MODULE HANDBOOK DESCRIPTION

Module designation	Mechatronic	
Code	FBB3212	
Semester(s) in which the module is taught	6 / third year	
Person responsible for the module	Paniran, ST., MT.	
Language	Indonesian	
Relation to curriculum	Concentration Elective for Electronics Engineering	
Teaching methods	Lectures, small group discussion, case base method.	
Workload (incl. contact hours, self-study hours)	Contact minutes every week, each week of the 16 weeks/semester: • Lectures: 2 x 50 minutes • Exercises and Assignments: 2 x 60 minutes • Private study: 2 x 60 minutes. total study hours = 5 hours 40 minutes/week	
Credit points	2 SKS (~ 3.2 ECTS)	
Required and recommended prerequisites for joining the module	- Basic Electrical (FBS2123) - Basic Electronics (FBS2114) - Electric Circuits 1 (FBS1213) - Basic control system (FBS2231)	
Module objectives/intended learning outcomes	1. Students are able to analyse the modeling Electromechanical Systems ; Structures and Materials, Modeling of Mechanical Systems for Mechatronics Applications, Fluid Power Systems, Electrical Engineering, Engineering Thermodynamics, Numerical Simulation, Modeling and Simulation for MEMS, Rotational and Translational Microelectromechanical Systems, MEMS Synthesis, Microfabrication, Analysis, and Optimization. Sensors and Actuators, Fundamentals of Time and Frequency, Sensor and Actuator Characteristics.	PLO3

	2. Students are able to design the modeling Electromechanical Systems ; Modeling of Mechanical Systems for Mechatronics Applications, Fluid Power Systems, Electrical Engineering, mechatronic Sensors and Actuators : Fundamentals of Time and Frequency, Sensors : 1 Linear and Rotational Sensors, 2 Acceleration Sensors, 3 Force Measurement, 4 Torque and Power Measurement, 5 Flow measurement, 6 Temperature Measurements, 7 Distance Measuring and Proximity Sensors, 8 Light Detection, Image, and Vision Systems. Actuators : 1 Electromechanical Actuators, 2 Electrical Machines, 3 Piezoelectric Actuators, 4 Hydraulic and Pneumatic Actuation Systems,	PLO4
	3. Students are able to expriment the modeling Electromechanical Systems; Fluid Power Systems, Electrical Engineering, Mechatronic Sensors and Actuators: 1 Linear and Rotational Sensors, 2 Temperature Measurements, 3 Distance Measuring and Proximity Sensors, 4 Light Detection, 5 Electromechanical Actuators, 6 Electrical Machines, 7 Hydraulic and Pneumatic Actuation Systems.	PLO5

Content	1. Overview of Mechatronics: - What Is Mechatronics? , - Mechatronic Design Approach, - System Interfacing, Instrumentation, and Control Systems, - Microprocessor-Based Controllers and Microelectronics, - An Introduction to Micro- and Nanotechnology, - Mechatronics Engineering Curriculum Design. 2. Physical System Modeling: - Modeling Electromechanical Systems ; Structures and Materials, - Modeling of Mechanical Systems for Mechatronics Applications, - Fluid Power Systems, - Electrical Engineering, - Engineering Thermodynamics, - Numerical Simulation, - Modeling and Simulation for MEMS, - Rotational and Translational Microelectromechanical Systems. 3. Mechatronic Sensors and Actuators: - Introduction to Sensors and Actuators, - Fundamentals of Time and Frequency, - Sensor and Actuator Characteristics, - Sensors : 1 Linear and Rotational Sensors, 2 Acceleration Sensors, 3 Force Measurement, 4 Torque and Power Measurement, 5 Flow measurement, 6 Temperature Measurements, 7 Distance Measuring and Proximity Sensors, 8 Light Detection, Image, and Vision Systems, 9 Integrated Microsensors, 10 Vision. - Actuators : 1 Electromechanical Actuators, 2 Electrical Machines, 3 Piezoelectric Actuators, 4 Hydraulic and Pneumatic Actuation Systems, 5 MEMS: Microtransducers Analysis, Design, and Fabrication.
Examination forms	- Written case study - Midterm and final test
Study and examination requirements	The final grade in the module is composed of: 1. Case I & II assessment: 25% 2. Case Project assessment: 30% 3. Midterm assessment: 20% 4. Final assessment: 25% Students must have a final grade of 65% or higher to pass

Reading list	1. Georg Pelz, 2003, Mechatronic Systems: Modelling and Simulation with HDLs, John Wiley & Sons Ltd, England. 2. Robert H. Binshop, 2008, Mechatronics System, Sensors, and Actuators : Fundamentals and modeling. CRC Press LLC, Printed in the United States of America. 3. Robert H. Binshop, 2008, Mechatronic System control, logic, and Acquisition. CRC Press LLC, Printed in the United States of America. 4. Robert H. Binshop, 2002, The Mechatronics Handbook. CRC Press LLC, Printed in the United States of America. 5. Sabri Cetinkunt, 2015, Mechatronics with Experiments, 2nd edition. John Wiley & Sons Ltd. 6. W. Bolton, 2003, Mechatronis: Electronic control system in mechanical and electrical engineering, Third Edition, Printed by ashfrod colour press Ltd, Gosport England.