

**Academic Council Meeting No. and Date : 03 / February 14, 2022**

**Agenda Number : 7**

**Resolution Number : 13 / 5.3**



**VidyaPrasarak Mandal's  
B. N. Bandodkar College of  
Science (Autonomous), Thane**



## **Certificate course in Machine Learning**

**[With effect from Academic Year 2022-2023]**

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## Course Outcome

- Understanding Human learning aspects.
- Understanding primitives in learning process by computer.
- Understanding nature of problems solved with Machine Learning

Eligibility :

Passed 12<sup>th</sup> standard (HSC) of Maharashtra State Board / CBSE / ICSE board or equivalent.

Mode of Conduct :

Offline lectures / Online lectures

## Structure of Programme

CourseCode	Course Title	No. of lectures	Credits
<b>BNBCCML1T1</b>	Certificate course in Machine Learning	<b>40</b>	<b>2</b>

## Syllabus

Course Code	Course Title	Credits	No. of lectures
<b>BNBCCML1T1</b>	<b>Certificate course in Machine Learning</b>	<b>2</b>	
<b>Unit I :</b>	<ul style="list-style-type: none"> <li>Machine learning, Examples of Machine Learning Problems, Structure of Learning, learning versus Designing, Training versus Testing, Characteristics of Machine learning tasks, Predictive and descriptive tasks, Machine learning Models: Geometric Models, Logical Models, Probabilistic Models. Features: Feature types, Feature Construction and Transformation, Feature Selection.</li> </ul>	<b>10</b>	
<b>Unit II :</b>	<ul style="list-style-type: none"> <li>Classification and Regression: Classification: Binary Classification- Assessing Classification performance, Class probability Estimation Assessing class probability Estimates, Multiclass Classification. Regression: Assessing performance of Regression- Error measures, Overfitting- Catalysts for Overfitting, Case study of Polynomial Regression. Theory of Generalization: Effective number of hypothesis, Bounding the Growth function, VC Dimensions, Regularization theory</li> </ul>	<b>10</b>	
<b>Unit III :</b>	<ul style="list-style-type: none"> <li>Linear Models: Least Squares method, Multivariate Linear Regression, Regularized Regression, Using Least Square regression for Classification. Perceptron, Support Vector Machines, Soft Margin SVM, Obtaining probabilities from Linear classifiers, Kernel methods for non-Linearity.</li> </ul>	<b>10</b>	

## Books for Reference

1.	Machine Learning: The Art and Science of Algorithms that Make Sense of Data by Peter Flach Cambridge University Press
2.	Introduction to Statistical Machine Learning with Applications in R by Hastie, Tibshirani, Friedman 2nd edition Springer
3.	Introduction to Machine Learning by EthemAlpaydin 2nd edition PHI

## Pattern of Evaluation(8 Hours for examination, assessment and evaluation)

MCQ Test/ Online MCQ Test (Duration: 1 Hour)

Assessment and Evaluation of Case Study Reports submitted by participants (Topics for case study to be allotted by teachers in consultation with students)

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