VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY HYDERABAD
B.TECH. MINOR IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

COURSE STRUCTURE AND SYLLABUS
(*Applicable for the batches admitted from the academic year 2022-2023*)

V SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22MC1AM301	Foundations of Artificial Intelligence	3	0	0	3	3
22MC2AM301	Artificial Intelligence Laboratory	0	0	3	3	1.5
Total		**3**	**0**	**3**	**6**	**4.5**

VI SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22MC1AM302	Artificial Intelligence Applications	3	1	0	4	4
Total		**3**	**1**	**0**	**4**	**4**

VII SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22MC1AM401	Principles of Machine Learning	3	0	0	3	3
22MC1AM402	Fundamentals of Deep Learning					
22MC2AM401	Principles of Machine Learning Laboratory	0	0	3	3	1.5
22MC2AM402	Fundamentals of Deep Learning Laboratory					
Total		**3**	**0**	**3**	**6**	**4.5**

VIII SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22MC1AM403	Robotics Process Automation	3	0	0	3	3
22MC1AM404	Natural Language Processing					
22MC1AM405	Game Theory					
22MC1AM406	Computer Vision & Robotics					
22MC1AM407	Speech & Video Processing					
22MC1AM408	Soft Computing					
22MC4AM401	Mini – Project	0	0	4	4	2
Total		**3**	**0**	**4**	**7**	**5**

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week
C – Credits SE – Sessional Examination CA – Class Assessment ELA – Experiential Learning Assessment
SEE – Semester End Examination D-D – Day to Day Evaluation LR – Lab Record
CP – Course Project PE – Practical Examination

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. Minor (AIML) V Semester

(22MC1AM301) FOUNDATIONS OF ARTIFICIAL INTELLIGENCE

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To review important concepts required for artificial intelligence
- To introduce the concept of learning patterns from data and develop a strong model using machine learning algorithms
- To explain theoretical foundation for understanding state of the art machine learning algorithms like classifications, regressions
- To understand unsupervised learning technique using partitioning and hierarchical clustering methods
- To gain the knowledge on clustering techniques

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Represent knowledge and facts for solving the real-world problems

CO-2: Build, and evaluate the model using different machine learning techniques

CO-3: Design and implement machine learning solutions to classification, regression

CO-4: Design and implement various unsupervised learning methods to real-world applications

CO-5: Implement clustering techniques on real time data

UNIT – I:

Defining Artificial Intelligence, Defining AI techniques, Using Predicate Logic and Representing Knowledge as Rules, Representing simple facts in logic, Computable functions and predicates, Procedural vs Declarative knowledge, Logic Programming.

UNIT – II:

Mathematical Foundations: Matrix Theory and Statistics for Machine Learning. Idea of Machines learning from data, Classification of problem – Regression and Classification, Supervised and Unsupervised learning.

UNIT – III:

Linear Regression: Model representation for single variable, Single variable Cost Function, Gradient Decent for Linear Regression, Gradient Decent in practice

UNIT – IV:

Logistic Regression: Classification, Hypothesis Representation, Decision Boundary, Cost function, Advanced Optimization, Multi-classification (One vs All), Problem of Overfitting.

UNIT – V:

Clustering: clustering as a machine learning task, different types of clustering techniques, partitioning methods, k-medoids, hierarchical clustering. Use-cases centered around classification and clustering.

TEXT BOOKS:

1. Artificial Intelligence, Cengage Learning, Saroj Kaushik, 1st Edition, 2011
2. Python Machine Learning by Example, Yuxi (Hayden) Liu, Packet Publishing Limited, 2017

REFERENCES:

1. Machine Learning, Saikar Dutt, Subramanian Chandramouli, Amit Kumar Das, Pearson India
2. Practical Workbook Artificial Intelligence and Soft Computing for Beginners, Anindita Das Bhattacharjee, Shroff Publisher-X Team Publisher
3. Machine Learning, Tom Mitchell, McGraw-Hill, 2017
4. Pattern Recognition and Machine Learning, Christopher M. Bishop, Springer, 2011
5. The Elements of Statistical Learning, T. Hastie, R. Tibshirani, J. Friedman, 2nd Edition, 2011

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. Minor (AIML) V Semester

(22MC2AM301) ARTIFICIAL INTELLIGENCE LABORATORY

TEACHING SCHEME		
L	T/P	C
0	3	1.5

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE OBJECTIVES:

- To review important concepts required for artificial intelligence
- To introduce the concept of learning patterns from data and develop a strong model using machine learning algorithms
- To explain theoretical foundation for understanding state of the art machine learning algorithms like classifications, regressions
- To understand unsupervised learning technique using partitioning and hierarchical clustering methods
- To explore various statistical methods for machine learning

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Represent knowledge and facts for solving the real-world problems
CO-2: Build, and evaluate the model using different machine learning techniques
CO-3: Design and implement machine learning solutions to classification, regression
CO-4: Design and implement various unsupervised learning methods to real-world applications
CO-5: Apply statistical methods to develop the machine learning models

LIST OF EXPERIMENTS:

WEEK - 1 & 2: Basic programs in Python to get familiarize various programming structures

WEEK - 3: Implementation of logical rules in Python

WEEK - 4, 5, 6 & 7: Using any data apply the concept of:
a. Liner regression
b. Gradient decent
c. Logistic regression

WEEK - 8: Perform and plot overfitting in a data set

WEEK - 9 &10: Implementation of KNN classification algorithm

WEEK - 11 &12: Implementation of k-means clustering algorithm

WEEK - 13: Explore statistical methods for machine learning

TEXT BOOKS:

1. Artificial Intelligence, Saroj Kaushik, 1st Edition, Cengage Learning, 2011
2. Python Machine Learning by Example, Yuxi (Hayden) Liu, Packet Publishing Limited, 2017
3. Machine Learning, Saikar Dutt, Subramanian Chandramouli, Amit Kumar Das, Pearson India

REFERENCES:

1. Practical Workbook Artificial Intelligence and Soft Computing for Beginners, Anindita Das Bhattacharjee, Shroff Publisher-X Team Publisher
2. Machine Learning, Tom Mitchell, McGraw-Hill, 2017
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VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. Minor (AIML) VI Semester

(22MC1AM302) ARTIFICIAL INTELLIGENCE APPLICATIONS

TEACHING SCHEME		
L	T/P	C
3	1	4

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To give deep knowledge of AI
- To know the applications of AI in various fields to make the life easy
- To introduce recent topics in AIML
- To gain knowledge about robotic process automation, and AI optimized hardware
- To understand the recent developments in artificial intelligence

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Correlate the AI and solutions to modern problems

CO-2: Decide when to use which type of AI technique

CO-3: Understand and analyse real world problems using AI techniques

CO-4: Develop solutions using artificial intelligence and block chain technologies

CO-5: Build smart solutions using AI techniques

UNIT – I:

Linguistic aspects of natural language processing, AI and Quantum Computing, Applications of Artificial Intelligence (AI) in business.

UNIT – II:

Emotion Recognition using human face and body language, AI based system to predict the diseases early,

UNIT – III:

Smart Investment analysis, AI in Sales and Customer Support, Robotic Processes Automation for supply chain management.

UNIT – IV:

AI-Optimized Hardware, Digital Twin i.e. AI Modelling, Information Technology & Security using AI.

UNIT – V:

Recent Topics in AI/ML: AI/ML in Smart solutions, AI/ML in Social Problems handling, Block chain and AI.

TEXT BOOKS:

1. AI and Analytics, Accelerating Business Decisions, Sameer Dhanrajani, John Wiley & Sons

2. Artificial Intelligence in Practice: How 50 Successful Companies Used AI and Machine Learning to Solve Problems, Bernard Marr, Matt Ward, Wiley

REFERENCES:

1. Life 3.0: Being Human in the Age of Artificial Intelligence, Max Tegmark, 2018
2. Homo Deus: A Brief History of Tomorrow, Yuval Noah Harari, 2017