



**DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING  
MECHANICAL ENGINEERING PROGRAM, BSC.**

**Course Syllabus**

**1. Course number and name**  
IE578, Artificial intelligence

**2. Credits and contact hours**  
(3+0) 3 credit hours, 3 contact hours

**3. Course type**  
Onsite learning course

**4. Instructor's or course coordinator's name**  
Dr.

**5. Textbook information**

Qiangfu ZHAO and Tatsuo Higuchi, Artificial Intelligence: From fundamentals to intelligent searches, Kyoritsu, 2017, ISBN:978-4-320-12419-6

**a. Other supplemental materials**  
Instructor's notes

**6. Specific course information**

**a. Catalog description**  
Introduction to AI, Propositional logic, Fuzzy logic, Pattern recognition, neural networks, Decision trees, Population based search.

**b. Prerequisites or co-requisites**  
Prerequisite: IE 413 Introduction to data analytics and machine learning

**c. The course is:**  
Elective in industrial engineering program

**7. Specific goals for the course**

**a. Course outcomes:**

After completion of the course, students are expected to be able to:

1. Understand the concept of knowledge representation and predicate logic and transform the real life information in different representation



# FET

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Engineering  
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2. Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems
3. Review research articles from well-known AI journals and conference proceedings regarding the theories and applications of AI
4. Understand machine learning concepts and range of problems that can be handled by machine learning.
5. Apply the machine learning concepts in real life problems

### b. The following student outcomes are addressed by the course:

None.

### 8. Learning Outcomes and their Alignment with Program Educational Objective (PEO's), Methods of Delivery, and Assessment Methods:

Learning Outcomes	Program PEOs	Method of Delivery	Assessment Method
<b>Course Outcomes</b>			
CO-(1): Understand the concept of knowledge representation and predicate logic and transform the real life information in different representation	-	Lectures (Example and Problems)	Assignment
CO-(2): Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems	-	Lectures (Example and Problems)	Project
CO-(3): Review research articles from well-known AI journals and conference proceedings regarding the theories and applications of AI	-	Interactive learning tutorial	Project
CO-(4): Understand machine learning concepts and range of problems that can be handled by machine learning.	-	Lectures (Example and Problems)	Assignment
CO-(5): Apply the machine learning concepts in real life problems	-	Lectures (Example and Problems)	Project

### 9. Weekly Teaching Plan



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<b>Week No.</b>	<b>Lecture</b>	<b>Topic</b>	<b>Method of Delivery</b>
1	Sun (9-10)	Chapter 1: Introduction to AI	Lecture
	Tue (9-10)	Chapter 1: Introduction to AI	Lecture
	Thu (9-10)	Chapter 1: Introduction to AI	Lecture
2	Sun (9-10)	Chapter 2: Problem formulation	Lecture
	Tue (9-10)	Chapter 2: Problem formulation	Lecture
	Thu (9-10)	Chapter 2: Problem formulation	Lecture
3	Sun (9-10)	Chapter 3: Search I	Lecture
	Tue (9-10)	Chapter 3: Search I	Lecture
	Thu (9-10)	Chapter 3: Search I	Lecture
4	Sun (9-10)	Chapter 4: Search II	Lecture
	Tue (9-10)	Chapter 4: Search II	Lecture
	Thu (9-10)	Chapter 4: Search II	Tutorial/synchronous lecture
5	Sun (9-10)	Chapter 5: Production system	Lecture
	Tue (9-10)	Chapter 5: Production system	Lecture
	Thu (9-10)	Chapter 5: Production system	Lecture
6	Sun (9-10)	Chapter 6: Ontology	Lecture
	Tue (9-10)	Chapter 6: Ontology	Lecture
	Thu (9-10)	Chapter 6: Ontology	Lecture
7	Sun (9-10)	Chapter 7: Propositional logic	Lecture
	Tue	Chapter 7: Propositional logic	Lecture



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	(9-10)		
	Thu (9-10)	Chapter 7: Propositional logic	Lecture
8	Sun (9-10)	Chapter 8: First order predicate logic	Lecture
	Tue (9-10)	Chapter 8: First order predicate logic	Lecture
	Thu (9-10)	Chapter 8: First order predicate logic	Lecture
9	Sun (9-10)	Chapter 9: Fuzzy logic	Lecture
	Tue (9-10)	Chapter 9: Fuzzy logic	Lecture
	Thu (9-10)	Chapter 9: Fuzzy logic	Lecture
10	Sun (9-10)	Chapter 10: Pattern recognition	Lecture
	Tue (9-10)	Chapter 10: Pattern recognition	Lecture
	Thu (9-10)	Chapter 10: Pattern recognition	Lecture
11	Sun (9-10)	Chapter 11: Distance based neural networks	Lecture
	Tue (9-10)	Chapter 11: Distance based neural networks	Lecture
	Thu (9-10)	Chapter 11: Distance based neural networks	Lecture
12	Sun (9-10)	Chapter 12: Multilayer neural networks	Lecture
	Tue (9-10)	Chapter 12: Multilayer neural networks	Lecture
	Thu (9-10)	Chapter 12: Multilayer neural networks	Lecture
13	Sun (9-10)	Chapter 12: Multilayer neural networks	Lecture
	Tue (9-10)	Chapter 12: Multilayer neural networks	Lecture
	Thu (9-10)	Chapter 12: Multilayer neural networks	Lecture
14	Sun (9-10)	Chapter 13: Decision trees	Lecture
	Tue (9-10)	Chapter 13: Decision trees	Lecture



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	Thu (9-10)	Chapter 13: Decision trees	Lecture
15	Sun (9-10)	Chapter 14: Population based search	Lecture
	Tue (9-10)	Chapter 14: Population based search	Lecture
	Thu (9-10)	Chapter 14: Population based search	Lecture

**10. Grade Distribution:**

Assessment	Grade	Week No.
- Midterm Exam	30%	7 <sup>th</sup> Week
-Assignments (Reports /Quizzes/ Seminar / Tutorials/ Home works ....)	20%	1-16 <sup>th</sup> Week
- Final Examination	50%	16 <sup>th</sup> Week

Note: Make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.