LECTURE PLAN

Institute/Department	UNIVERSITY INSTITUTE OF COMPUTING (UIC)	**Program**	**Master of Computer Applications (MC305)**
Master Subject Coordinator Name:	Abha Sharma	**Master Subject Coordinator E-Code**:	**E11948**
Course Name	Machine Learning	**Course Code**	**21CAT-701**

Lecture	Tutorial	Practical	Self Study	Credit	Subject Type
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Course Type	Course Category	Mode of Assessment	Mode of Delivery
Program Core	Graded (GR)	Theory Examination (ET)	Theory (TH)

Mission of the Department	M1. To provide innovative learning centric facilities and quality-oriented teaching learning process for solving computational problems. M2. To provide a framework through Project Based Learning to support society and industry in promoting a multidisciplinary activity. M3. To develop crystal clear evaluation system and experiential learning mechanism aligned with futuristic technologies and industry. M4. To provide doorway for promoting research, innovation and entrepreneurship skills in collaboration with industry and academia. M5. To undertake societal activities for upliftment of rural/deprived sections of the society.
Vision of the Department	To be a Centre of Excellence for nurturing computer professionals with strong application expertise through experiential learning and research for matching the requirements of industry and society instilling in them the spirit of innovation and entrepreneurship.

Program Educational Objectives(PEOs)	
PEO1	Establish a well-fortified computing foundation of successful professionals by applying computing fundamentals and domain-specific knowledge, demonstrating their innovative skills and considering social and environmental concerns.
PEO2	Undertake successful implementation of ethical solutions as an individual or a member or a leader of a team by investigating, analyzing, formulating and solving complex computing problems in multidisciplinary approaches using modern tools.
PEO3	Enhance professionalism and ethical attitude in the profession while communicating with local, national, and foreign peers, bound within regulations and leading to lifelong learning.
PEO4	Promote awareness for uplifting health, safety, legal, environmental, ethical and cultural diversity issues for serving the society.

Program Specific OutComes(PSOs)	
PSO1	Analyze their abilities in systematic planning, developing, testing and executing complex computing applications in field of Social Media and Analytics, Web Application Development and Data Interpretations.
PSO2	Apprise in-depth expertise and sustainable learning that contributes to multi-disciplinary creativity, permutation, modernization and study to address global interest.

Program OutComes(POs)	
PO1	Apply mathematics and computing fundamental and domain concepts to find out the solution of defined problems and requirements. (Computational Knowledge)
PO2	Use fundamental principle of Mathematics and Computing to identify, formulate research literature for solving complex problems, reaching appropriate solutions. (Problem Analysis)
PO3	Understand to design, analyze and develop solutions and evaluate system components or processes to meet specific need for local, regional and global public health, societal, cultural, and environmental systems. (Design/Development of Solutions)
PO4	Use expertise research-based knowledge and methods including skills for analysis and development of information to reach valid conclusions. (Conduct Investigations of Complex Computing Problems)
PO5	Adapt, apply appropriate modern computing tools and techniques to solve computing activities keeping in view the limitations. (Modern Tool Usage)
PO6	Exhibiting ethics for regulations, responsibilities and norms in professional computing practices. (Professional Ethics)

PO7	Enlighten knowledge to enhance understanding and building research, strategies in independent learning for continual development as computer applications professional. (Life-long Learning)
PO8	Establishing strategies in developing and implementing ideas in multi- disciplinary environments using computing and management skills as a member or leader in a team. (Project Management and Finance)
PO9	Contribute to progressive community and society in comprehending computing activities by writing effective reports, designing documentation, making effective presentation, and understand instructions. (Communication Efficacy)
PO10	Apply mathematics and computing knowledge to access and solve issues relating to health, safety, societal, environmental, legal, and cultural issues within local, regional and global context. (Societal and Environmental Concern)
PO11	Gain confidence for self and continuous learning to improve knowledge and competence as a member or leader of a team. (Individual and Teamwork)
PO12	Learn to innovate, design and develop solutions for solving real life business problems and addressing business development issues with a passion for quality competency and holistic approach. (Innovation and Entrepreneurship)

Text Books

Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Introduction to Machine Learning	Ethem Alpaydin	3rd	MIT Press	2015
2	Machine Learning in Action	Peter Harrington	2nd	Dream Tech Press	2014
3	Natural Language Processing with Python	Steven Bird, Ewan Klein and Edward Loper	2nd	O'Reilly Media	2015

Reference Books

Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Data Mining Introductory and Advanced Topics	Margaret. H. Dunham	2nd	Pearson Education	2006
2	Machine Learning Methods in the Environmental Sciences	William W. Hsieh	1st	Cambridge University Press	2009
3	Taming Text How to Find, Organize, and Manipulate It	Grant S. Ingersoll, Thomas S. Morton, and Andrew L	2nd	Manning Publication Co.	2012

Course OutCome

SrNo	OutCome
CO1	Recognize the characteristics of machine learning that make it useful to real-world problems
CO2	Design algorithms for machine learning to study and research.
CO3	Identify machine learning technique suitable to any problem.
CO4	Apply Dimensionality reduction techniques in ML.
CO5	Create a graphical representation of the given data set using matplotlib package in pandas.

Lecture Plan Preview-Theory

Unit No	LectureNo	ChapterName	Topic	Text/ Reference Books	Pedagogical Tool**	Mapped with CO Numer (s)
1	1	Chapter 1.1 Introduction to Machine Learning	Introduction, Key Terminology	T-Introduction to Machine Learni	PPT	CO1
1	2	Chapter 1.1 Introduction to Machine Learning	Types of machine learning	,T-Introduction to Machine Learni,R-Data Mining Introductory and A	PPT	CO1
1	3	Chapter 1.1 Introduction to Machine Learning	Issues in machine learning	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	PPT	CO1

1	4	Chapter 1.1 Introduction to Machine Learning	Application of Machine Learning	,T-Introduction to Machine Learni,R-Data Mining Introductory and A	PPT	CO5
1	5	Chapter 1.1 Introduction to Machine Learning	Suitable Libraries for ML	,T-Machine Learning in Action,R-Taming Text How to Find, Organ	PPT	CO1
1	6	Chapter 1.2: Data preprocessing with machine learning techniques.	Supervised Machine Learning: Classification	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	PPT	CO5
1	7	Chapter 1.2: Data preprocessing with machine learning techniques.	Unsupervised Machine Learning: Clustering	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	PPT	CO5
1	8	Chapter 1.2: Data preprocessing with machine learning techniques.	Backpropagation Learning	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO3
1	9	Chapter 1.2: Data preprocessing with machine learning techniques.	Data Reduction and data transformation	,T-Machine Learning in Action,R-Data Mining Introductory and A	PPT	CO4
1	10	Chapter 1.2: Data preprocessing with machine learning techniques.	Principal component Analysis (PCA)	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	Simulation	CO4
1	11	Chapter 1.3 Various types of regression analysis	Universal Approximation	,T-Machine Learning in Action,R-Data Mining Introductory and A	PPT	CO3
1	12	Chapter 1.2: Various regression techniques.	Linear and non linear regression	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	PPT	CO5
1	13	Chapter 1.3 Various types of regression analysis	Logistic regression	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	PPT	CO5
1	14	Chapter 1.3 Various types of regression analysis	Outlier detection	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO5
1	15	Chapter 1.3 Various types of regression analysis	Rivision	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO3
2	16	Chapter 2.1 Other Classification Algorithms	Classification Using Decision Trees: Information gain, Gini index	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO2
2	17	Chapter 2.1 Other Classification Algorithms	Entropy, Decision Tree	,T-Machine Learning in Action,R-Data Mining Introductory and A	PPT	CO5

2	18	Chapter 2.1 Other Classification Algorithms	Rule Based Classification	,T-Machine Learning in Action,R-Taming Text How to Find, Organ	PPT	CO2
2	19	Chapter 2.1 Other Classification Algorithms	Naïve Bayes Classifications	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO3
2	20	Chapter 2.1 Other Classification Algorithms	K-nearest neighbor	,T-Machine Learning in Action,R-Data Mining Introductory and A	PPT	CO3
2	21	Chapter 2.2	Support Vector Machines (SVM)	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO5
2	22	Chapter 2.2	Support vectors, Maximum Margin Linear Separators,Kernals	,T-Machine Learning in Action,R-Machine Learning Methods in th	Case Study,PPT	CO2
2	23	Chapter 2.2	Bayesian Belief Networks	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO3
2	24	Chapter 2.2	Evaluation metrics in classifiers	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO3
2	25	Chapter 2.2	Accuracy, Precision Recall, F-measure	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT,Simulation	CO3
2	26	Chapter 2.3	Perceptron	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO5
2	27	Chapter 2.3	Hidden Markov Model	,T-Machine Learning in Action,R-Taming Text How to Find, Organ	PPT	CO3
2	28	Chapter 2.3	Multilayer networks	,T-Machine Learning in Action,R-Data Mining Introductory and A	PPT	CO3
2	29	Chapter 2.3	N various libraries	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT,Simulation	CO2
2	30	Chapter 2.3	back-propagation	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	PPT,Video Lecture	CO3
3	31	Chapter 3.1	Natural Language Processing and its techniques,	,T-Machine Learning in Action,R-Taming Text How to Find, Organ	Activity,PPT	CO2
3	32	Chapter 3.1	Feature Engineering on Text Data	,T-Machine Learning in Action,R-Taming Text How to Find, Organ	PPT	CO4
3	33	Chapter 3.1	Natural Language Generation,	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO4
3	34	Chapter 3.1	Natural Language Processing	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO4
3	35	Chapter 3.1	Natural Language Processing Libraries,	,T-Machine Learning in Action,R-Taming Text How to Find, Organ	PPT	CO4
3	36	Chapter 3.2	Accessing Text corpora,	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO3
3	37	Chapter 3.2	Regular Expression for detecting word pattern,	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO4
3	38	Chapter 3.2	Useful Applications of Regular Expression.	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO2
3	39	Chapter 3.2	Genetic Algorithms, An illustrative Example with clustering,	T-Introduction to Machine Learni	PPT	CO3
3	40	Chapter 3.2	Genetic Algorithms, An illustrative Example with clustering,	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO4
3	41	Chapter 3.3	Conditional Frequency Distribution,	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	PPT	CO3
3	42	Chapter 3.2	Accessing Text from the web and from disk,	,T-Introduction to Machine Learni,R-Machine Learning Methods in th	PPT	CO3
3	43	Chapter 3.3	Text Processing with Unicode,	,T-Machine Learning in Action,R-Machine Learning Methods in th	PPT	CO3
3	44	Chapter 3.3	Regular Expression for detecting word pattern	,T-Natural Language Processing wi,R-Taming Text How to Find, Organ	PPT,Simulation	CO2

3	45	Chapter 3.3	Useful Applications of Regular Expression	,T-Natural Language Processing wi,R-Taming Text How to Find, Organ	PPT	CO3

Assessment Model			
Sr No	Assessment Name	Exam Name	Max Marks
1	20EP02	External Theory	80
2	20EP02	Attendance and Engagement Score on BB	2
3	20EP02	Mid-Semester Test-1	40
4	20EP02	Quiz	6
5	20EP02	Short Term Paper / Research Paper	12
6	20EP02	Mid-Semester Test-2	40

CO vs PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3	NA
CO2	3	3	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	2	3
CO3	2	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	3	NA
CO4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO5	NA	3	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Target	2.67	3	3	3	NA	NA	NA	NA	NA	NA	NA	NA	2.67	3