COURSE CODE: ENS-321

COURSE NAME: Artificial Intelligence for Environmental Applications

CREDIT HOURS: Theory = 02   Practical = 01   Total = 03

CONTACT HOURS: Theory = 32   Practical = 48   Total = 80

PREREQUISITE: None

MODE OF TEACHING: Instruction: 2 hours of Lecture per week (67%)
Lab Demonstration: 3 hours of Lab work per week (33%)

Course Description:

Overview of artificial intelligence, intelligent agents and environment, problem solving by various search strategies (uninformed search, informed search, constraint satisfaction), searching in partially known environments, knowledge representation and reasoning, propositional theorem proving, syntax and semantics of first order logic, planning and acting in deterministic and non-deterministic domains, acting under uncertainty, probabilistic reasoning, learning from observations, fundamentals of neural networks, planning robot's uncertain movements. Common sense & free will, some advanced applications of AI in real world.

TOPICS COVERED:

Week	Topic
1	Intelligent Agents and Environment
2	Problem Solving by Searching (Uninformed)
3	Problem Solving by Searching (Informed)
4	Games
5	Introduction to Machine Learning
6	Supervised Learning
7	Regression, Classification
8	Bayesian Analysis
9	**Mid Semester Exam**
10	Decision Trees
11	Intro. to Deep Learning

12	Convolutional Neural Networks
13	Convolutional Neural Networks
14	Unsupervised Learning
15	Unsupervised Learning
16	Project Presentations
17	Project Presentations
18	**End Semester Exam**

Tools / Software Requirement:

Python

Text and Material:

1. Hands-On Machine Learning with Scikit-Learn, Keras, and Tensor Flow, 2nd Edition by Aurélien Géron, 2019.
2. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach. 3rd edition. Prentice Hall. 2009
3. http://cs229.stanford.edu
4. http://www.robots.ox.ac.uk/~az/lectures/ml/
5. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/demonstrations/
6. http://web.stanford.edu/class/stats202/content/viewhw.html?hw4
7. http://www.cs.cmu.edu/~tom/mlbook-chapter-slides.html

ASSESMENT SYSTEM:

Theoretical/Instruction	100%
Assignments	10%
Quizzes	15%
Mid Semester Exam	25%
End Semester Exam	50%

Practical Work	100%
Lab Work	70%
Lab Exam/Projects	30%