



Course Specifications

Course Title:	Differential Equations-2
Course Code:	242Math-3
Program:	Mathematics
Department:	Mathematics
College:	College of Science and Arts-Najran
Institution:	Najran University



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A. Course Identification

1. Credit hours:			
2. Course type			
a.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/>
b.	Required <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>	Others <input type="checkbox"/>
3. Level/year at which this course is offered:			
Forth			
4. Pre-requisites for this course (if any):			
241Math-3			
5. Co-requisites for this course (if any):			
N/A			

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	45
2	Laboratory/Studio	
3	Tutorial	
4	Others (specify)	3
	Total	48
Other Learning Hours*		
1	Study	30
2	Assignments	10
3	Library	10
4	Projects/Research Essays/Theses	
5	Others (specify)	15
	Total	113

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course is discussed for solving the ordinary differential equations. In this course, the different methods of solution of second differential equation and system of equations are presented. Like variation of parameters, transformation to standard form, decompose the operator etc. Series Solutions of second order differential equations are also studied.

2. Course Main Objective

The main objective of the course is to study of the existence and uniqueness of the solutions for differential ordinary equations and methods of solving them

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge: By the end of the semester, the students will be able to	
1.1	memorize the basic concepts about differential equations effectively.	L1, L2
1.2	list the solutions of differential equations in a sequential way.	L1, L2
1.3		
1...		
2	Skills : By the end of the semester, the students will be able to	
2.1	determine the appropriate method for solving the differential equations	L1, L2
2.2		
2.3		
2...		
3	Competence:	
3.1	Promoting free, creative and critical thinking.	
3.2	Working independently.	
3.3	Searching for data and information and analyzing them.	
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Picard Method for successive approximation, Lipschitz condition	3
2	The existence and uniqueness of the solution	6
3	Gronwall's inequality, Dependence the solution of the initial value problem on the initial condition	2
4	Linear systems with constant coefficients: Homogeneous, Non Homogeneous	9
5	Linear differential equations of second order with variable coefficients :variation of parameters, transformation to standard form, decompose the operator, Abel's method, replacement of the independent variable, exact equation, adjoint equation, reduction of order, Series .	25

6...	Series Solutions of second order differential equations : (Frobenious method)	
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge		
1.1	memorize the basic concepts about differential equations effectively.	Class motivations and discussions	Homework assignments
1.2	list the solutions of differential equations in a sequential way.	Solved problems method	Collaborative learning and Team work
...			
2.0	Skills		
2.1	determine the appropriate method for solving the differential equations	Class discussions	Training reports, Quizzes
2.2			
...			
3.0	Competence		
3.1	Promoting free, creative and critical thinking.		
3.2	Working independently.		
3.3	Searching for data and information and analyzing them.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignment 1	3	
2	Assignment 2	4	
3	Assignment 3	5	
4	Assignment 4	6	
5	Assignment 5	8	
6	Assignment 6	9	
7	Assignment 7	10	
8	Assignment 8	11	

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Available at office hours per week and reachable via email and Blackboard

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Hassan Mustafa Alauddin, Abdel Wahab Abbas Rajab and Sana Ali Zare (2006), Library of Al-Roshd, Differential Equations - Part II
Essential References Materials	<ul style="list-style-type: none"> • Kent; Nagle; Saff; Snider, Fundamentals Of Differential Equations And Boundary Value Problems (Sixth Edition), Amazon • Earl D. Rainville, Phillip E. Bedient, Elementary Differential Equations (Seventh Edition), Macmillan Publishing Company
Electronic Materials	http://www.nu.edu.sa/gui/SubDefault.aspx?PageId=696 http://lib.nu.edu.sa/digitalLibrary.aspx?PageId=1494 http://lib.nu.edu.sa/SubLibrary.aspx?PageId=1491 https://twitter.com/math1427?lang=ar http://en.wikipedia.org/wiki/Differential_equation http://mathworld.wolfram.com/OrdinaryDifferentialEquation.html http://mathforum.org/differential/differential.html
Other Learning Materials	MATHEMATICA or MATLAB

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> • Classrooms number of seats = 20 seat • Computer rooms containing at most 21 PCs • Rooms equipped with modern teaching techniques and different display devices.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, Smart Board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	No need

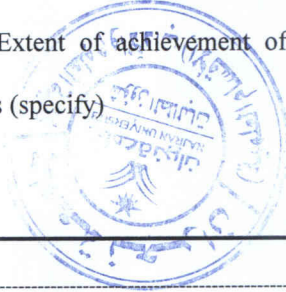
G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students	Electronic Evaluations
Extent of achievement of course learning outcomes	Faculty Members	Analysis work by Microsoft-Excel
Quality of learning resources	Students, Faculty Members	Questionnaires

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)



H. Specification Approval Data

Council / Committee	
Reference No.	
Date	