



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Mathematics Department

Sekip Utara Bulaksumur Yogyakarta 55281 Telp: +62 274 552243 Fax: +62 274 555131 Email: math@ugm.ac.id Website: matematika.fmipa.ugm.ac.id

Doctoral Program in Mathematics

Telp : +62 274 552243

Email : maths3@ugm.ac.id;

Website : <http://math.fmipa.ugm.ac.id/dpmath>

MODULE HANDBOOK
Doctoral in Mathematics

Module name:	Mathematical System Theory															
Module level, if applicable:	Doctoral Program															
Code, if applicable:	MMM 6305															
Semester(s) in which the module is taught:	4st Semester (2st Year)															
Person responsible for the module:	Chair of Applied Mathematics Research Group															
Lecturer(s):	Dr. Ari Suparwanto, M. Si															
Language:	Bahasa Indonesia															
Relation to curriculum:	Doctoral Degree in Mathematics, Compulsory / Elective Course															
Credit points:	3 Semester Credit Unit															
Type of teaching, contact hours:	3x50 minutes lectures, 3x60 minutes structured activities.															
Workload:	<ul style="list-style-type: none"> • 3x50 minutes lectures, • 3x60 minutes structured activities, • 3x60 minutes individual study, • In 16 weeks per semester (including assignments and examinations) 															
Recommended prerequisites:	Introduction of algebra structure 2, Introduction of System Theory															
Module objectives/intended learning outcomes:	<p>On successful completion of this course, students should be able to:</p> <p>CO1. Understand about mathematical system and determine the linearization of nonlinear systems.</p> <p>CO2. Determine the solution of linear systems and impulse and step response Menentukan linearisasi dari sistem nonlinear.</p> <p>CO3. Analyze the Stability, Controllability, and Observability.</p> <p>CO4. Determine the realization of linear systems.</p>															
Content:	Linear System, Linearization, Solution of Linear differential equations, Impulse and step response, Stability, Controllability, Observability, Realization theory and Hankel matrices															
Study and examination requirements and forms of examination:	<p>The final mark will be weighted as follows:</p> <table border="1"> <thead> <tr> <th>No</th> <th>Assessment methods (components, activities)</th> <th>Weight (percentage)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Final Examination</td> <td>35%</td> </tr> <tr> <td>2</td> <td>Mid-Term Examination</td> <td>30%</td> </tr> <tr> <td>3</td> <td>Projects</td> <td>25%</td> </tr> <tr> <td>4</td> <td>Peer Assessment/Quiz</td> <td>10%</td> </tr> </tbody> </table> <p>Final grade will be determined as follows:</p>	No	Assessment methods (components, activities)	Weight (percentage)	1	Final Examination	35%	2	Mid-Term Examination	30%	3	Projects	25%	4	Peer Assessment/Quiz	10%
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1	Final Examination	35%														
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	<p>Grade Criteria</p> <p>A : $95 \leq \text{final mark} \leq 100$ A- : $90 \leq \text{final mark} < 95$ A/B : $85 \leq \text{final mark} < 90$ B+ : $78 \leq \text{final mark} < 85$ B : $70 \leq \text{final mark} < 78$ B- : $65 \leq \text{final mark} < 70$ B/C : $60 \leq \text{final mark} < 65$ C+ : $54 \leq \text{final mark} < 60$ C : $48 \leq \text{final mark} < 54$ C- : $40 \leq \text{final mark} < 48$ C/D : $35 \leq \text{final mark} < 40$ D+ : $30 \leq \text{final mark} < 35$ D : $25 \leq \text{final mark} < 30$ E : final mark < 25</p> <p>Final grade will be determined as follows: Grade Criteria The initial cut-off points for grades A, B, C, and D should not be less than 80%, 65%, 50%, and 40%, respectively.</p>
Media employed:	White/Black Board, LCD Projector, Laptop/Computer
Reading List:	<ol style="list-style-type: none"> 1. Brewer, J.W., Bunce, J.W., van Vleck, F.S., 1986, "Linear Systems over Commutative Rings", Marcel Dekker, Inc., New York 2. Brown, W.C., 1993, "Matrices over Commutative Rings", Marcel Dekker, Inc., New York. 3. Olsder, G.J., 1994, "Mathematical Systems Theory", VSSD, The Netherland.

Mapping of The COs and PLOs

	PLO - 1 S3 Mat	PLO - 2 S3 Mat	PLO - 3 S3 Mat	PLO - 4 S3 Mat	PLO - 5 S3 Mat	PLO -6 S3 Mat
CO 1		v		v		
CO 2			v		v	
CO 3			v	v	v	
CO 4				v	v	

Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

PLO-1	:	<p>Attitude:</p> <p>Devote to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working in the area of expertise independently.</p>
PLO-2	:	<p>Knowledge:</p> <p>Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics).</p>
PLO-3	:	<p>Knowledge:</p> <p>Able to think logically, analytically, inductively, deductively, and structured; having the ability to manage, lead, and develop research programs independently, and able to communicate the thoughts as well as his work to the scientific community and the general public.</p>

PLO-4	:	Skill: Creating new concepts and / or new methods (original) in the field of mathematics that are recognized nationally and internationally.
PLO-5	:	Skill: Able to apply mathematics according to their field of expertise to solve problems including those that require a multidisciplinary, cross-disciplinary, or trans-disciplinary approach.
PLO-6	:	<i>Life Long Learning:</i> Having lifelong learning skills and adaptive to the development of science and technology, especially in fields related to Mathematics and its applications.