Lingaya's Vidyapeeth

Deemed-to-be-University u/s 3 of UGC Act 1956, Government of India
NAAC ACCREDITED
Approved by MHRD / AICTE / PCI / BCI / COA / NCTE
Nachauli, Jasana Road, Faridabad- 121002 (Haryana)
Website: www.lingayasvidyapeeth.edu.in | Ph: 0129-2598200-05

COURSE PLAN & COURSE DATA SHEET

PROGRAM: B.TECH (AIML)VIII SEM	DEGREE: B.TECH
COURSE: AIML Tools and Applications	SEMESTER: VIII CREDITS: 3
COURSE CODE: CS-402C REGULATION:	COURSE TYPE: CORE
COURSE AREA/DOMAIN: AIML	CONTACT HOURS: 3 hours/week
CORRESPONDING LAB COURSE CODE (IF ANY):	LAB COURSE NAME (IF ANY):

PROGRAM EDUCATIONAL OBJECTIVES:

SYLLABUS:

UNIT	DETAILS	HOURS
I	NTRODUCTION TO AI- Agents and Environments – Uninformed Search Strategies,Informed Search Strategies-Local Search Algorithm- Problem Formulation-Constraint Satisfaction Problem. INFERENCE- Forward and Backward Chaining-Unification-Uncertainty-Inference in Bayesian Network – Learning from Observations-Forms of Learning-Inductive Learning,Neural Network-Learning Decision trees-Reinforcement Learning-Case Study TOOLS : Introduction to python, control statements, list, dictionary, object, class et	10
II	MACHINE LEARNING FUNDAMENTALS –Types of Machine Learning - Supervised, Unsupervised, Reinforcement- The Machine Learning process. Terminologies in MLTesting ML algorithms Installation of Python Libraries/ MATLAB tools for Machine Learning (ii) Data pre-processing using Python Machine Learning libraries INTRODUCTION TO TOOLS : Intro to scikit-learn, classification, regression, clustering, PCA, Dimension reduction. PANDAS->>data cleaning, data wrangling, etc	09
III	PERCEPTRON- Multilayer perceptron- Back Propagation – Initialization, Training and Validation Support Vector Machines(SVM) as a linear and non-linear classifier - Limitations of SVM Practical Component: TOOLS : Introduction to TensorFlow Programming (Using TensorFlow Libraries / MATLAB) (i) Recognition of MNIST handwritten digits using Artificial Neural Network. (ii) Build an email spam classifier using SVM.	09
IV	PROBABILISTIC GRAPHICAL MODELS: Bayesian Networks - Learning Naive Bayes classifiers-Markov Models – Hidden Markov Models Sampling – Basic sampling methods – Monte Carlo -Reinforcement Learning Practical Component: (Using Python Libraries / MATLAB)	08
V	MINING COMPLEX DATA TYPES - Other Methodologies - Data Mining Applications DATA MINING AND SOCIETY – Data Mining Trends – Real world applications – Data Mining Tool study. TOOLS : Pytorch Programming	06
	TOTAL HOURS	42

Teacher Centric Approach **TC1: Chalk and Talk, TC2: PPT, TC3: Video Lectures TC4: Blended learning**
Learner Centric Approach: **LC1: Assignment. LC2: Mini project. LC3: Quiz/Class test. LC 4: Seminar on recent trends.** **LC5: Group Task. LC6: Others**

DETAILED SESSION PLAN

Lecture session/ Number	Topics to be covered	CO addressed	Teacher Centric Approach	Learner Centric Approach	References	Relevance with POs and PSOs
1	**UNIT-1 INTRODUCTION TO AI-** Agents and Environments		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
2	Uninformed Search Strategies		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
3	Informed Search Strategies		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
4	Local Search Algorithm		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
5	Problem Formulation		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
6	Constraint Satisfaction Problem		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
7	INFERENCE- Forward and Backward Chaining		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
8	Unification-Uncertainty		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
9	Inference in Bayesian Network		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
10	Learning from Observations		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
11	Forms of Learning- Inductive Learning		TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1

12	Neural Network-Learning Decision trees	TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
13	Reinforcement Learning-Case Study	TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
14	TOOLS : Introduction to python, control statements	TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
15	list, dictionary, object, class etc.	TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
16	Doubt call	TC1	LC1,LC3	T1	PO1,PO2,PO3,PSO1
17	**UNIT-2 MACHINE LEARNING FUNDAMENTALS –** Types of Machine Learning - Supervised, Unsupervised,	TC1	LC1,LC3	T1	PO1,PO2,PO8,PS01,PSO2
18	Reinforcement- The Machine Learning process	TC1	LC1,LC3	T1	PO1,PO2,PO8,PS01,PSO2
19	Terminologies in ML	TC1	LC1,LC3	T1	
20	Testing ML algorithms Installation of Python Libraries/ MATLAB tools for Machine Learning	TC1	LC1,LC3	T1	PO1,PO2,PO8,PS01,PSO2
21	Data pre-processing using Python Machine Learning	TC1	LC1,LC3	T1	
22	INTRODUCTION TO TOOLS : Intro to scikit-learn	TC1	LC1,LC3	T1	PO1,PO2,PO8,PS01,PSO2
23	classification, regression, clustering	TC1	LC1,LC3	T1	
24	PCA, Dimension reduction.	TC1	LC1,LC3	T1	
25	PANDAS-data cleaning	TC1	LC1,LC3	T1	
26	PANDAS- data wrangling	TC1	LC1,LC3	T1	PO1,PO2,PO8,PS01,PSO2
27	**Doubt class**	-	-	-	-
28	**UNIT-3 PERCEPTRON-** Multilayer perceptron	TC1	LC1,LC3	T1	PO2,PO8,PSO1, PSO2
29	Back Propagation – Initialization	TC1	LC1,LC3	T1	PO2,PO3,PSO2, PSO3

30	Training and Validation Support Vector Machines(SVM) as a linear and non-linear classifier	TC1	LC1,LC3	T1	PO2,PO3,PSO2, PSO3
31	Limitations of SVM Practical Component:	TC1	LC1,LC3	T1	PO2,PO3,PSO2, PSO3
32	TOOLS : Introduction to TensorFlow Programming (Using TensorFlow Libraries / MATLAB)	TC1	LC1,LC3	T1	PO2,PO3,PSO2, PSO3
33	Data Readers, Data Adapters	TC1	LC1,LC3	T1	PO2,PO3,PSO2, PSO3
34	(i) Recognition of MNIST handwritten digits using Artificial Neural Network	TC1	LC1,LC3	T1	PO2,PO3,PSO2, PSO3
35	(ii) Build an email spam classifier using SVM.	TC1	LC1,LC3	T1	PO2,PO3,PSO2, PSO3
36	**Doubt class**	-	-	-	-
37	**UNIT-4 PROBABILISTIC GRAPHICAL MODELS:** Bayesian Networks **,** Learning Naive Bayes Classifiers	TC1	LC1,LC3	T1	PO1,PO6,PO9,PO12,PSO1,PSO2
38	Markov Models – Hidden Markov Models Sampling	TC1	LC1,LC3	T1	PO1,PO6,PO9,PO12,PSO1,PSO2
39	Basic sampling methods – Monte Carlo	TC1	LC1,LC3	T1	PO1,PO6,PO9,PO12,PSO1,PSO2
40	Reinforcement Learning Practical Component: (Using Python Libraries / MATLAB)	TC1	LC1,LC3	T1	PO1,PO6,PO9,PO12,PSO1,PSO2
41	**Doubt class**	-	-	-	-
42	**UNIT-5 MINING COMPLEX DATA TYPES -** Other Methodologies	TC1	LC1,LC3	T1	PO1,PO6,PO11, PSO1,PSO2
43	Data Mining Applications	TC1	LC1,LC3	T1	PO1,PO6,PO11, PSO1,PSO2
44	DATA MINING AND SOCIETY – Data Mining Trends	TC1	LC1,LC3	T1	PO1,PO6,PO11, PSO1,PSO2

45	Real world applications		TC1	LC1,LC3	T1	PO1,PO6,PO11, PSO1,PSO2
46	Data Mining Tool study		TC1	LC1,LC3	T1	PO1,PO6,PO11, PSO1,PSO2
47	TOOLS : Pytorch Programming		TC1	LC1,LC3	T1	PO1,PO6,PO11, PSO1,PSO2

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
1	Dr.Nilakshi Jain, Artificial Intelligence, As per AICTE: Making a System Intelligent, Wiley Publications, 1st Edition,2019
2	Vijayvargia, Abhishek, Machine Learning with Python: An Approach to Applied Machine Learning, BPB Publications; 1st edition,2018.
3	Dr. S.Lovelyn Rose, Dr. L.Ashok Kumar, Dr.D.Karthika Renuka, Deep Learning using Python, Wiley India Pvt. Ltd 2019
4	Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Publications, 4th Edition, 2020.
5	Saroj Kaushik, Artificial Intelligence, Cengage Learning India, 2011

 # WEB SOURCE REFERENCES (W):

1	https://keras.io/
2	https://ai.google/
3	https://www.coursera.org/learn/neural-networks-d

COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM

COURSE OBJECTIVES:

1	Machine learning tools are algorithmic applications of artificial intelligence that give systems the ability to learn and improve without ample human input, similar concepts are data mining and predictive modeling
2	They allow software to become more accurate in predicting outcomes without being explicitly programmed.

COURSE OUTCOMES:

S.NO	DESCRIPTION	PO(1..12) MAPPING	PSO(1..3) MAPPING
Cxxx.1	Top tools to be used in AI Scikit Learn, Tensorflow, Theano, Caffe, MxNet, Keras, PyTorch, CNTK , etc.	PO1,PO2,PO3	PSO1
Cxxx.2	Demonstrate various AI Tools, applications, languages and Machine Learning Techniques.	PO1,PO2,PO8	PSO1, PSO2
Cxxx.3	Solve problems using search strategies and understand the basic process of Machine Learning.	PO2,PO8	PSO1, PSO2
Cxxx.4	Apply classification and regression algorithms on real world data	PO1,PO6,PO9,PO12	PSO1, PSO2
Cxxx.5	Develop an expert system. Comprehend the structure of an artificial neural network and identify the building blocks of a convolutional neural network.	PO1,PO6,PO11	PSO1, PSO2
COURSE OVERALL PO/PSO MAPPING:			

COURSE OUTCOMES VS POs MAPPING (DETAILED; HIGH:3; MEDIUM:2; LOW:1**):**

S.NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Cxxx.1	2	2	1											1	
Cxxx.2	2	1						3						2	1
Cxxx.3		2						3						1	1
Cxxx.4	1					2			2	3				1	1
Cxxx.5	1					2						1		1	2

POs & PSO REFERENCE:

PO 1	Engineering Knowledge	PO7	Environment & Sustainability	PSO1	To equip the students with theoretical and implementation knowledge in all the latest area of Computer Science and Engineering for successful career in software industry, pursuing higher studies, or entrepreneurial establishment.
PO 2	Problem Analysis	PO8	Ethics	PSO2	To nurture the students with the critical thinking abilities for better decision making by offering them a socially acceptable solutions to real life problem through computing paradigm.
PO 3	Design & Development	PO9	Individual & Team Work	PSO3	To nurture the students with the comprehensive analytical and design by offering them techno-commercial feasible solutions of real business problem through computing.
PO 4	Investigations	PO10	Communication Skills		
PO 5	Modern Tools	PO11	Project Mgt. & Finance		
PO 6	Engineer & Society	PO12	Life Long Learning		

COs VS POs MAPPING JUSTIFICATION:

S.NO	PO/PSO MAPPED	LEVEL OF MAPPING	JUSTIFICATION
Cxxx.1			
Cxxx.2			
Cxxx.3			
Cxxx.4			
Cxxx.5			
Cxxx*			

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS, POs & PSOs:

SNO	DESCRIPTION	PROPOSED ACTIONS
1		
2		
3		

4		
5		

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

 # TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

1	
2	
3	
4	
5	
6	
7	

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☐ CHALK & TALK	☐ STUD. ASSIGNMENT	☐ WEB RESOURCES	☐ NPTEL/OTHERS
☐ LCD/SMART BOARDS	☐ STUD. SEMINARS	☐ ADD-ON COURSES	☐ WEBNIARS

ASSESSMENT METHODOLOGIES-DIRECT

☐ ASSIGNMENTS	☐ STUD. SEMINARS	☐ TESTS/MODEL EXAMS	☐ UNIV. EXAMINATION
☐ STUD. LAB PRACTICES	☐ STUD. VIVA	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		
TC1	LC1,LC3	T1	PO2,PO3,PSO2, PSO3

ASSESSMENT METHODOLOGIES-INDIRECT

☐ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☐ STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

 # INNOVATIONS IN TEACHING/LEARNING/EVALUATION PROCESSES:

1.
2.
3.
4.
5.

Prepared by
Dr. Ritu Sindhu

Approved by
Dr. Ritu Sindhu

 # Additionally, the details to be compiled separately by the Departmental Coordinator for the entire Department.