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Master in Mathematics

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MODULE HANDBOOK

Module Name	**Sistem Kendali Diskrit (*Discrete System Theory*)**
Module level, if applicable	**Master Program**
Code, if applicable	**MMM 5312**
Subtitle, if applicable	
Courses, if applicable	***Discrete System Theory***
Semester(s) in which the module is taught	1nd(second) semester
Person responsible for the module	Chair of The Lab. of Applied Mathematics
Lecturer(s)	Prof. Dr. Salmah, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course
Teaching methods	150 minutes lectures and 180 minutes structured activities per week.
Workload (incl. contact hours, self-study hours)	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
Required and recommended prerequisites for joining the module	Students should be proficient in linear algebra

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>After completing these course the students will be able:

CO1. to develop model of discrete control problems into basic standard state space form.

CO2. to solve linear systems

CO3. to recognize basic system properties such as stability, controllability and observability and to characterize the properties for discrete systems.

CO5. To design feedback control for discrete systems.

CO6. To design observer for discrete systems, and understand separation principle of feedback control and observer.

CO7. To design linear quadratic optimal control for discrete systems.

CO8. to relate between the theory and applications of simple control system problems, and to interpret the solutions.</td></tr>
<tr><td>Content</td><td>Topics include modeling aspect and state space form of discrete systems,
Z-transform, solution of linear difference equation system, system properties: stability, controllability and observability odf discrete systems, feedback, observer, separation principle of feedback and observer, linear quadratic optimal control for discrete systems, steady state.</td></tr>
<tr><td>Examination forms</td><td>Essay, oral presentation</td></tr>
<tr><td>Study and examination requirements</td><td>The minimum requirement (final grade) to pass the course is D. The final mark will be weighted as follows:

No. | Assessment methods (components, activities) | Weight (percentage)
1. | Final Examination | 30%-40%
2. | Mid-term Examination | 30%-40%
3. | Class Activities: Quiz, Homework, etc. | 20%-30%</td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer/Tablet, eLok/Simaster</td></tr>
</table>

Reading list	• Geert Jan Olsder, 1994, *Mathematical Systems Theory,* 1'st Edition, Delft University of Technology. • Katsuhiko Ogata, 2006, *Discrete-Time Control System,* Dorling Kindersley Pvt Ltd. • Kwakernaak, H., dan Sivan, R., 1972, Linear Optimal Control Systems, Wiley, Interscience Division of John Wiley and Sons. • Rabbath, C.A, Lechevin, N., 2014, Discrete-Time Control System Design with Applications 2014th Edition, Springer

CO-PLO Mapping

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**
CO 1		√	√			
CO 2		√	√			
CO 3		√	√			
CO 4		√	√			
CO 5		√	√			
CO 6		√	√			

Compilation Date :

Modified Date :