Artificial Intelligence in The Built Environment

Course Code	Credit Hours
CE-451	3-0

Course Description

This course will introduce students to fundamental concepts of coding, computing, machine learning, and artificial intelligence, thus providing them with modern research tools necessary to develop state-of-the-art industrial and academic output

Text Book:

1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall,2nd Edition
2. The History of Artificial Intelligence Author Chris Smith,Brian McGuire,Ting Huang,
3. Tarabishy, S., Kosicki, M., & Tsigkari, M. (2021). Artificial Intelligence for the Built Environment. Springer International Publishing.

Reference Book:

Prerequisites :

Nil.

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%

Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assessment/ Viva	20%

Teaching Plan

Weeks	Topic	Reading assignment /Homework	CLO No.	PLO No.	Assessment methodology	Learning domain	Level of learning 1-6
1	Introduction to AI and Machine Learning Overview of AI techniques AI-based applications in Building Information Modeling Overview of AI in built environment	Lecture	1	5	**Assignments, Quizzes, Mid Semester Exams.**	**Cognitive**	5
2	PEAS Concept, Inputs, Outputs, Processes, AI agents, Agent function and agent program, Agent and Environment Types	Lecture, Handouts, Textbook 1 HW 1, Quiz 1	1	5			5
3	Exploration of Datasets and their Analysis Data collection and analysis techniques, Data-driven decision-	Lecture, Handouts, Textbook 1 Lecture	3	12	**Assignments, Quizzes, Mid Semester Exams.**	**Cognitive**	3

	making algorithms						
4	Frequent pattern Mining, Search algorithms, Initial and goal states	Lecture, Handouts, Textbook 1 Lecture	3	12			3
5	Supervised vs Unsupervised Machine Learning Techniques Exploration of Supervised Learning Techniques	Lecture, HW 2, Quiz 2	2	3			6
6	Regression Analysis Linear regression Logistic Regression	Handouts	2	3			6
7	Clustering, Bayes Classification, KNN Classification	Handouts	2	3			6
8	Basics of Python Programming Introduction to Anaconda IDE	Handouts	3	12			3
9	**MID-SEMESTER EXAM**						
10	Overview of Artificial neural network (ANN) models, Usage of ANNs	Lecture Handouts Assignment 3,	2	3	**Assignments, Quizzes, Mid Semester Exams.**	**Cognitive**	6

	in different applications	Quiz 3					
11	Building Information Modelling Modelling in Revit	Lecture	3	12			3
12	Modelling in Revit (Contd.) Basics of Python Programming in BIM	Lecture, Assignment 4, Quiz 4	3	12			3
13	Weka's exploration and its usage	Lecture	3	12			3
14	Case Studies Intelligent transportation system Soil Mechanics	Lecture, Assignment 5, Quiz 5	1	5			5
15	Case Studies Intelligent scheduling, resource allocation, and risk management	Lecture	1	5			5
16	Case Studies Use of AI in Structural Design Open AI construction	Lecture	1	5			5
17	Project/ Major Assignment Demos and Vivas		2	3			6
18	**ESE**						

Practical: Nil