STATE UNIVERSITY OF-YOGYAKARTA
FACULTY OF-MATHEMATICS AND NATURAL SCIENCE
SILLABY

Faculty   : Mathematics and Natural Science
Study Program   : International Mathematics Education
Course/Code   : Differential Equation
Credit   : Teory = 2 (two) SKS, Practise = 1 (one) SKS
Semester   : 3 (three)
Prerequisite/Code   : Differential Calculus
Professor   : Nikenasih Binatari, M.Si

I. Course Description

The subject of differential equation constitutes a large and very important branch of modern mathematics. From the early days of the calculus, the subject has been an area of great theoretical research and practical applications, and it continuous to be so in our day. Therefore, differential equation is an essential subject to be known for all mathematicians. This course will discuss about three major aspects of the subject: theory, method and application.

II. Standard of Competence

Upon completing this course, students should understand the general theory of differential equations and the basic techniques for solving differential equations involving one unknown function and one independent variable. At this end of this course, students should understand which theory and method of differential equation may be applied to solve numerous problems, be able to solve it and interpret the solution in the origin problems.

III. Activity Plan

Meeting	Basic Competence	Essential Concept	Learning Strategies	Referencee	Character
1	Students should understand the motivation of differential equation arise from the real problem. Next, the students should understand the concepts and classification of differential equation and its general solution.	I. Introduction to Differential Equations - Some Basic Mathematical Models - Definitions and Terminology	Lecturing	[B] p.1 [C] p.2	Curiousity
2		- Classification of Differential Equations - Initial Value Problems - Boundary Value Problems	Lecturing	[A]	Understand
3		- Autonomous Equation	Lecturing and Exercise	[B] p.74	Reasonable
4		- Definition of Differential Equations Solution	Lecturing, Discussions	[B]	Careful
5	Students should be able to recognize various types of first order differential equation for which exact solutions may be obtained by definite procedures and to understand how to solve it.	II. First Order Equations for Which Exact Solutions are obtainable - Standard forms of First Order Differential Equations - Exact Equation	Lecturing, Discussion and Exercise	[A] p.25 - 31	Creative
6		- Solution of Exact Differential Equations	Lecturing, Discussion and Exercise	[A] p.31 - 38	Creative
7		- Method of Grouping - Integrating Factor	Lecturing, Discussion and Exercise	[A] p.35 - 36	Creative
8		- Separable Differential Equations	Lecturing, Discussion and Exercise	[A] p.39 [C] p.31	Creative
9		- Homogeneous Differential Equations	Lecturing, Discussion and Exercise	[D]	Creative
10		- Linear Differential Equations	Lecturing, Discussion and Exercise	[A] p.49 - 53	Creative
11		- Bernoulli Differential Equations	Lecturing, Discussion and Exercise	[A] p.54 – 61 [D]	Creative

12,13		- Special Integrating Factor - Special Transformation	Lecturing, Discussion and Exercise	[A] p.61	
14	First Mid Term Exam	Examination		[A], [B], [C]	Sportsmanship
15		Review of the First Midterm Exam		[A], [B], [C]	
16	Students should be able to interpret the solution in terms of the quantities involved in the original problem	III. Applications of First Order Equations - Orthogonal Trajectories	Lecturing, Discussion and Exercise	[A] p.70 – 74	Tough
17		- Oblique Trajectories	Lecturing, Discussion and Exercise	[A] p.74 – 77	Tough
18,19		- Application in Mechanics Problems and Rate Problems	Presentation	[A]	Applicative Innovative
20	Second Mid Term Exam	Examination		[A], [B], [C]	
21		Review of the Second Midterm Exam		[A], [B], [C]	
22,23	Students should be able to recognize higher order linear differential equation and to understand the explicit methods of solving them.	IV. Explicit Methods of Solving Higher Order Linear Differential Equations - Basic Theory of Linear Differential Equations	Lecturing, Discussion and Exercise	[A], [E],	Creative
24,25,26		- The Homogeneous Linear Equation with Constant Coefficients	Lecturing, Discussion and Exercise	[A] p.135, [E]	Creative
27 28		- The Method of Undetermined Coefficients	Lecturing, Discussion and Exercise	[A] p.152, [E]	Creative
29 30		- Variation of Parameters	Lecturing and Exercise, Discussion	[A] p.152, [E]	Creative
31		Practises	Exercise	[A]	
32	Final Exam				

IV. Reference
Compulsory :

[A]   Ross, S.L, *Differential Equations*, 1984, J. Willey, New York

[B]   Boyce, W.E., and Diprima, R.C. *Elementary Differential Equations and Boundary Value Problems*, 1992, J. Willey, New York.

Additional :

[C] Zill, Dennis G., Cullen, Michael R. 1997. *Differential Equations with Boundary-value Problems*. Fourth Edition. USA : Brooks/Cole Publishing Company.

[D] http://tutorial.math.lamar.edu/Classes/DE/DE.aspx

[E] http://www.sosmath.com/diffeq/diffeq.html

V. Evaluation

Component	Worth
Individual Assignment	10%
Group Assignment	15%
First Midterm Exam	20%
Second Midterm Exam	20%
Final Exam	35%
Total	**100%**

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