SATUAN ACARA PERKULIAHAN

DASAR TEKNIK PENGENDALIAN SISTEM INDUSTRI

Oleh :

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DEPARTEMEN TEKNOLOGI INDUSTRI PERTANIAN

FAKULTAS TEKNOLOGI PERTANIAN

INSTITUT PERTANIAN BOGOR

2016

Course Syllabus
Introduction to Industrial System Control Techniques

Course title	Introduction to Industrial System Control Techniques		
Course code: **TIN213**	Credits: 3(2-3)	Semester: 3	Compulsory/optional: Compulsory
Coordinator's name	Dr. Ir. Hartrisari H, DEA	Instructor's name	Dr. Ika Amalia K, S.TP, M.Si Dr. Ir. Sugiarto, M.Si Dr. Ir. Muslich, M.Si
Main reference (Title, author, year)	1. James G. 2015. Modern Engineering Mathematics, 4th Ed. Pearson Prentice Hall, London.		
Additional reference	-		
Brief description	This course provides the basis for calculating the control of industrial systems, including an introduction and illustrations of control systems, introduction to control theory, functions, introduction to mathematical discrete, deferential and integral, and the Laplace transform and its applications in control and optimization of industrial processes and management.		
Prerequisite	-		
Course outcome	A. To explain the definition of systems and industrial processes (categories of processes: the transformation process, the process of moving / transport; categories of systems: natural vs. engineered, character and scale, and component changes, steady-state versus unsteady state, the system approach, simulation and mathematical model B. To understand the theory of control: closed-loop system, mathematical model, approximate dynamical systems, controller design C. To explain and use the principles of discrete mathematics: set theory, switching and logic circuits, proportional and methods of proof, application engineering: expert systems; control D. To explain the various types of function and its usefulness: a basic definition, linear and quadratic functions, polynomial functions, rational functions, circular functions, exponential functions, logarithmic and hyperbolic, and the irrational function E. To solve problem cases involving deferential and Integral: deferential, deferential techniques, higher derivates, application to problems of optimization, integration, integration techniques, and application integration F. To explain the principles and solving problems involving numerical deferential, and numerical evaluation of integrals G. To explain and solve problem cases involving the Laplace transform and its application area, solution of deferential equations, and possibilities of industrial application		

<table>
<tr><td></td><td colspan="5">H. To explain the application of Industrial Process Control for simple cases in the industry: Mechanism controller (controller mechanism), Process Control (Control of process)</td></tr>
<tr><td>Relationship between course outcomes and student outcomes</td><td colspan="5">1. Course outcomes A, B, and C support student outcomes 2 and 4.
2. Course outcomes D, E, F, G, and H support student outcomes 4, 6, and 12.</td></tr>
<tr><td>Offered to</td><td colspan="5">Study Program of Agroindustrial Technology-IPB and other study programs as elective course</td></tr>
<tr><td>Topics to be covered</td><td colspan="5">1. Introduction
2. Introduction to control theory
3. Discrete mathematics
4. Function
5. Differential and integral
6. Differential numerical, and numerical evaluation of integral
7. Laplace transformation
8. Industrial process control</td></tr>
<tr><td rowspan="3">Percentage</td><td>Knowledge</td><td>30 %</td><td rowspan="8">Facility/media</td><td>x</td><td>White board</td></tr>
<tr><td>Skill</td><td>50 %</td><td>x</td><td>LCD projector</td></tr>
<tr><td>Attitude</td><td>20 %</td><td>x</td><td>Computer</td></tr>
<tr><td rowspan="4">Activity, contact hours (hour/week)</td><td>Lecture</td><td>2 hours/week</td><td>x</td><td>Wifi</td></tr>
<tr><td>Lab work</td><td>3 hours/week</td><td>x</td><td>Sound system</td></tr>
<tr><td>Tutorial</td><td>-</td><td></td><td>Courseware</td></tr>
<tr><td>Others</td><td>-</td><td></td><td>Other: ….</td></tr>
<tr><td rowspan="3">Assessment</td><td>Assignment</td><td>10% (homeworks, paper, practical report)</td><td colspan="3"></td></tr>
<tr><td>Examination</td><td>90 % (mid and final exams)</td><td colspan="3"></td></tr>
<tr><td>Quiz</td><td>-</td><td colspan="3"></td></tr>
</table>

MAIN REFERENCE:

1. James G. 2015. Modern Engineering Mathematics, 4th Ed. Pearson Prentice Hall, London.

JADWAL DAN MATERI PERKULIAHAN

Week	Learning Outcomes	Topics	References	Lecturer
(1)	(2)			(4)
1	To explain the definition of systems and industrial processes (categories of processes: the transformation process, the process of moving / transport; categories of systems: natural vs. engineered, character and scale, and component changes, steady-state versus unsteady state, the system approach, simulation and mathematical model	Introduction	1	Hartrisari
2				
3	To understand the theory of control: closed-loop system, mathematical model, approximate dynamical systems, controller design	Introduction to control theory	1	Hartrisari
4	To explain and use the principles of discrete mathematics: set theory, switching and logic circuits, proportional and methods of proof, application engineering: expert systems; control	Discrete mathematics	1	Hartrisari
5	To explain the various types of function and its usefulness: a basic definition, linear and quadratic functions, polynomial functions, rational functions, circular functions, exponential functions, logarithmic and hyperbolic, and the irrational function			Ika
6				Ika
7				Sugiarto
Midterm Exam				
8	To solve problem cases involving deferential and Integral: deferential, deferential techniques, higher derivates, application to problems of optimization, integration, integration techniques, and application integration	Differential and integral	1	Sugiarto
9				Muslich

Week	Learning Outcomes	Topics	References	Lecturer
10	To explain the principles and solving problems involving numerical deferential, and numerical evaluation of integrals	Differential numerical, and numerical evaluation of integral	1	Muslich
11	To explain and solve problem cases involving the Laplace transform and its application area, solution of deferential equations, and possibilities of industrial application	Laplace transformation	1	Ika
12				
13	To explain the application of Industrial Process Control for simple cases in the industry: Mechanism controller (controller mechanism), Process Control (Control of process)	Industrial process control	1	Ika
14				

JADWAL DAN MATERI RESPONSI

Week	Learning Outcomes	Topics	References	Lecturer
(1)	(2)			(4)
1	To explain the definition of systems and industrial processes (categories of processes: the transformation process, the process of moving / transport; categories of systems: natural vs. engineered, character and scale, and component changes, steady-state versus unsteady state, the system approach, simulation and mathematical model	Introduction	1	Hartrisari
2				
3	To understand the theory of control: closed-loop system, mathematical model, approximate dynamical systems, controller design	Introduction to control theory	1	Hartrisari
4	To explain and use the principles of discrete mathematics: set theory, switching and logic circuits, proportional and methods of proof, application engineering: expert systems; control	Discrete mathematics	1	Hartrisari

Week	Learning Outcomes	Topics	References	Lecturer
5	To explain the various types of function and its usefulness: a basic definition, linear and quadratic functions, polynomial functions, rational functions, circular functions, exponential functions, logarithmic and hyperbolic, and the irrational function			Ika
6				Ika
7				Sugiarto
Midterm Exam				
8	To solve problem cases involving deferential and Integral: deferential, deferential techniques, higher derivates, application to problems of optimization, integration, integration techniques, and application integration	Differential and integral	1	Sugiarto
9				Muslich
10	To explain the principles and solving problems involving numerical deferential, and numerical evaluation of integrals	Differential numerical, and numerical evaluation of integral	1	Muslich
11	To explain and solve problem cases involving the Laplace transform and its application area, solution of deferential equations, and possibilities of industrial application	Laplace transformation	1	Ika
12				
13	To explain the application of Industrial Process Control for simple cases in the industry: Mechanism controller (controller mechanism), Process Control (Control of process)	Industrial process control	1	Ika
14				