	Universitas Negeri Surabaya **Faculty of Mathematics and Natural Sciences** **Master of Science Education Study Program**	**Document Code**

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
STEAM Education	8410102225	Study Program Elective Courses	**T=2**	**P=0**	**ECTS=4.48**	2	March 22, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**

Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**	
	PLO-2	Demonstrate the character of being tough, collaborative, adaptive, innovative, inclusive, lifelong learning and entrepreneurial spirit
	PLO-4	Develop yourself continuously and collaborate.
	Program Objectives (PO)	
	PLO-PO Matrix	

P.O	PLO-2	PLO-4

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

Short Course Description	This course focuses on increasing students' understanding and knowledge of science, technology, engineering, art and mathematics, so that this understanding can be used to solve problems and make decisions for human progress. This course uses two approaches, project-based and problem-based with an emphasis on Project Based Learning. In the first half of the semester, students are asked to critically identify problems in society, search for and offer solutions to these problems by integrating STEAM knowledge components in the learning context. In the middle of the last semester, they will use the integration patterns they have experienced to design simple STEAM activity designs for students.

References	**Main :**

1. 1. Armstrong, L. (2019). STEAM Projects: Observation, Experimentation, & Presentation. New York: Mark Twain Media, Inc.
2. 2. Burke, L. (2018). The STEAM Team Simple Science Explained. New York: DK Publishing.
3. 3. Kao, V., Kiernan, J. E. (Eds). (2022). Writing STEAM: Composition, STEM, and a New Humanities. New York: Routledge
4. 4. Khine, M. S., Areepattamannil, S. (Eds). (2019). STEAM Education: Theory and Practice. Cham: Springer Nature.
5. 5. Sousa, D. A., & Pilecki, T. (2018). From STEM to STEAM: Brain-Compatible Strategies and Lessons That Integrate the Arts. London: Corwin.
6. 6. Voigt, D. C. S. (2023). STEAM Teaching and Learning Through the Arts and Design: A Practical Guide for PK–12 Educators. New York: Routledge.
7. 7. Wilhite, Z. B. (eds). (2019). Promoting Language and STEAM as Human Rights in Education: Science, Technology, Engineering, Arts and Mathematics. New York: Springer.

Supporters:

1. 1. Aguilera, D., & Revilla, J. O. (2021). STEM vs. STEAM Education and Student Creativity: A Systematic Literature Review. Education Science 11(331), 1-13. doi:10.3390/educsci11070331
2. 2. Arce, E., Suárez-García, A., López-Vázquez, J. A., & Fernández-Ibáñez, M. I. (2022). Design Sprint: Enhancing STEAM and engineering education through agile prototyping and testing ideas. Thinking Skills and Creativity, 44. doi:10.1016/j.tsc.2022.101039
3. 3. Herro, D., Quigley, C., & Cian, H. (2018). The Challenges of STEAM Instruction: Lessons from the Field. Action in Teacher Education, 41(2), 172-190. doi:10.1080/01626620.2018.1551159
4. 4. Holmes, K. P., Moore, J. J., & Holmes, S. V. (2023). A Sensory Approach to STEAM Teaching and Learning: Materials-Based Units for Students K-6. London: Routledge.
5. 5. Lestari, D., Ibrahim, N., & Iriani, C. (2023). STEAM: Science, Technology, Engineering, Art, and Mathematics on History Learning in the 21st Century. Journal of Education Research and Evaluation, 7(2), 306-312. doi:10.23887/jere.v7i2.44172

Supporting lecturer	Dr. Eko Hariyono, S.Pd., M.Pd. Dr. Mohammad Budiyanto, S.Pd., M.Pd. Dr. Hasan Subekti, S.Pd., M.Pd. Prof. Nadi Suprapto, S.Pd., M.Pd., Ph.D.

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							0%
2							0%
3							0%
4							0%
5							0%
6							0%
7							0%
8							0%
9							0%
10							0%
11							0%
12							0%
13							0%
14							0%
15							0%
16							0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
		0%

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.