

21B33C504 – Digital Control Engineering

Module designation	Digital Control Engineering (Undergraduate)
Semester(s) in which the module is taught	5 th
Person responsible for the module	Dr. Satria Gunawan Zain, M.T. Fathahillah, S.Pd., M.Eng. Dr. Ir. Abd. Muis Mappalotteng, M.Pd., M.T. IPM Zainuddin, S.Pd., M.Pd.
Language	Indonesia – English
Relation to curriculum	This course is a compulsory course
Teaching methods	Lecture, Presentation
Workload (incl. contact hours, self-study hours)	CH: 09.00-17.00 Face to face: 3x50 minutes / week Independent Study: 3x50 minutes / week Structured assignment: 3x50 minutes / week
Credit points	3 SKS (equivalent 5.1 ECTS)
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Program Learning Outcomes (PLO) PLO 3: Internalize the spirit of independence, struggle and entrepreneurship. PLO 5: Able to design, engineer and implement software. PLO 7: able to apply logical, critical, creative, systematic and innovative thinking in the context of developing or implementing science and technology that pays attention to and applies humanities values in accordance with their field of expertise; PLO 10: Able to utilize the latest information technology for use in learning activities in the classroom and laboratory. Course Learning Objectives (CLO) The Digital Control Engineering course is a basic course in the Information and Computer Technology Education Undergraduate Study Program. This course covers control system analysis and design for linear systems in stability or performance cases. This course is related to other subjects such as Algorithms, Microprocessor Systems, Analog and Digital

	Electronics, Software Engineering, Digital Image Processing, Technological Innovation, Mobile Device Programming, Object Oriented Programming, and Artificial Intelligence. This course includes several main discussions, namely: 1. Basic concepts of microcontrollers; 2. Arduino microcontroller programming; 3. LED programming; 4. Seven Segment Output; 5. DC Motor Control; 6. Simple innovation prototype; 7. Schematic Design and 8. VHDL Programming using ISE Design. Sub CLO: Sub-CLO 1: Able to explain the definition of a microcontroller Sub-CLO 2: Able to explain the basic concepts of Arduino Sub-CLO 3: Able to explain the function of Arduino pins Sub-CLO 4: Able to understand each Arduino shield function Sub-CLO 5: Able to install Arduino IDE applications Sub-CLO 6 Able to create schematic designs using the Arduino simulator application Sub-CLO 7 Able to run schematic circuit simulators in simulator applications Sub-CLO 8 Able to create Arduino microcontroller programs Sub-CLO 9 Able to run Arduino microcontroller programs Sub-CLO 10 Able to create digital control system program sketches Sub-CLO 11 Able to assemble digital control system components Sub-CLO 12 Able to run digital control system sketch programs Sub-CLO 13 Able to create simple digital control system innovations
Content	Students will learn about: • Basic concepts of microcontrollers: theoretical definitions of the Arduino microcontroller, Arduino shield, Led, Seven Segment and several definitions related to other components. • Arduino microcontroller programming: getting to know the Arduino microcontroller, installing Arduino IDE software, running the Arduino microcontroller program. • LED programming: create and run sketch programs for flashing LEDs, LEDs in a row, and LED traffic lights. • Seven Segment Output: create and run a seven segment output sketch program on Arduino • DC Motor Control: create and run a DC Motor, Stepper Motor, Servo Motor control sketch program on the Arduino microcontroller • Simple innovation prototype; create and run simple sketch programs using LEDs and Buzzers • Schematic Design: designing schematic circuits using Xilinx Ise or Fritzing software. • VHDL Programming: create and run VHDL sketch programs using ISE Design.
Examination forms	Assessment Techniques: Exam, Presentation, Case Based Learning Assessment Forms: Assignment, Presentation Assessment
Study and examination requirements	• Students have to inform the lecturer when they are not able to attend the class due to sickness etc • Active in making projects by showing participation in making projects in class

	• Able to present and answer questions that exist during project presentations
Reading List	• Cekdin, Cekmas. (2017). Sistem Teknik Kendali. Yogyakarta: Andi Publisher. • Effendy, Marwan. (2019). Pengetahuan Dasar Sistem Kendali. Surakarta: Muhammadiyah University Press. • Kadir, Abdul. (2017). Pemrograman Arduino & Processing. Jakarta: Elex Media Komputindo. • Laksono, Heru, Dibyo. (2014). Sistem Kendali. Yogyakarta: Graha Ilmu. • Pambudi, Wahyu Setyo. (2021). Aplikasi Akuisisi Data Sensor dengan InstrumentLab, PlotLab, Chart pada Arduino Uno. Yogyakarta: Penerbit Andi. • Riyana, Dkk. (2014). Rangkaian Digital. Yogyakarta: Graha Ilmu.