UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
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Doctoral Program in Mathematics

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MODULE HANDBOOK
Doctoral in Mathematics

Module name:	Linear System over ring
Module level, if applicable:	Doctoral Program
Code, if applicable:	MMM 6202
Semester(s) in which the module is taught:	**4st Semester (2st Year)**
Person responsible for the module:	Chair of Algebra 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:	• 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:	On successful completion of this course, students should be able to: CO1. Explain the concept of a system over commutative ring. CO2. Expalin and characterizes the concept Reachibility and observability of system over commutative ring CO3. . Expalin and characterizes the concept pole assignability and coeficients assignability of system over commutative ring CO4. Expalin and characterizes the concept pole assignability and coeficients assignability of dynamic system over commutative ring CO5. Explain the concept of parametric stabilization and solve the parametric stabilization problem.
Content:	Systems with delay as systems over ring, Reachability and observability, Pole assignability and Stabilizability, Realization Theory, Parameter Stabilization.
Study and examination requirements and forms of examination:	The final mark will be weighted as follows: No — Assessment methods (components, activities) — Weight (percentage) 1 — Final Examination — 35% 2 — Mid-Term Examination — 30% 3 — Projects — 25% 4 — Peer Assessment/Quiz — 10%

	Final grade will be determined as follows: Grade Criteria A : $95 \leq$ final mark ≤ 100 A- : $90 \leq$ final mark < 95 A/B : $85 \leq$ final mark < 90 B+ : $78 \leq$ final mark < 85 B : $70 \leq$ final mark < 78 B- : $65 \leq$ final mark < 70 B/C : $60 \leq$ final mark < 65 C+ : $54 \leq$ final mark < 60 C : $48 \leq$ final mark < 54 C- : $40 \leq$ final mark < 48 C/D : $35 \leq$ final mark < 40 D+ : $30 \leq$ final mark < 35 D : $25 \leq$ final mark < 30 E : final mark < 25 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.
Media employed:	White/Black Board, LCD Projector, Laptop/Computer
Reading List:	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**		
CO 4		**v**				
CO 5					**v**	**v**

Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

PLO-1	:	**Attitude:** Devote to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working in the area of expertise independently.
PLO-2	:	**Knowledge:** Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics).
PLO-3	:	**Knowledge:**

		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.
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	:	***Life Long Learning:*** Having lifelong learning skills and adaptive to the development of science and technology, especially in fields related to Mathematics and its applications.