Course Code	TKEE162206
Course Name	Control Systems
Course Instructors	Priyatmadi, Igi Ardiyanto, Samiadji Herdjunanto, Adha Imam Cahyadi, Oyas Wahyunggoro
Course Type	Required
Course Classification	Engineering Topics
Credit / Contact Hour per Week	3 / 150 minutes per Week
Course Description	This course studies the control of dynamic systems to run in accordance with the desired. This subject covers aspects of dynamics such as: stability, sensitivity, transient response, ability to resist interference, steady state errors, and so forth. Various control techniques have been researched and applied so that previously manual-controlled systems can now be automated. To be able to understand the process of control properly, students are required to understand the concept of dynamic systems well. To be able to control dynamic systems well, need dynamic system modeling. Various models have been developed such as: block diagram with its Laplace transform, signal flow graph, and so on. Based on these models developed controllers that produce the output of the system approaching the desired.
Prerequisites Courses	
Covered Student Outcome	**Development of Engineering Solution (b)** **Engineering Design (c)**

Learning Outcome	1. Students are able to understand the definition of control, control history, control system terms, various control systems, and examples of control system applications 2. Students are able to understand ystem time response with block diagram, polar position and zero system, system performance based on location of poles and zero 3. Students are able to understand Criteria angle and magnitude, rules drawing rootlocus, drawing rootlocus with MATLAB, Designing PID controllers using rootlocus, lag-lead compensator using rootlocus 4. Students are able to improve steady state response with serial compensation, improved transient state response with cascade compensator, improved joint response, feedback compensation, physical realization of compensator 5. Students are able to know the design of the controller using Bode Plot and Nyquist, control strands 6. Students are able to understand system in state space, state transition matrix, Cayley Hamilton Theorem, state space conversion to transfer function and vice versa, controllability and observability
Topic	1. System modeling 2. Time response 3. Frequency response 4. Stability 5. Root locus
Direct Asessment	
Indirect Assesment	Questionnaire (EDOM)
References	[1] N.S. Nise, *Control System Engineering*, Hoboken, NJ: John Wiley & Sons Ltd., 2004. [2] J. Jacob, *Industrial Control Electronics*, Englewood Cliffs, NJ.: Prentice-Hall International Editions, 1989. [3] M. Jamshidi and M. Zavarei, *Linear Control Systems : A Computer-Aided*

Direct Asessment Plan	**Measured Learning Outcome**
Assignments	LO1-6
Mid Exam	LO1,LO2,LO3
Final Exam	LO4,LO5,LO6

	Approach., Great Britain: Wheaton & Co.Ltd., 1986. [4] Ogata, Katsuhiko, and Yanjuan Yang. *Modern control engineering*. Vol. 5. Upper Saddle River, NJ, USA: Prentice Hall, 2002.