

Week Wise Distribution of the Contents

Course Code	CS467
Course Title	Machine Learning
CrHr (TCH + LCH)	3(3+0)
Pre-requisite	None
Recommended Texts	<ol style="list-style-type: none"> 1. Machine Learning Paradigms, Artificial Immune Systems and their Applications in Software Personalization, Dionysios Sotiropoulos, George A. Tsihrintzis, Springer International Publishing, 2016, ISBN 978-3-319-47192-1 2. Machine Learning: The New AI (The MIT Press Essential Knowledge series), EthemAlpaydin, The MIT Press, 2016, ISBN: 9780262529518 3. E. Alpaydin, Introduction to Machine Learning, 2nd edition, The MIT Press., 2010, ISBN 978-0-262-01243-0 4. Smola and S.V.N Vishwanathan, Introduction to Machine Learning, CambridgeUniversity Press., 2008, ISBN 0-521-82583-0 5. D. Barber, Bayesian Reasoning and Machine Learning, CambridgeUniversity Press., 2012, ISBN 978-0521518147
Course Description	This course provides a broad introduction to machine learning, data mining, and statistical pattern recognition. Topics include: (i) Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks). (ii) Unsupervised learning (clustering, dimensionality reduction, recommender systems, deep learning). (iii) Best practices in machine learning (bias/variance theory; innovation process in machine learning and AI). The course will also draw from numerous case studies and applications, so that you'll also learn how to apply learning algorithms to building smart robots (perception, control), text understanding (web search, anti-spam), computer vision, medical informatics, audio, database mining, and other areas.
Course Objectives	<ul style="list-style-type: none"> • Main objective of the course is providing graduate and advance undergraduate students with an understanding of practical and theoretical methods, mathematics, and algorithms required for applications and research in Machine Learning. • Apply user centered design and usability engineering principles as they design a wide variety of software user interfaces.
Course Outline	<ul style="list-style-type: none"> • Machine Learning • Types of Machine Learning, Supervised Learning • Classification, Classification based on Distance Measurement • Bayesian Learning, Decision Trees, Logistic Regression • Clustering
Week Number	Topic
W1	Introduction to Machine Learning. Types of Machine Learning, Supervised Learning. Classification, Classification based on Distance Measurement
W2	k-Nearest Neighbours Algorithm. Bayesian Learning, Decision Trees, Logistic Regression

W3	Support Vector Machines. Predicting Numeric Values
W4	Regression, Tree Based Regression
W5	Evaluating Learning Methods. Unsupervised Learning
W6	Clustering
W7	Association Rules, Reinforcement Learning. Sequence Alignment
W8	Hidden Markov Models
MID EXAM / MID OF SEMESTER	
W9	Multiple Models
W10	Evolutionary Algorithms
W11	Big Data and MapReduce
W12	Design and Analysis of Machine Learning Experiments
W13	Regularization
W14	Neural Networks: Representation
W15	Machine Learning System Design
W16	Large Scale Machine Learning
