



Module Handbook

Module Name :	<i>Aplikasi Kontrol Non-linear</i> Nonlinear Control Application
Module level :	Bachelor degree/Undergraduate Program
Course Code :	4420103023
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	8 th / fourth year
Module coordinator(s)	Dr. Yusuf Fuad, M.AppSc
Lecturer(s):	Dimas Avian Maulana, M.Si
Language:	Bahasa Indonesia (Indonesian Language)
Classification within the curriculum:	Compulsory / Elective
Teaching format/class hours per week during the semester:	3 contact hours of lectures (<i>sks</i> or credit unit*)
Workload :	3 x 50 minutes lectures, 3 x 60 minutes structured activity, and 3 x 60 minutes individual activity per week, 14 weeks per semester 119 total hours per semester ~ 4.77 ECTS**
Credit Unit:	3 credit unit (4.77 ECTS)
Requirements:	Complex analysis, Ordinary Differential Equation, Elementary Linear Algebra, Control and System Theory



<p>Learning goals/competencies:</p>	<p>Knowledge (KNO-1): Demonstrating mathematical knowledge and mathematical insight.</p> <p>CLO-1: Able to perform basics of Lyapunov theory, Root Locus method, and the effect of feedback on the system, advanced stability theory, and nonlinear control system design</p> <p>Skill (SKI-3): Analyzing the formal structure of mathematical problems and relevant fields.</p> <p>CLO-2: Able to analyze basics of Lyapunov theory, Root Locus method, and the effect of feedback on the system, advanced stability theory, and nonlinear control system design in the relevant fields</p> <p>Competence (COM-2): Generating ideas used for completing mathematical tasks and to communicate them either in writing or orally, in accordance with scientific principles</p> <p>CLO-3: Able to complete mathematical task about basics of Lyapunov theory, Root Locus method, and the effect of feedback on the system, advanced stability theory, and nonlinear control system design in the relevant fields</p> <p>Attitude and Social (SOC-2): Showing responsibility for work in the field of expertise independently, having a lifelong willingness to learn, and having the courage to make decisions</p> <p>CLO-4: Able to show responsibility about basics of Lyapunov theory, Root Locus method, and the effect of feedback on the system, advanced stability theory, and nonlinear control system design in the relevant fields</p>
<p>Content</p>	<p>This course discusses the concept of nonlinear control and its application which includes the basics of Lyapunov theory, Root Locus method, and the effect of feedback on the system, advanced stability theory, and design of nonlinear control systems through active learning that utilizes technology and computers. Lecture activities are carried out in a student center with discussions, observations, project assignments, and presentations.</p>

<p>Attribute Soft skill:</p>	<p>Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class.</p>
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Study/exam achievements:	The final grade (<i>NA</i>) is calculated based on the following ratio:		
	Assessment Components	Percentage of contribution	
	Participation	20%	
	Assignment	30%	
	Mid-semester test	20%	
	Final semester test	30%	
	Grade conversion of 0-100 scale into 0-4 scale is set as below:		
	Letter	Number	Grade Interval
	A	4,00	$85 \leq A \leq 100$
	A-	3,75	$80 \leq A- < 85$
	B+	3,50	$75 \leq B+ < 80$
	B	3,00	$70 \leq B < 75$
	B-	2,75	$65 \leq B- < 70$
	C+	2,50	$60 \leq C+ < 65$
	C	2,00	$55 \leq C < 60$
	D	1,00	$40 \leq D < 55$
	E	0,00	$0 \leq E < 40$
Learning Methods :	Student-centered approach; project-based learning; lecturer and discussion; and presentations (structured activities)		
Form of Media:	Power point slides; video; worksheets, and textbooks		



Literature (primary references):	<ol style="list-style-type: none">1. Slotine, J-J.E. & Li, W. 1991. Applied Nonlinear Control. Prentice Hall.2. Isidori, A., Sontag, E. D., & Thoma, M. (1995). Nonlinear control systems (Vol. 3). London: springer.3. Nijmeijer, H., & Van der Schaft, A. J. (1990). Nonlinear dynamical control systems (Vol. 175). New York: Springer-verlag.
Notes:	<p>*1 credit unit or <i>sks</i> in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</p> <p>**1 credit unit or <i>sks</i> = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019</p>