	Universitas Negeri Surabaya **Faculty of Engineering** **, Information Technology Education Undergraduate Study Program**	

SEMESTER LEARNING PLAN

Courses		CODE	Course Family		Credit Weight			SEMESTER	Compilation Date
Artificial intelligence		8320702032	Compulsory Study Program Subjects		T=2	P=0	ECTS=3.18	3	July 17, 2024
AUTHORIZATION		SP Developer			Course Cluster Coordinator			Study Program Coordinator	
		Harun Al Rosyid, S.T., M.T.			....			Drs. Bambang Sujatmiko, M.T.	

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**

PLO-8	Mastering the concepts and implementation in developing software engineering, games, intelligent multimedia, and network computer engineering.
PLO-13	Able to develop innovative educational products or learning resources using scientific design-based strategies to support teaching activities that can be integrated with ICT.

Program Objectives (PO)

PO - 1	Able to explain the concept, definition, history and use of artificial intelligence
PO - 2	Able to explain concepts, definitions, working principles, intelligent agent work environment
PO - 3	Able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems using AI techniques

PLO-PO Matrix

P.O	PLO-8	PLO-13
PO-1		
PO-2		
PO-3		

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PO-1																
PO-2																
PO-3																

Short Course Description	Artificial intelligence courses are courses that focus on exploring basic concepts, terminology, applications, impacts, and problem solving processes, as well as discussing ethical considerations and future thinking in artificial intelligence. This course explains concepts, provides examples, and builds algorithmic solutions for artificial intelligence problems using SEARCHING, REASONING, PLANNING and LEARNING techniques, especially in the field of education.
References	**Main :**

1. Russel, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall
2. Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial intelligence in education. Boston: Center for Curriculum Redesign

Supporters:

1. Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development.
2. Kusumadewi, Sri. (2003). Artificial Intelligence: Teknik dan Aplikasinya. Yogyakarta: Graha Ilmu.
3. Suyanto. (2014). Artificial Intelligence : Searching - Reasoning - Planning – Learning (Edisi Revisi Kedua). Bandung: Informatika.

Supporting lecturer	Harun Al Rosyid, S.T., M.T. Dr. Ricky Eka Putra, S.Kom., M.Kom. Martini Dwi Endah Susanti, S.Kom., M.Kom.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students are able to explain the concept, definition, history and use of artificial intelligence	Students are precise in explaining the concept, definition, history and use of artificial intelligence	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, group discussion and reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** History and Introduction of AI **Literature:**	3%
2	Students are able to explain the concepts, definitions, working principles, work environment of intelligent agents	Students are precise in explaining the concept, definition, history and use of artificial intelligence	**Criteria:** 1.Cognitive Value 2.Affective Values 3.Psychomotor Values **Forms of Assessment** : Participatory Activities, Practice/Performance, Tests	Presentation, Group Discussion, and Reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** AI Agents and PEAS **Reference:** *Russel, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	25%
3	Able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems with SEARCHING techniques using the Blind/Un-informed Search Algorithm	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems with SEARCHING techniques using the Blind/Un-informed Search algorithm	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities	Presentation, Group Discussion and Reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** Breadth-First Searching (BFS), and Depth-First Searching (DFS) **References:** *Russel, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%
4	Able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems with SEARCHING techniques using the Blind/Un-informed Search Algorithm	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems with SEARCHING techniques using the Blind/Un-informed Search algorithm	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, Group Discussion and Reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** A* Algorithm, Greedy Be-FS **References:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%

5	Able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems with SEARCHING techniques using the Heuristic Search Algorithm	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems using SEARCHING techniques using the Heuristic Search Algorithm	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, Group Discussion and Reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** Hill Climbing Algorithm **References:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%
6	Able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems with SEARCHING techniques using the Heuristic Search Algorithm	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems using SEARCHING techniques using the Heuristic Search Algorithm	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, Group Discussion and Reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** Minimax and Alpha-Beta Pruning Algorithms **References:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%
7	Students are able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems using REASONING techniques using Proportional Logic and First Order Logic	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems using REASONING techniques using Proportional Logic and First Order Logic	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, Group Discussion and Reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** Proportional Logic and First Order Logic **References:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%
8	UTS						0%
9	Students are able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems using the REASONING technique using Fuzzy Logic	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems using the REASONING technique using Fuzzy Logic	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, Discussion and reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** FIS, Fuzzy Mamdani and Fuzzy Sugeno **References:** *Russel, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%
10	Students are able to explain concepts, provide examples, and build algorithmic solutions to artificial intelligence problems using the PLANNING technique in the World of Blocks	Students are precise in explaining concepts, giving examples, and building algorithmic solutions to artificial intelligence problems using the PLANNING technique in the World of Blocks	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities	Presentation, Discussion and reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** World of Blocks **Bibliography:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	3%

11	Students are able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems using PLANNING techniques in Goal Stack Planning and Constraint Planning	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems using PLANNING techniques in Goal Stack Planning and Constraint Planning	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, Discussion and reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** Goal-Stack-Planning and Constraint Planning **References:** *Russel, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%
12	Students are able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems with the LEARNING technique using Decision TREE	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems with the LEARNING technique using Decision TREE	**Criteria:** 1.Cognitive Value 2.Affective Values 3.Psychomotor Values **Forms of Assessment** : Participatory Activities, Practice/Performance, Tests	Presentation, Discussion and reflection 2 X 50	Interactive Zoom Meeting Quiz	**Material:** Algorithm ID.3 and Algorithm C.45 **References:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	29%
13	Students are able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems with the LEARNING technique using the Support Vector Machine Algorithm	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems with LEARNING techniques using the Support Vector Machine Algorithm	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, Discussion and reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** Support Vector Machine Algorithm **Reference:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%
14	Students are able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems with LEARNING techniques using Artificial Neural Networks	Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems with LEARNING techniques using Artificial Neural Networks	**Criteria:** 1.Cognitive Value 2.Affective Values **Form of Assessment** : Participatory Activities, Tests	Presentation, Discussion and reflection 2 X 50	Zoom Meeting Interactive Quiz 2 X 50	**Material:** ANN Backpropagation **References:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*	4%

| 15 | Students are able to explain concepts, provide examples, and build algorithmic solutions for artificial intelligence problems with LEARNING techniques using Genetic Algorithms | Students are precise in explaining concepts, giving examples, and building algorithmic solutions for artificial intelligence problems with LEARNING techniques using Genetic Algorithms | **Criteria:**
1.Cognitive Value
2.Affective Values

Form of Assessment :
Participatory Activities, Tests | Presentation, Discussion and reflection 2 X 50 | Zoom Meeting Interactive Quiz 2 X 50 | **Material:** Genetic Algorithms **Library:** *Russell, S. Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. New Jersey: Prentice Hall*

Material: Genetic Algorithms **References:** *Kusumadewi, Sri. (2003). Artificial Intelligence: Techniques and Applications. Yogyakarta: Graha Ilmu.* | 4% |
| 16 | UAS | | | | | | 0% |

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	44.5%
2.	Practice / Performance	18%
3.	Test	37.5%
		100%

Notes
1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.