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MODULE HANDBOOK

Module name	Robotics Experiment
Module level, if applicable	Undergraduate
Code, if applicable	MII 2320
Courses, if applicable	Robotics (MII 2319)
Semester(s) in which the module is taught	Odd Semester
Person responsible for the module	Ika Candradewi, S.Si., M.Cs.
Lecturer(s)	Ika Candradewi, S.Si., M.Cs. Bakhtiar Aldino Ardi Sumbodo, S.Si., M.Cs.
Language	English Bahasa Indonesia
Relation to curriculum	1. Undergraduate degree program, elective, 3th semester. 2. International undergraduate program, elective, 3th semester.
Teaching methods	1. Undergraduate degree program delivered using lectures and practicum instruction with students less than 30. 2. International undergraduate degree program delivered using lectures and instruction with students less than 30.
Workload (incl. contact hours, self-study hours)	1. Lectures: 1 x 100 = 100 minutes per week. 2. Exercises and Assignments: 1 x 50 = 50 minutes per week. 3. Self-study: 1 x 50 = 50 minutes per week.
Credit points	1 Credit Points
Requirements according to the examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.
Required and recommended prerequisites for joining the module	Students must take robotics course (MII 2319)
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to: CO1. Students are able to understand the basic concepts of python programming on Robot Operation System (ROS) [CPL 3] CO2. Students are able to program the turtlebot3 robot using python on ROS for specific applications and able to solve problems in programming robot [CPL 4]

PLO		CO1	CO2
Program	**PLO1**		

<table>
<tr><td></td><td>
<table>
<tr><td rowspan="4">Learning Outcome (PLO)</td><td>PLO2</td><td></td><td></td></tr>
<tr><td>PLO3</td><td>√</td><td></td></tr>
<tr><td>PLO4</td><td></td><td>√</td></tr>
<tr><td>PLO5</td><td></td><td></td></tr>
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</td></tr>
<tr><td>Content</td><td>1. Introduction: ROS Installation and ROS Introduction
2. ROS Topics – Publisher
3. ROS Topics – Subscribers & Messages
4. ROS Services – Clients
5. ROS Services – Server
6. Python Classes on ROS
7. ROS Actions – Clients
8. ROS Actions – Servers
9. Application of SLAM (Simultaneous Localization and Mapping) on Turtlebot3
10. Turtlebot3 Navigation and Simulator Application
11. Case Study
12. Response – Final Project</td></tr>
<tr><td>Study and examination requirements and examination forms</td><td>The evaluation is done in three forms, namely:
1. Final exam
2. Case Study
3. Ten group assignments are to be completed within a specific timeframe, And Assessment is done using a rubric to measure student understanding related to the target and class rank.</td></tr>
<tr><td>Media employed</td><td>e-learning Platform (ELOK), projector, whiteboard, and presentation.
Robotic Turtlebot3 Kit, Ubuntu OS with ROS, Gazebo Simulation Software</td></tr>
<tr><td>Assessments and evaluation</td><td>
<table>
<tr><th>Type</th><th>Percentage</th><th>CO1</th><th>CO2</th></tr>
<tr><td>Participatory Activities*)
Experiment</td><td>10%</td><td>√</td><td></td></tr>
<tr><td>Final Exam -Project Results/Case Study Results/PBL Results*)</td><td>30%</td><td></td><td>√</td></tr>
<tr><td>Task (Skill-based Assessment (SBA))
Structured Assignments</td><td>10%</td><td></td><td>√</td></tr>
<tr><td>Experiment Report</td><td>20%</td><td>√</td><td></td></tr>
<tr><td>Case Study</td><td>20 %</td><td>√</td><td>√</td></tr>
<tr><td>Final Exam – Theoritical & Analisis</td><td>10 %</td><td>√</td><td></td></tr>
<tr><td>Total</td><td>100</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Reading list</td><td>Main References :</td></tr>
</table>

	1. ROS Robot Programming, A Handbook is written by TurtleBot3 Developers. https://community.robotsource.org/t/download-the-ros-robot-programming-book-for-free/51 2. Materi Praktikum Robotika di Elok https://elok.ugm.ac.id/course/view.php?id=8184 3. https://emanual.robotis.com/docs/en/platform/turtlebot3/learn/#youtube-course 4. http://wiki.ros.org/Documentation

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