



MODULE HANDBOOK DESCRIPTION

Module designation	Telemetry	
Code	FBC0008	
Semester(s) in which the module is taught	6 / third year	
Person responsible for the module	Cahyo Mustiko O. M., ST., MSc., Ph.D.	
Language	Indonesian	
Relation to curriculum	Free elective for Telecommunication Engineering	
Teaching methods	Lecture, small group discussion.	
Workload (incl. contact hours, self-study hours)	<p>Contact minutes every week, each week of the 16 weeks/semester:</p> <ul style="list-style-type: none"> • Lectures: 2 x 50 minutes • Exercises and Assignments: 2 x 60 minutes • Private study: 2 x 60 minutes. <p>Total study hours = 5 hours 40 minutes/week</p>	
Credit points	2 (~ 3.2 ECTS)	
Required and recommended prerequisites for joining the module	-	
Module objectives/intend ed learning outcomes	1. Students are able to analyze telemetry systems, telemetry inputs, data processing, Rx/Tx data transmission, wireless wave (radio wave) data transmission, Internet of Things (IoT) performance, and antenna requirements	PLO3
	2. Students are able to design telemetry systems with Rx/Tx-based data transmission systems, antenna design for radio wave data transmission, and desktop-based interface design.	PLO4
	3. Students are able to complete experiments with design results to better understand the concept of telemetry systems.	PLO5

Content	<ol style="list-style-type: none"> 1. Telemetry System: Understanding of Telemetry System, Brief History of Telemetry, Working Concept of Telemetry System, and Regulatory Standards in the Field of Telemetry. 2. Input Concept in Telemetry: Actuator Control Relay Concept, Transistor, Opto-Isolator, Introduction to Motors (DC Motors, Servo Motors, Stepper Motors), Data Logger, Temperature Sensor (LM35 Temperature Sensor, DS18B20 Temperature Sensor, Thermocouple Temperature Sensor, LDR, Ultrasonic, Humidity Sensor (YL 69 Sensor, DHT11 Sensor), Vibration Sensor, Passive Infrared Sensor (PIR) (Parts of PIR Sensor, Working Principle, and Application), Load Cell Sensor, and Gas Sensor. 3. Data Processing Program: Programming of Sensor Data, LCD Programming, and Seven-Segment Display. 4. Transmission and Reception of TX/RX Data: Serial Communication Program, and Radio Wave Communication Tx/Rx. 5. Wireless Communication Devices (Radio Waves): Radio Wave Communication Devices, Bluetooth, Wifi, and SMS Gateway Command (Working Principle of GSM Module). 6. Internet of Things (IoT): Definition of IoT, Understanding IoT, History of IoT, System in IoT), IoT Resource Management, IoT Data Analysis and Management, Communication Protocols (Network Layer, Transport and Application Layer), IoT Applications (Monitoring & Actuating, Business Process & Data Analysis), IoT Security and Privacy, Authentication, Standards, and Regulations. 7. Desktop-Based Interface: Visual Basic (Control Menu, Menu, Toolbar, Form Window, Toolbox, Project Explorer, Properties Window, Form Layout Window, Code Window), Students are able to explain the depiction of antenna parameters, Development of Web-Based Applications (Interface, Structure, Web Application Development, Applications), Programming Languages HTML/PHP/SQL (HTML (Hypertext Markup Language), PHP, SQL Databases (Structured Query Language), Google Firebase), and Types of Web-Based Application Projects.
Examination forms	<ul style="list-style-type: none"> - Multiple choice examination and Essay, - Presentation case study.
Study and examination requirements	<p>The final grade in the module is composed of:</p> <ol style="list-style-type: none"> 1. Per-meeting score = 5 % x 16 meeting = 80% 2. Exercise Report/ Homework/Portofolio =20% <p>Students must have a final grade of 65% or higher to pass</p>
Reading list	<ol style="list-style-type: none"> 1. Gordon Clarke, 2004, "Practical Modern SCADA Protocols: DNP3, 60870.5 and Related System", Elsevier. 2. Andreas Wing, 1995, "Protocols and Architectures for Wireless Sensor Network", Wiley Publishing Company. 3. Dale Barr, 2004, "Supervisory Control and Data Acquisition (SCADA) System", National Communications System.

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| | <ol style="list-style-type: none">4. Keith Stouffer, Joe Falco, and Karen Kent, 2006, "Guide to Supervisory Control and Data Acquisition (SCADA) and Industrial Control System Security", National Institute of Standards and Technology.5. W Bolton, 2004, "Instrumentation and Control System", Elsevier. |
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