



Course Specification

— (Bachelor)

Course Title: Calculus II

Course Code: 2022104-4

Program: Bachelor in Mathematics

Department: Mathematics and Statistics Department

College: Faculty of Sciences

Institution: Taif University

Version: 1

Last Revision Date: 20/05/2023



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	6
E. Learning Resources and Facilities	6
F. Assessment of Course Quality	6
G. Specification Approval	7



A. General information about the course:

1. Course Identification

1. Credit hours: 4

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: Level 3 / Second Year

4. Course general Description:

This course covers basics of calculus and how they can use to solve several problems. The course focus The Fundamental Theorem of Calculus, The Indefinite Integrals and The Net Change Theorem, studying most known techniques of integration (The Substitution Rule, Trigonometric Integrals, Integration by Parts, Trigonometric Substitution and Integration of Rational Functions by Partial Fractions). Improper integrals and applications of integration (Area Between Curves and Volume and, Volumes by Cylindrical Shells and Average Value of a Function and Arc Length of Curves). The course focuses also on the link between theory and practice.

5. Pre-requirements for this course (if any):

Calculus I (2021204-4)

6. Co -requirements for this course (if any):

None

7. Course Main Objective(s):

1. Understanding the elementary theorems and properties of Integral Calculus such as The Definite Integral, Fundamental Theorem of Calculus, Indefinite Integrals and The Net Change Theorem. And recognizing the Substitution Rule, Application of Integration (Area Between Curves, Volumes, Volumes by Cylindrical Shells, Average Value of a Function).
2. Applying the Techniques of Integration (Integration by Parts, Trigonometric Integrals, Trigonometric Substitution, and Integration of Rational Functions by Partial Fractions) and Illustrating the Applications of Integration (Area of a Surface Revolution, Applications to Physics and Engineering, Applications to Economics and Biology).



2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4Hr /Week	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	60
2.	Laboratory/Studio	NA
3.	Field	NA
4.	Tutorial	NA
5.	Others (specify)	NA
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	<u>Memorize</u> the Definite Integral Rules and the Fundamental Theorem of Calculus.	K1	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Assignments
1.2	<u>Outline</u> the rate of convergence and complexity requirements of various optimization algorithms.	K1	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Exams Assignments
2.0	Skills			





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	<u>Evaluate</u> anti-derivatives, indefinite and definite integrals of elementary functions.	S2	<ul style="list-style-type: none"> Interactive classes Group discussions 	<ul style="list-style-type: none"> Quizzes Assignments
2.2	<u>Calculate</u> definite integrals for computing areas, volumes and length	S2	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Exams Quizzes
3.0 Values, autonomy, and responsibility				
3.1	Realize the professional and ethical responsibility in conducting their work	V3	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Quizzes Assignments

C. Course Content

No	List of Topics	Contact Hours
1.	The Definite Integral and The Fundamental Theorem of Calculus and the Indefinite Integrals and The Net Change Theorem	4
2.	Techniques of Integration (The Substitution Rule).	4
3.	Techniques of Integration (Trigonometric Integrals)	4
4.	Techniques of Integration (Trigonometric Substitution).	4
5.	Techniques of Integration (Integration of Rational Functions by Partial Fractions)	4
6.	Techniques of Integration (Integration by Parts).	4
7.	First Midterm exam,	4
8.	Improper Integrals.	4
9.	Application of Integration (Area Between Curves and Volumes)	4
10.	Application of Integration (Volumes by Cylindrical Shells and Average Value of a Function)	4
11.	Further Applications of Integration (Arc Length of Curves).	4
12.	Further Applications of Integration (Area of a Surface Revolution)	4
13.	Second Midterm exam	4
14.	Further Applications of Integration (Applications to Physics and Engineering).	4
15.	Further Applications of Integration (Applications to Economics and Biology).	4
Total		60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Continuous Evaluation	10 %
2.	Assignments, report	Continuous Evaluation	10 %
3.	Midterm 1 Exam	7-9	15%
4.	Midterm 2 Exam	12-13	15%
5.	Final Exam	15-16	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	H. Anton, I. Bivens and S. Davis, (2010), Calculus: Early Transcendentals, International Student Version, 10th Edition, USA, John Wiley & Sons, Inc
Supportive References	J. Stewart, (2012), Calculus: Early Transcendentals, 7th edition, USA, Brooks/Cole
Electronic Materials	https://www.abebooks.com/book-search/title/calculus-early-transcendentals-7th-edition/author/james-stewart/
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (Projector, smart board, software)	Data show, Blackboard
Other equipment (Depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Program Leader	Direct & Indirect





Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of students assessment	Faculty, Program Leader	Direct
Quality of learning resources	Students, Faculty	Indirect
The extent to which CLOs have been achieved	Faculty	Direct & Indirect
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department Council
REFERENCE NO.	4
DATE	October 2023

