UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Mathematics Department

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Master in Mathematics

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MODULE HANDBOOK

Module name	Linear Systems over Rings
Module level, if applicable	Master
Code, if applicable	MMM-6202
Subtitle, if applicable	
Courses, if applicable	Linear Systems over Rings
Semester(s) in which the module is taught	2
Person responsible for the module	Algebra Research Group
Lecturer(s)	Dr. rer.nat. Ari Suparwanto, M.Si. Prof. Dr. rer. nat. Sri Wahyuni, M.S.
Language	Bahasa Indonesia
Relation to curriculum	Master Degree, Elective Course
Teaching methods	Lecture, discussion, presentations, homework etc.
Workload	Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam.
Credit points	3 Credits
Requirements according to the examination regulations	Students have an examination card where the course is stated on.
Recommended prerequisites	Students should be proficient in introduction to mathematical system theory over a field and introduction to ring theory,
Module objectives/intended learning outcomes	After completing this course, students have the ability to: CO1. Explains the concept of linear system over commutative rings , namely the background to the emergence of linear systems over commutative rings and the definition of linear sytems over commutative rings. CO2. Explain the concept of reachability and observability of linear system over commutative rings and characterize reachability and observability of linear system over commutative rings. CO3. Explain the concept of pole assignabiliyy and coefficient assignability of the linear system over the commutative ring and solve the problem of pole assignability and coefficiient assignability of linear system over commutative rings. CO4. Explain the concept of parametric stabilization and solve the problem of parametric stabilization.
Content	1. A system with a delay as an over ring system. 2. Reachability and observability of linear sytems over commutative rings. 3. Pole assignability and coefficient assignability. 4. Dynamic stabilization. 5. Paramtris 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	25-40%
2.	Mid-Term Examination	25-40%
3.	Quiz/Presentation, Homework	20-50%

To pass the course, the minimum grade is C (50%)

Media employed	White/Black Board, LCD Projector, Laptop/Computer, Zoom, E-Learning, Simaster
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.

PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1	v		v	v					
CO 2		v	v		v	v			
CO 3	v		v		v				
CO4		v		v		v			

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