Course	:	**Controlling Systems**
Module Level	:	Undergraduate
Code	:	FIE308
Semester/Term	:	5th /Third Year
Module Coordinator(s):	:	Dr. Riries Rulaningtyas, S.T, M.T
Lecturer(s):		Dr. Riries Rulaningtyas, S.T, M.T, Winarno, S.Si, M.T, Yhosep Gita, S.Si, M.Si
Classification within the Curriculum	:	~~Compulsory Course~~ / Elective Course
Workload	:	2 hours of lectures, 2 hours of structural activities, 2 hours of individual study,14 weeks per semester, and total 84 hours per semester ~2.8 ECTS*
Credit Points	:	2
Requirement(s)	:	Electronics II (FIE212), Mathematical Physics III (FIT212)
Learning Outcome	:	LO2: They have ability to apply mathematical methods to solve problems in physics LO3: They have ability to apply concepts and principles of physics for theoretical analysis, modeling and simulation LO7: They are able to apply knowledge and principles of physics in industry and medical field as well as other interdisciplinary fields
Learning Goals/Competences	:	**General Competence (Skill):** Students are able to: Understand and explain the principle of control systems and its application. **Specific Competence:** Students are able to: a. design the control systems b. analyze the control systems c. analyze the error of control systems d. analyze the stability of control systems e. design the control systems via frequency and state space responses.
Contents	:	**Control Systems:** concept, structure, aplication. **Modelling in the frequency domain:** transfer function, electrical network transfer function, translational mechanical systems transfer function, rotational mechanical systems transfer function, **Modelling in the time domain:** state space, converting transfer function to state space, converting state space to transfer function, **Time Response:** poles, zeros, system response, first order systems, second order systems, **Stability:** Routh-Hurwitz criterion, stability in state space, **Steady State Errors:** steady-state error specification, steady-state error for

		disturbances, steady-state error for systems in state space, **Root Locus Techniques:** defining the Root Locus, properties of the Root Locus, Transient Response Design, **Frequency Response Techniques:** Bode Plots, Nyquist criterion, **Desig via Frequency Response:** Lag compesation, lead compesation, **Design via state space:** controller design, observer design.
Soft Skill Attribute	:	Honesty and Dicipline.
Study/Exam Achievements	:	Students are considered competent and eligible to pass the course upon obtaining at least 40 of maximum score for the exams (midterm test and final exam), structured activity (group discussion). Final score is calculated as follow: 20% assignment + 10% soft skill + 35% midterm + 35% final exam Final grade is defined as follow: A : 75 – 100 AB : 70 - 74.99 B : 65 - 69.99 BC : 60 - 64.99 C : 55 - 59.99 D : 40 - 54.99 E : 0 - 39.99
Forms of Media	:	Powerpoint slides, LCD projectors and whiteboards
Learning Methods	:	Lecture, assessments and group discussion
Referensi	:	a. Ogata, K., 2002, *Modern Control Engineering*, Fourth Edition, Prentice Hall b. Nise, N., S., 2011, Control Systems Engineering, Sixth Edition, John Wiley & Sons, Inc.
Notes	:	*Total ECTS={(total hours workloadx50 min)/60 min}/25 hours Each ECTS is equals with 25 hours