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MODULE HANDBOOK

Module name	**Robotics**
Module level	Undergraduate
Code	MII-2319
Courses (if applicable)	Robotics
Semester	Fall (Odd)
Contact person	Andi Dharmawan
Lecturer	Andi Dharmawan Ilona Usuman
Language	Bahasa Indonesia & English
Relation to curriculum	1. Undergraduate degree program, compulsory, 3th semester. 2. International undergraduate program, compulsory, 3th semester.
Type of teaching, contact hours	1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 30 students.
Workload	1. Lectures: 3 x 50 = 100 minutes (1 hours 10 menit) per week. 2. Exercises and Assignments: 3 x 50 = 100 minutes per week. 3. Private study: 3 x 50 = 100 minutes per week.
Credit points	3 credit points (sks).
Requirements according to the Examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.
Recommended prerequisites	-
Learning outcomes (course outcomes) and their corresponding PLOs	After completing this module, a student is expected to: CO1 Able to explain the basic concepts of Robotics CO2 Able to analyze, design Robotics systems, perform component selection, and improve the capabilities of simple robots CO3 Able to understand the basic concepts of python programming on Robot Operating System (ROS) CO4 Able to implement and program robotics systems using python on ROS for specific applications and discuss solving problems in robot programming

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<tr><td></td><td>
<table>
<tr><td colspan="2">PLO</td><td>CO1</td><td>CO2</td><td>CO3</td><td>CO4</td></tr>
<tr><td rowspan="5">Program Learning Outcome (PLO)</td><td>PLO1</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>PLO2</td><td></td><td>√</td><td></td><td></td></tr>
<tr><td>PLO3</td><td></td><td></td><td>√</td><td></td></tr>
<tr><td>PLO4</td><td></td><td></td><td></td><td>√</td></tr>
<tr><td>PLO5</td><td></td><td></td><td></td><td>√</td></tr>
</table>
</td></tr>
<tr><td>Contents</td><td>1. Introduction
2. Rotational Kinematics
3. Orientation kinematics
4. Forward Kinematics
5. Inverse Kinematics
6. Basic Concepts of Robot Operating Systems (ROS)
7. Robot application using ROS</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>The evaluation is done in 3 forms, namely:
1. Trial, either midterm or semester test,
2. Four tasks, individual assignments to be completed within a certain timeframe, and
3. Two quizzes, held on face-to-face, once before midterm exam and once after midterm exam, with a short answer form.

Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.</td></tr>
<tr><td>Media employed</td><td>LCD, blackboard, and websites.</td></tr>
<tr><td>Assessments and Evaluation</td><td>
<table>
<tr><th>Type</th><th>Percentage</th><th>CO1</th><th>CO2</th><th>CO3</th><th>CO4</th></tr>
<tr><td>Quiz</td><td>5 %</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Individual Task</td><td>20 %</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Project Task</td><td>15 %</td><td></td><td></td><td>√</td><td>√</td></tr>
<tr><td>Midterm Exam</td><td>30 %</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Final Exam</td><td>30 %</td><td></td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Reading List</td><td>[1] Jazar, R., N., 2006, Theory of Applied Robotics, Kinematics, Dynamics and Control, Springer New York
[2] Kajita, S., Hirukawa, H., Harada, K., Yokoi, K., 2014, Introduction to Humanoid Robotics, Springer New York
[3] Angeles Jorge, 2007, Fundamentals of Robotic Mechanical Systems, Theory, Methods and Algorithms, Springer New York.</td></tr>
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[4] The Construct Team, 2021, ROS for Beginner, [Online] https://www.theconstructsim.com/intro-to-robot-programming-ros-learning-path.
[5] Robotis, 2021, E-manual Turtlebot3, [Online] https://emanual.robotis.com/docs/en/platform/turtlebot3.