



# University of Management and Technology

## **School of Business and Economics**

Course Title: Introduction to Machine Learning

Course Code: ML-485

Resource Person: Satwat Bashir

Department: **IS**

### **SBE Vision**

SBE envisions its success in the sustainable contribution that it will make to the industry, academia and research in public and private sector. SBE will lead by providing professionally competent and ethically conscious human resources engaged in the global and local context to foster socio-economic growth and sustainability for the society. SBE envisages having faculty with high research potential and a deep desire for cutting edge research including collaboration with national and international partners.

### **SBE Mission**

Being a research-oriented and student-centric business school, we emphasize research publications in impact journals as well as state-of -the-art learning methodologies. We will prepare our students to become the future ethical business leaders and the guiding post for the society, while equipping them with the knowledge and skills required by world-class professionals. We will be the leading choice for organizations seeking highly talented human resource. SBE will foster internationalization with key stakeholders and actively work to exchange best practices with business schools across Pakistan through collaborations, workshops, conferences and other means.

## **Program Objectives**

### **Course Objectives**

Machine learning studies the design and development of algorithms that can improve their performance at a specific task with experience. Machine learning methods have been applied to a diverse number of problems ranging from learning strategies for game playing to recommending movies to customers. This course covers the key approaches to machine learning, including inductive inference of decision trees, linear models for classification and regression; Bayesian learning methods, support vector machines, and graphical models. The theory discussed in class will be empirically tested in assignments and homework.

### **Learning Objectives**

To provide a comprehensive introduction to machine learning methods

To build mathematical foundations of machine learning and provide an appreciation for its applications

To provide experience in the implementation and evaluation of machine learning algorithms

To develop research interest in the theory and application of machine learning

### **Learning Outcomes**

Formulate and execute solutions to machine learning problems

Understand the trade-offs among model complexity, data size, and model performance Apply and interpret information theoretic and probabilistic machine learning methods on real-world datasets.

### **Teaching Methodology (List methodologies used -example are given below)**

Interactive Classes

Class Activities based Learning

## **STUDENTS ARE REQUIRED TO READ AND UNDERSTAND ALL ITEMS OUTLINED IN THE PARTICIPANT HANDBOOK**

### **Class Policy:-**

- **Mobile Policy**  
**TURN OFF YOUR MOBILE PHONE!** It is unprofessional to be texting or otherwise.
- **Email Policy**  
**READ YOUR EMAILS!** You are responsible if you miss a deadline because you did not read your email. Participants should regularly check their university emails accounts regularly and respond accordingly.
- **Class Attendance Policy**  
A minimum of 80% attendance is required for a participant to be eligible to sit in the final examination. Being sick and going to weddings are absences and will not be counted as present. You have the opportunity to use 6 absences out of 30 classes. Participants with less than 80% of attendance in a course will be given grade 'F' (Fail) and will not be allowed to take end term exams. International students who will be leaving for visa during semester should not use any days off except for visa trip. Otherwise they could reach short attendance.
- **Withdraw Policy**  
Students may withdraw from a course till the end of the 12th week of the semester. Consequently, grade W will be awarded to the student which shall have no impact on the calculation of the GPA of the student. A Student withdrawing after the 12th week shall be automatically awarded "F" grade which shall count in the GPA.
- **Moodle**  
UMT -LMS (Moodle) is an Open Source Course Management System (CMS), also known as a learning Management System (LMS). Participants should regularly visit the course website on MOODLE Course Management system, and fully benefit from its capabilities. If you are facing any problem using moodle, visit <http://oit.umt.edu.pk/moodle>. For further query send your queries to [moodle@umt.edu.pk](mailto:moodle@umt.edu.pk)
- **Harassment Policy**

Sexual or any other harassment is prohibited and is constituted as punishable offence. Sexual or any other harassment of any participant will not be tolerated. All actions categorized as sexual or any other harassment when done physically or verbally would also be considered as sexual harassment when done using electronic media such as computers, mobiles, internet, emails etc.

- ### Use of Unfair Means/Honesty Policy

Any participant found using unfair means or assisting another participant during a class test/quiz, assignments or examination would be liable to disciplinary action.

- ### Plagiarism Policy

All students are required to attach a “Turnitin” report on every assignment, big or small. Any student who attempts to bypass “Turnitin” will receive “F” grade which will count towards the CGPA. The participants submit the plagiarism report to the resource person with every assignment, report, project, thesis etc. If student attempts to cheat “Turnitin”, he/she will receive a second “F” that will count towards the CGPA. There are special rules on plagiarism for final reports etc. all outlined in your handbook.

- ### Communication of Results

The results of quizzes, midterms and assignments are communicated to the participants during the semester and answer books are returned to them. It is the responsibility of the course instructor to keep the participants informed about his/her progress during the semester. The course instructor will inform a participant at least one week before the final examination related to his or her performance in the course.

## Course Outline

Course code...485.....

Course title..... Introduction to Machine Learning

Program	BBA and BBIS
Credit Hours	3
Duration	15
Prerequisites (If any)	Linear Algebra, Basics of Progg
Resource Person Name and Email	Satwat Bashir satwat.bashir@umt.edu.pk
Counseling Timing (Room# )	Mention at LMS
Contact no.	-

Web Links:- (Face book, Linked In, Google Groups, Other platforms)	
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**Chairman/Director Programme signature.....Date.....**

**Dean's signature.....Date.....**

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

<b>Marks Evaluation</b>	<b>Marks in percentage</b>
<b>Quizzes:</b>	<b>10%</b>
<b>Assignments:</b>	<b>20%</b>
<b>Final Project &amp; Presentation:</b>	<b>25%</b>
<b>Mid Term Exam:</b>	<b>20%</b>
<b>End Term Exam:</b>	<b>25%</b>
<b>Total:</b>	<b>100%</b>

**Recommended Text Books:**

1. **Machine Learning by Tom M. Mitchell**
2. Machine Learning: A Probabilistic Perspective by Kevin P. Murphy

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-Book: -----

No	Topics to be covered in the course	Assessments	Deadlines
1	Introduction		
2	Bayes classifier		
3	Linear regression	Assignment 1	
	Regularization		
4	Cross validation	Assignment 2	Assignment 1
	Logistic regression		
5	Nearest neighbour		Assignment 2
6	Revision		
7	Mid Term		
8	Neural networks		



9	Neural networks	Assignment 3	
10	Decision trees		
11	Decision trees		Assignment 3
12	Clustering	Assignment 4	
13	Normalization		
14	Revision		Assignment 4
15	PAC Learning		