Semester: 7th			
Paper code: AIML411P	**L**	**T/P**	**Credits**
Subject: Advances in Machine Learning Lab	**0**	**2**	**1**
Marking Scheme:			
1. Teachers Continuous Evaluation: As per university examination norms from time to time			
2. End term Examination: As per university examination norms from time to time			
INSTRUCTIONS TO EVALUATORS: Maximum Marks: As per university norms			
1. This is the practical component of the corresponding theory paper.			
2. The practical list shall be notified by the teacher in the first week of the class commencement under the intimation to the office of the HOD/ Institution in which they appear is being offered from the list of practicals below.			
3. Instructors can add any other additional experiments over and above the mentioned in the experiment list which they think is important.			
4. At least 8 experiments must be performed by the students.			
Course Objectives:			
1.	Explore and analyze state-of-the-art machine learning approaches.		
2.	Develop practical skills in implementing advanced ML models and solving complex AI challenges.		
Course Outcomes:			
CO1	Understand the latest advancements in machine learning algorithms and techniques.		
CO2	Apply advanced ML methods to real-world problems, demonstrating proficiency in using cutting-edge tools.		

Course Outcomes (CO) to Programme Outcomes (PO) Mapping

(Scale 1: Low, 2: Medium, 3: High)

CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	2	2	2	2	1	-	-	-	-	-	-	1
CO2	2	2	2	2	1	1	1	1	1	1	1	2

List of Experiments:

1. Implement a deep neural network from scratch using TensorFlow or PyTorch, gaining hands-on experience in building complex neural architectures.

2. Utilize pre-trained models and perform transfer learning to solve real-world problems efficiently.

3. Implement a GAN to generate synthetic data and explore its applications in image generation and data augmentation.

4. Apply NLP techniques to process and analyze textual data, including sentiment analysis and named entity recognition.

5. Build RL agents and train them using OpenAI Gym or Stable Baselines to solve challenging tasks.

6. Understand the interpretability of ML models by using LIME or SHAP to explain model predictions.

7. Use AutoML and Hyperparameter tuning tools to automate the model selection and optimization process.

8. Analyze time series data, perform forecasting, and evaluate model performance using Prophet or statsmodels.

9. Compress and quantize large ML models to make them suitable for deployment on resource-constrained devices.

10. Explore federated learning concepts and implement distributed ML models using TensorFlow Federated.

11. Generate adversarial attacks on ML models and implement defense mechanisms to enhance model robustness.

12. Utilize Ray Tune to perform hyperparameter search and optimize ML models efficiently.