Format: 5

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| **Symbiosis Institute of Technology, Pune** | | | | | | | | | | |
| **Session Plan** | | | | | | | | | | |
| **Name of the department – AI-ML** | | | | | | | | | | |
| **Name of the course-Unsupervised Learning** | | | | | | | | **Credit - 3** |  | |
| **Semester -** | | | | **4** | |  | | **Batch – 2023-27** |  | |
| **Name of the faculty- Dr. Gargi Bhide** | | | | | | | | | | |
|  |  |  |  | |  | |  | | |  |
| **Lect.**  **No** | **Unit No.** | **Points to cover** | **Methodology** | | **Faculty Conducting** | | **Lecture/Exp. Learning/Evaluation** | | | **CO** |
| 1 | 1 | Introduction to Machine Learning, applications | Classroom Teaching | | Dr.Gargi Bhide | | Lecture PPT | | | CO1 |
| 2 | 1 | Introduction to Machine Learning, applications | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO1 |
| 3 | 1 | Types of Learning: Supervised, Unsupervised and Semi-Supervised Learning | Classroom Teaching | | Dr. Gargi Bhide | | Lecture  Discussion based interactive session | | | CO1 |
| 4 | 1 | Data Types and distance measures Numeric Data and Euclidean Distance | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO1 |
| 5 | 1 | Categorical data, Graph data, Spatial data | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO1 |
| 6 | 1 | Trajectory data | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO1 |
| 7 | 1 | Time Series Data | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO1 |
| 8 | 1 | Distance measures, Manhattan | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO1 |
| 9 | 1 | Minkowski | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO1 |
| 10 | 1 | Chessboard | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO1 |
| 11 | **Unit 1** | **CA 1** | **Mind Map** | | **Dr. Gargi Bhide** | | **Evaluation** | | | **CO1** |
| 12 | 2 | Dimensionality Reduction -Data size, Feature size and scalability issues in Machine Learning | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO2 |
| 13 | 2 | Linear Discriminate Analysis | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO2 |
| 14 | 2 | Principal Component Analysis | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO2 |
| 15 | 2 | Independent Component Analysis | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO2 |
| 16 | 2 | Non-Negative Matrix Factorization and types | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO2 |
| 17 | 2 | Singular Value Decomposition | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO2 |
| 18 | 2 | Manifold Learning methods: MDS and T-SNE | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO2 |
| 19 | 2 | normalization of input data, Density estimation | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO2 |
| 20 | 3 | Clustering algorithms Clustering Patterns and techniques- static and incremental clustering algorithms | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 21 | 3 | k-means | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 22 | 3 | agglomerative | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 23 | 3 | Partitional Clustering and types | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 24 | 3 | Hierarchical Clustering and types | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 25 | 3 | Performance evaluation measures in clustering techniques | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 26 | 3 | Performance evaluation measures in clustering techniques | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 27 | 3 | Computational issues with clustering algorithms and how different clustering implementations try to overcome them. | Classroom Teaching | | Dr. Gargi Bhide | | Lecture  Discussion based interactive session | | | CO3 |
| 28 | 3 | Comparison and Selection of algorithm based on applications | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 29 | 3 | Comparison and Selection of algorithm based on applications | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO3 |
| 30 | **Unit 2 and 3** | **CA 2** | **Unit Test** | | **Dr. Gargi Bhide** | | **Evaluation** | | | **CO2, CO3** |
| 31 | 4 | Advanced clustering algorithms | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 32 | 4 | BIRCH Algorithm, | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 33 | 4 | CURE Algorithm, | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 34 | 4 | Spectral Clustering, | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 35 | 4 | Canopy Clustering, | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 36 | 4 | Density Based Clustering- DBSCAN Algorithm. | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 37 | 4 | Mixture Models- Gaussian | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 38 | 4 | Mixture Models | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 39 | 4 | Expectation Maximization | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO4 |
| 40 | 5 | Deep unsupervised learning approaches Introduction to autoencoders | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO5 |
| 41 | 5 | Introduction to autoencoders | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO5 |
| 42 | 5 | GAN | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO5 |
| 43 | 5 | GAN | Classroom Teaching | | Dr. Gargi Bhide | | Lecture PPT | | | CO5 |
| 44 | 4 and 5 | Coding Statements | Hands on | | Dr. Gargi Bhide | | Execution | | | CO4, CO5 |
| 45 | **Unit 4 and 5** | **CA 3** | **Coding Competition** | | **Dr. Gargi Bhide** | | **Evaluation** | | | **CO4, CO5** |

Sign of the faculty member: Dr. Gargi Bhide

# Sign of HoD: Shruti Patil