	Module Description/Course Syllabi
	Study Programme: Bachelor of Mathematics Faculty of Mathematics and Natural Sciences Universitas Andalas

1. *Course number and name*

MAT61256 Introduction to Artificial Intelligence

2. *Credits and contact hours/Number of ECTS credits allocated*

3 SKS / 4,53 ECTS

3. *Instructors and course coordinator*

1. Dr. Dodi Devianto
2. Mawanda Almuhayar, M.Sc

4. *Textbook, title, author, and year*

1. S. Russel, P. Norvig, *Artificial Intelligence: A Modern Approach,* 4th ed. Harlow, Essex: Pearson Education, 2021.
2. Suyanto, *Artificial Intelligence: Searching, Reasoning, Planning, and Learning,* 3rd ed. Bandung: Informatika, 2021.

5. *Recommended reading and other learning resources/tools*

3. C. M. Bishop, *Pattern Recognition and Machine Learning.* New York: Springer, 2006.
4. C. M. Bishop, H. Bishop, *Deep Learning: Foundations and Concepts.* Cham, Switzerland: Springer, 2024.

6. *Specific course information*

A. *Brief description of the content of the course (catalog description)*

In this course, students will learn about artificial intelligence (AI) methods used for data modeling and analysis which include the introduction and history of AI development, types and terms in AI, perceptron models and multi-layer perceptrons or neural networks, neural network model training, neural network model optimization, and neural network model applications in various selected cases such as regression, classification, and time series and accompanied by an introduction to the software and programming languages used to build these models.

B. Prerequisites or co-requisites

1. MAT61151 Data Analysis
2. MAT62252 Regression Analysis

C. Indicate whether a required or elective course in the program

Elective course

D. Level of course unit (according to EQF: first cycle Bachelor, second cycle Master)

First cycle Bachelor

E. Year of study when the course unit is delivered (if applicable)

4th year

F. Semester when the course unit is delivered

7th semester or odd semester

G. Mode of delivery (face-to-face, distance learning)

Face-to-face learning

7. Intended Learning Outcomes

ILO-5: An ability to formally and correctly prove a simple mathematical statement using facts and methods that have been studied.

ILO-6: Have ability data literacy and technology and can apply them in solving simple mathematical problems or other relevant fields.

ILO 7: An ability to communicate effectively especially in the area of mathematics in with diverse communities.

8. *Course Learning Outcomes*

An ability to explain artificial intelligence (AI) and the history of its development in everyday life. (ILO-5)

An ability to explain the types of AI that can be used in everyday life and terms in AI that are commonly used. (ILO-5)

An ability to create perceptron models and multi-layer perceptrons or neural networks using data based on events in everyday life. (ILO-5, ILO-6)

An ability to train neural network models with various model architectures using data based on events in everyday life. (ILO-5, ILO-6)

An ability to optimize neural network models to get the best model parameters using data based on events in everyday life. (ILO-5, ILO-6)

An ability to apply neural network models to various cases of modeling and data analysis using data based on events in everyday life and explain the results obtained and their benefits for decision-making. (ILO-5, ILO-6, ILO-7)

9. *Brief list of topics to be covered*

1. Introduction and History of the Development of Artificial Intelligence (AI).
2. Types and terms in AI.
3. Perceptron Model and Multi-Layer Perceptron or Neural Network.
4. Neural Network Model Training: Forward Pass and Backpropagation.
5. Model Neural Network Optimization: Gradient Descent and Stochastic Gradient Descent.
6. Application of Neural Network models in Regression, Classification, and Time Series cases.

10. *Learning and teaching methods*
Directed Learning, Teacher-Centered Learning, Case-Based Learning

11. *Language of instruction*
Bahasa Indonesia and English

12. *Assessment methods and criteria*
Summative Assessment : 1. Assignment: 20% 2. Mid-term exam: 25% 3. Final exam / final project: 55%