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Master in Mathematics

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MODULE HANDBOOK

Module Name	Bisimulation System Theory
Module level, if applicable	Master's degree
Code, if applicable	MMM-6324
Subtitle, if applicable	
Courses, if applicable	Bisimulation System Theory
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	Chair of The Lab. Of Applied Mathematics
Lecturer(s)	Dr. Noorma Yulia Megawati, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory 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 this course, the students should have:

CO 1. Ability to apply the basic concept of controlled invariance subspace

CO 2. Ability to apply the concept of bisimulation relation on labelled transition systems

CO 3. Ability to analyse the bisimulation relation between two continuous systems

CO 4. Ability to analyse the simulation relation between two continuous systems

CO 5. Ability to design a reduction system which bisimilar to the original system</td></tr>
<tr><td>Content</td><td>The course will cover:
Continuous linear system: solution system, system properties,
controlled invariant subspace,
labelled transition system: bisimulation relation on labelled transition system,
bisimulation relation on continuous linear system: deterministic system and nondeterministic system, algorithm of maximal bisimulation relation,
simulation relation on linear system continuous,
reduction system by bisimulation.</td></tr>
<tr><td>Examination forms</td><td>Written exam</td></tr>
<tr><td>Study and examination requirements</td><td>To pass the course, the minimum grade is C. The final mark will be weighted as follows:

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

Reading list	1. Van der Schaft, A. J., 2004., Equivalence of Dynamical Systems by Bisimulation, IEEE Transactions on Automatic Control, 49(12), 2160-2172. 2. Milner, R., 1989, Communication and Concurrency, Prentice Hall, Englewood Cliffs. 3. Basile, G., & Marro, G., 1992, Controlled and Conditioned Invariants in Linear System Theory, Prentice Hall, Englewood Cliffs, NJ. 4. Antoulas, A.C., 2005, Approximation of Large-Scale Dynamical Systems, Society for Industrial and Applied Mathematics, Philadelphia.

CO-PLO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO 1			v			
CO 2			v	v		
CO 3				v	v	
CO 4				v	v	
CO 5				v	v	

Compilation Date :

Modified Date :