MODULE HANDBOOK DESCRIPTION

Module designation	*IoT (Internet of Things) Wireless Communication*
Code	*FBD0006*
Semester(s) in which the module is taught	*7 / fourth year*
Person responsible for the module	*A.S.Rachman, ST., MT.*
Language	*Indonesian*
Relation to curriculum	*Elective for Computer Engineering*
Teaching methods	*lectures, small group discussion, project & 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 • Self-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	-
Module objectives/intended learning outcomes	*1. Students are able to differentiate the basics of wireless communication: IoT wireless communication involves the use of different wireless communication technologies, such as Bluetooth, Wi-Fi, Zigbee, and cellular networks, including their range, data rates, and power requirements.* *2. Students are able to understand knowledge of IoT protocols: IoT devices use different protocols to communicate with each other and the internet, like MQTT, CoAP, and HTTP can help you design efficient and reliable IoT communication systems.*	*PLO3 (M)*

	3. *Students are able to plan and design IoT communication systems that are reliable, secure, and energy-efficient.* 4. *Students are able to design IoT communication systems that meet these requirements.*	*PLO4 (H)*
	5. *Students are able to produce the integration with Cloud Computing and Big Data: IoT devices generate massive amounts of data, and cloud computing and big data technologies are used to store and analyze this data.*	*PLO8 (L)*
Content	1. *Introduction to IoT Wireless Communication: This covers the basic concepts of IoT and its wireless communication technologies such as Wi-Fi, Bluetooth, Zigbee, and cellular networks.* 2. *IoT Wireless Communication Hardware and Software: This covers the hardware and software components used in IoT wireless communication, including sensors, actuators, microcontrollers, and operating systems.* 3. *IoT Communication Protocols: This covers the different communication protocols used in IoT systems such as MQTT, CoAP, and HTTP, and their characteristics such as reliability, latency, and security.* 4. *IoT Wireless Communication Standards: This covers the different standards and regulations that govern IoT wireless communication, such as IEEE 802.15.4 and 5G.* 5. *IoT Wireless Communication Applications: This covers the different applications of IoT wireless communication, including smart homes, smart cities, and industrial IoT.* 6. *IoT Wireless Communication Security: This covers the security threats and vulnerabilities in IoT communication systems and how to secure them.* 7. *IoT Wireless Communication Design and Implementation: This covers the design and implementation of IoT wireless communication systems, including the selection of wireless communication technologies, hardware and software components, and communication protocols.*	
Examination forms	- *Case based* - *Project based*	
Study and examination requirements	*The final grade in the module is composed of:* a. *Case I assessment: 20%* b. *Case II assessment: 20%* c. *Project based: 60%* *Students must have a final grade of 65% or higher to pass*	

Reading list	*"IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things" by David Hanes, Gonzalo Salgueiro, and Patrick Grossetete. This book provides a comprehensive introduction to IoT Wireless Communication, covering topics such as networking technologies, protocols, and use cases.* *"Building Arduino Projects for the Internet of Things: Experiments with Real-World Applications" by Adeel Javed. This book offers hands-on projects that use Arduino boards to create IoT Wireless Communication projects.* *"IoT Wireless Networks: Architectures, Protocols, and Standards" by Song Guo and Chunsheng Zhu. This book provides a detailed overview of IoT Wireless Communication, covering topics such as wireless network architectures, protocols, and standards.* *"Internet of Things (IoT): Technologies, Applications, Challenges and Solutions" edited by B. B. Gupta and Dharma P. Agrawal. This book provides a comprehensive overview of IoT Wireless Communication, covering topics such as IoT technologies, applications, challenges, and solutions.* *"Wireless Communications Principles and Practice" by Theodore S. Rappaport. This book covers wireless communication principles and technologies, including cellular and Wi-Fi networks, which are fundamental to IoT wireless communication.* *"ZigBee Wireless Networks and Transceivers" by Shahin Farahani. This book covers the ZigBee wireless communication protocol, which is commonly used in IoT applications.* *"Bluetooth Low Energy: The Developer's Handbook" by Robin Heydon. This book provides an in-depth overview of Bluetooth Low Energy (BLE), which is commonly used in IoT devices such as wearables.*