



MINISTRY OF HIGHER EDUCATION, SCIENCE, AND
TECHNOLOGY

UNIVERSITAS NEGERI SURABAYA

FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNDERGRADUATE PROGRAM OF MATHEMATICS EDUCATION

Ketintang Campus, Jalan Ketintang, C8 C9 Building, Surabaya 60231

Phone: +62 895335466373, email: s1-pmat@unesa.ac.id

Website: <https://pendidikan-matematika.fmipa.unesa.ac.id/>

Undergraduate Program of Mathematics

Module Handbook

Module Name:	Artificial Intelligence for Mathematics Education
Module Level:	Sarjana (S-1) / Undergraduate
Abbreviation, if applicable:	8420202234
Sub-heading, if applicable:	-
Course included in the module, if applicable:	-
Semester/term :	8 / Fourth year
Module Coordinator(s):	Nurus Saadah
Lecturer(s):	Nurus Saadah, Nina Rinda Prihartiwi
Language:	Indonesia
Classification within the curriculum:	Compulsory course /elective studies
Teaching format/class hours per week during the semester	Teaching format: lectures, project-based tutorial assignment, and individual study 2 x 170 minutes = 340 minutes = 5.6 hours
Workload:	16 weeks per semester consisting of: <ul style="list-style-type: none">• 1 hour lectures (1 x 50 minutes) per week,• 1 hour assignments (1 x 60 minutes) per week,➤ 1 hour individual study (1 x 60 minutes) per week, Total workload : 16x2x170 minutes = 5,440 minutes = 90.67 hours=3.18 ECTS*
Credit Point:	2
Requirements:	N/A



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Learning Goals :	<p>PLO-3 : Develop logical, critical, systematic and creative thinking in carrying out specific work in the field of expertise and in accordance with the work competency standards in the relevant field</p> <p>PLO-5 : Possess basic mathematical knowledge to solve mathematical problems and their applications in education</p> <p>PLO-6 : Master the principles of mathematical knowledge to support mathematical thinking skills in solving mathematical problems</p> <p>PLO-10 : Make data-based decisions in completing student assignments and evaluating work done</p> <p>CLO-1 : Explain basic concepts of artificial intelligence (AI), machine learning, and generative AI, including their mathematical foundations at a conceptual level, and their potential and limitations in solving mathematical problems and in their applications in education</p> <p>CLO-2 : Use AI tools appropriately (including prompt engineering) to support mathematical thinking: problem solving, exploration, reasoning, and the design of mathematical problems and tasks</p> <p>CLO-3 : Evaluate AI output logically, critically, and systematically (mathematical correctness, pedagogical suitability), and apply ethics, data privacy, and academic integrity in using AI</p> <p>CLO-4 : Make data-based decisions in designing AI-assisted assessment and feedback, and develop, present, and evaluate an AI-assisted mathematics learning product</p>
Content:	<p>This course introduces artificial intelligence (AI), machine learning, and generative AI and their use in mathematics education. Students study the mathematical ideas behind machine learning at a conceptual level, prompt engineering, AI-based learning platforms, the use of AI to explore mathematical problems and to design problems, tasks, and instructional materials, AI-assisted formative assessment and feedback with data-based decision making, critical evaluation of AI output, and ethics, data privacy, and academic integrity. The course concludes with a project to develop an AI-assisted mathematics learning product through project-based learning.</p>



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**Study/exam
achievements**

- Students are considered competent and pass if the final score is at least 55 or C.

- Final score is calculated as follows:

Week	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)	Evaluation (%)
1	CLO-1	PLO-5	4
2	CLO-1	PLO-5	4
3	CLO-1	PLO-5	4
4	CLO-2	PLO-6	5
5	CLO-2	PLO-6	4
6	CLO-2	PLO-6	4
7	CLO-2	PLO-6	5
8	CLO-2	PLO-6	15
9	CLO-4	PLO-10	5
10	CLO-3	PLO-3	5
11	CLO-3	PLO-3	5
12	CLO-4	PLO-10	5
13	CLO-4	PLO-10	5
14	CLO-4	PLO-10	5
15	CLO-4	PLO-10	10
16	CLO-4	PLO-10	15

- Final index is defined as follow:

Index	Converted Score	Score Range
A	4.00	$85 \leq A \leq 100$
A-	3.75	$80 \leq A- < 85$
B+	3.50	$75 \leq B+ < 80$
B	3.00	$70 \leq B < 75$
B-	2.75	$65 \leq B- < 70$
C+	2.50	$60 \leq C+ < 65$
C	2.00	$55 \leq C < 60$
D	1.00	$40 \leq D < 55$
E	0.00	$0 \leq E < 40$

**Forms of
Media**

Slides and LCD projectors, whiteboard, computers/laptops, AI tools, learning management system



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Literature	<ol style="list-style-type: none">1. Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. Center for Curriculum Redesign.2. Russell, S., & Norvig, P. (2021). Artificial Intelligence: A Modern Approach (4th ed.). Pearson.3. UNESCO. (2023). Guidance for Generative AI in Education and Research. UNESCO.4. Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence Unleashed: An Argument for AI in Education. Pearson.5. Kasneci, E., et al. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. Learning and Individual Differences, 103, 102274.6. UNESCO. (2024). AI Competency Framework for Teachers. UNESCO.7. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? International Journal of Educational Technology in Higher Education, 16, 39.
Note	<p>Based on the regulation of the minister of education and culture of Indonesia number 3 of 2020 concerning national higher education standards, it is state 1 CU equals to 170 minutes per week. Therefore, in one semester (16 weeks, including midterm a final exam) $1 \text{ CU} = 170 \times 16 = 2.720$ minutes or 45.3 hours. Therefore, workhours in 144 CU $\times 45.3 \text{ hours} = 6.523,2$ hours. Unesa decided that 1 ECTS with 144 CU, $6.523,2/229 \text{ ECTS} = 28.48$ hours, so that 1 CU = 1.59 ECTS</p>