Supervised and Deep Learning	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
EAE	7	MLDA-EAE	MLDA-EAE-3	ML-463T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1.	To introduce students to the fundamentals of Supervised Learning and Deep Learning techniques and algorithms.
2.	To enable students to develop skills in implementing supervised and deep learning algorithms using Python programming language and popular machine learning libraries.
3.	To equip students with the ability to evaluate the performance of supervised and deep learning models and select the appropriate models for specific problems.
4.	To provide students with hands-on experience in working with real-world supervised and deep learning projects.

Course Outcomes (CO)

CO 1	Develop a deep understanding of the concepts and applications of Supervised Learning and Deep Learning techniques and algorithms.
CO 2	Develop proficiency in using Python programming language and popular machine learning libraries to implement supervised and deep learning models.
CO 3	Demonstrate the ability to evaluate the performance of supervised and deep learning models and select the appropriate models for specific problems.
CO 4	Gain hands-on experience in working with real-world supervised and deep learning projects, including image recognition, text analysis, and time-series analysis.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	2	3	-	-	-	3	2	2	3
CO 2	3	2	2	2	3	-	-	-	3	2	2	3
CO 3	3	2	2	2	3	-	-	-	3	2	2	3
CO 4	3	2	2	2	3	-	-	-	3	2	2	3

UNIT-I

Introduction to Machine Learning, Types of Machine Learning, Supervised Learning Basics, Regression and Classification, Linear Regression, Logistic Regression, Model Evaluation Metrics

UNIT-II

Introduction to Deep Learning, Artificial Neural Networks, Activation Functions, Loss Functions, Optimization

Algorithms, Backpropagation Algorithm, Regularization Techniques

UNIT-III

Introduction to CNNs, CNN Architecture, Convolution and Pooling Layers, Object Detection, Image Segmentation, Transfer Learning, Introduction to RNNs, RNN Architecture, Long Short-Term Memory (LSTM), Gated Recurrent Unit (GRU), Text Generation, Language Translation

UNIT – IV

Generative Adversarial Networks (GANs), Autoencoders, Reinforcement Learning, Natural Language Processing (NLP), Sentiment Analysis, Time Series Analysis

Textbooks:

1. Aurélien Géron, "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow", 2nd Edition, O'Reilly Media, 2019. ISBN: 978-1492032649
2. Francois Chollet, "Deep Learning with Python", 1st Edition, Manning Publications, 2017. ISBN: 978-1617294433

Reference Books:

1. "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron.
2. "Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville.
3. "Pattern Recognition and Machine Learning" by Christopher M. Bishop.
4. Ian Goodfellow, Yoshua Bengio, and Aaron Courville, "Deep Learning", 1st Edition, MIT Press, 2016. ISBN: 978-0262035613
5. Andrew Ng, "Machine Learning Yearning", eBook, 2018.
6. Sebastian Raschka and Vahid Mirjalili, "Python Machine Learning", 3rd Edition, Packt Publishing, 2019. ISBN: 978-1789955750