizzM2xVFItgF8hE_ab</a> Calculus:  <a href="https://www.youtube.com/playlist?list=PLZHQQObOWTQDMsr9K-rj53DwVRMYO3t5Yr">https://www.youtube.com/playlist?list=PLZHQQObOWTQDMsr9K-rj53DwVRMYO3t5Yr</a> </li> </ol> StatQuest with Josh Starmer (YouTube Channel): <a href="https://www.youtube.com/user/joshstarmer">https://www.youtube.com/user/joshstarmer</a> .			