



Teaching Plan

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DIFFERENTIAL EQUATIONS

BACS 1223

SEMESTER 2

SESSION 2008/2009

BACS 1223 DIFFERENTIAL EQUATION (3, 2, 2)

Type of Subject: K

1.0 Learning Outcomes

Upon completion of this subject, the student should be able to:

- (a) Solve second order linear differential equations with constant coefficients by using method of Undetermined Coefficient and method of Variation of Parameters.
- (b) Solve linear differential equations with constant coefficients by the Laplace Transform method.
- (c) Find the Fourier series of a periodic function and solving partial differential equations using the separation of variable method.
- (d) Apply the knowledge of ordinary and partial differential in solving engineering problems.

2.0 Synopsis

This subject consists of 5 chapters: Introduction of ordinary and partial differential equations, second order linear differential equation with constant coefficients, Laplace Transform, Fourier Series and Partial Differential Equations. The syllabuses are developed based on these three different stages which is exposing the learner's on the fundamental concept of differential equation, various techniques to solve different type of differential equation and lastly, apply the various solving techniques to the learner's engineering problem .

3.0 Pre requisite:

None

4.0 References

- [1] Dennis G. Zill & Micheal R. Cullen (2005). Differential Equations with Boundary-Value Problems, Sixth Edition. Thomson Learning, Inc.
- [2] R. Kent Nagle, Edward B. Saff & Arthur David Snider (2008). Fundamentals of Differential Equations and Boundary Value Problems, Fifth Edition. Pearson Education Inc.
- [3] C. Henry Edwards & David E. Penney (2008). Differential Equations and Boundary Value Problems, Fourth Edition. Pearson Education Inc.
- [4] Werner Kohler & Lee Johnson (2004). Elementary Differential Equations with Boundary Value Problems. Pearson Education Inc.

5.0 Subject Implementations

- i) Lectures
 - 2 hours per week for 14 weeks (Total = 28 hours)
- ii) Tutorials
 - 2 hours per week for 14 weeks (Total = 28 hours)
- iii) Mid-term Test
 - 2 hours

6.0 Subject Evaluations

Course Works:

Quizzes (10% X 2)	20%
Assignment	10%
Mid Semester Exam	25%
Tutorial	5 %

Final Examination	40%
Total	100%

7.0 Methods of Assessment

Component	Knowledge	Competency	Attitude	Communication
Test/Quiz/Tutorial	√		√	
Assignment	√	√	√	√

8.0 Detail Syllabus and Teaching Plan

Week	Session	Contents	Remarks
1	Lecture 1 Exercise	Chapter 1: Introduction <ul style="list-style-type: none"> • The Classification of Differential Equation <ul style="list-style-type: none"> ○ Ordinary and Partial Differential Equation ○ Independent and Dependent Variables ○ The Order of a Differential Equation ○ Linear and Nonlinear Differential Equation Revision: Differentiation and Integration	30/12/08-4/1/09
2	Lecture 2 Tutorial 1	Chapter 2: Second order linear differential equations <ul style="list-style-type: none"> • Solving Homogeneous Equations with Constant Coefficients Topic related to lecture 1	5/1/09-11/1/09
3	Lecture 3 Tutorial 2	<ul style="list-style-type: none"> • Solving Nonhomogeneous Equations <ul style="list-style-type: none"> ○ Method of Undetermined Coefficients Topic related to lecture 2	12/1/09-18/1/09
4	Lecture 4 Tutorial 3	<ul style="list-style-type: none"> • Solving Nonhomogeneous Equations <ul style="list-style-type: none"> ○ Method of Variation of Parameters Topic related to lecture 3	19/1/09-25/1/09 Give assignment to students
5		1 st Semester Break	Chinese New Year 26 & 27/1/09 26/1/09-1/2/09
6	Lecture 5 Tutorial 4	Chapter 3: The Laplace Transform <ul style="list-style-type: none"> • Introduction • Properties of the Laplace Transform • The Unit Step Function Topic related to lecture 4	2/2/09-8/2/09 Quiz 1(10%) Scope: Tutorial 1
7	Lecture 5 Tutorial 5	<ul style="list-style-type: none"> • Inverse Laplace Transform <ul style="list-style-type: none"> ○ Properties of Inverse Laplace Transform Topic related to lecture 4	9/2/09-15/2/09
8	Lecture 6 Tutorial 6	<ul style="list-style-type: none"> • Inverse Laplace Transform <ul style="list-style-type: none"> ○ Properties of Inverse Laplace Transform (cont...) Topic related to lecture 5	16/2/09-22/2/09 Mid-term Test Scope: Lecture 1-5
9	Lecture 7 Tutorial 7	<ul style="list-style-type: none"> • Solution of Initial Value Problem Topic related to lecture 6	23/2/09-1/3/09

10	Lecture 8	<ul style="list-style-type: none"> • Solution of Initial Value Problem (cont...) • Transfer Function 	2/3/09-8/3/09
	Tutorial 8	Topic related to lecture 7	
11	Lecture 9	Chapter 4: Fourier Series <ul style="list-style-type: none"> • Even and Odd Functions • Periodic Functions 	9/3/09-15/3/09
	Tutorial 9	Topic related to lecture 8	
12	Lecture 10	<ul style="list-style-type: none"> • Fourier Series Formulas • Fourier Cosine Series • Fourier Sine Series 	16/3/09-22/3/09 Quiz 2(10%) Scope: Tutorial 9
	Tutorial 10	Topic related to lecture 9	
13	Lecture 11	<ul style="list-style-type: none"> • Half-Range Expansions • Applications of Fourier Series 	23/3/09-29/3/09
	Tutorial 11	Topic related to lecture 11	
14	Lecture 12	Chapter 5: Partial Differential Equations <ul style="list-style-type: none"> • Introduction <ul style="list-style-type: none"> ○ Order of PDE ○ Linear and Nonlinear PDE ○ Homogeneous and Nonhomogeneous PDE 	30/3/09-05/4/09 Students submit Assignment
	Tutorial 12	Topic related to lecture 12	
15	Lecture 13	<ul style="list-style-type: none"> • Classification of PDE • Method of Separation of Variables 	06/3/09-12/4/09
	Tutorial 13	Review of Tutorial 1-12	
16,17, 18,19		FINAL EXAMINATION	13/4/09-10/5/09

