



MODULE HANDBOOK DESCRIPTION

Module designation	Control System (FBS3139)
Semester(s) in which the module is taught	5 / <i>third year</i>
Person responsible for the module	Dr. Ir. I Ketut Wiryajati, ST., MT., IPU., ASEAN. Eng.; I Nyoman Wahyu S., ST., MSc., Ph.D.; I Made Ari Nrartha, ST., MT.; Muhamad Irwan, ST., MT.
Language	<i>Indonesian</i>
Relation to curriculum	<i>Compulsory</i>
Teaching methods	<i>Small Group Discussion, Case Base Method</i>
Workload (incl. contact hours, self-study hours)	Contact Hours every week, each week of the 16 weeks/semester : (per week includes) <ul style="list-style-type: none"> • 3 x 50 minutes : Lecture • 3 x 60 minutes : Exercise and Assignment • 3 x 60 minutes : Self-learning total Study hours = 510 minutes/week
Credit points	3 (~ 4,8 ECTS)
Required and recommended prerequisites for joining the module	- Signal and System (FBS2229)
Module objectives/Program Learning Outcomes (PLO)	<p>PLO 2 (H) – Knowledge: Able to apply knowledge of science and mathematics, electrical technology, information technology and/or materials technology to gain a thorough understanding of the principles in the field of electrical engineering.</p> <p>PLO 3 (M) – Engineering Analysis : Able to choose method, make literature reviews, design experiments with simulations, and analyse result to reach the right conclusions, as well as develop guidelines for using tools</p> <p>PLO 4 (L) – Engineering Design : Able to design and develop components, system and/or processes to support engineering activities and create technological innovations by optimally utilizing potential resources</p>

	<ol style="list-style-type: none"> 1. Students are able to develop mathematical model of various system 2. Students are able to develop block diagram 	PLO-2
	<ol style="list-style-type: none"> 3. Students are able to analyse transient responses 4. Students are able to analyse system stability 5. Students are able to design control systems with root locus 6. Students are able to use Bode plots to determine stability and to design controllers 7. Students are able to get stability and gain and phase margins using Nyquist diagrams 	PLO-2 & PLO-3
	<ol style="list-style-type: none"> 8. Students are able to apply PID control 	PLO-4
Content	System modelling, transient response analysis, System stability analysis, root locus control system design, bode plot to determine stability, frequency response analysis (Nyquist diagram) and PID control application.	
Examination forms	<i>Multiple choice examination and Essay, Presentation case study, Document Software Requirement Specification</i>	
Study and examination requirements	<i>Per-meeting score = 5 % x 16 meeting = 80%</i> <i>Exercise Report/ Homework/Portofolio = 20%</i>	
Reading list	<ol style="list-style-type: none"> 1. Ogata, K., 2010, Modern Control Engineering (Fifth Edition), Prentice Hall, USA. 2. Hussein, A. M., Lecturer note: Block Diagram; Signal Flow Graph; State Variables; Modelling physical systems; Transient Response; Steady State Error; Stability Analysis; Root Locus; Design by Root Locus; Bode Plots; Nyquist Analysis, Benha University, Faculty of Engineering at Shubra. 3. System modelling and control from paper journal. 	