هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Introduction to Calculus
Course Code:	MATH243-3
Program:	Bachelor of Science in Chemistry
Department:	Department of Physical Sciences
College:	College of Science
Institution:	Jazan University
Version:	TP-153 (2024)
Last Revision Date:	1 February 2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3hrs)

2. Course type

A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐ Elective		

3. Level/year at which this course is offered: (3rd Level--- 2nd Year.)

4. Course general Description:

Course title	Course code	Contact Hours			Credit Hours	Year	Level	Prerequisite	Corequisite
		Lec	Tut	Lab					
Introduction to calculus	MATH243-3	2	1	0	3	2nd	3rd	MATH102-4	---

This course aims to give the students theoretical principles of calculus to prepare students for calculus-based chemistry courses.

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

MATH102-4

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

none

7. Course Main Objective(s):

1- Identify the concepts of functions and inequalities, distinguish between their basic types, and draw them graphically.
2- Identify limits and connections and perform calculations related to them.
3- Distinguishing between integration and differentiation and understanding the relationship between them.
4- Identify the basic rules of differentiation and apply them to different functions.
5- Giving the basic concepts of calculating integration and calculating areas and volumes.
6- To recognize the importance of calculus concerning chemistry and realize the relationship between them.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	$(3 \times 15) = 45$	100%

No	Mode of Instruction	Contact Hours	Percentage
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	15
5.	**Others (specify)**	
Total		45

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;** *Upon completion of the course, students are able to:*			
1.1	***Define, organize, rewrite, illustrate, and indicate the key theories, concepts, rules and terminology of calculus (limits, functions, integration, differentiation integration…etc.) and its applications related to chemistry courses. (I)***	**K 1**	***Lecture discussion***	***Exams Assignments***
1.2	***Describe, explain and evaluate calculus phenomena, rules, functions and their applications related to chemistry courses. (I)***	**K 2**	***Lecture discussion***	***Exams Assignments***
2.0	**Skills;** *Upon completion of the course, students are able to:*			
2.1	***Calculate, design, estimate, Predict and solve a variety of calculus (limits, functions, integration, differentiation integration…etc.) problems. (I)***	**S 1**	***Lecture discussion***	***Exams Assignments***
3.0	**Values, autonomy, and responsibility;** *Upon completion of the course, students are able to:*			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.1	*Apply the ethics of mathematic practice in his study. (I)*	V 2	*Lecture discussion*	*Assignments Classroom activities*

C. Course Content

No	List of Topics	Contact Hours
1.	Inequalities - Functions - Drawing the curve of functions - Even and odd functions - Trigonometric functions - Inverse functions - Inverse trigonometric functions	6
2.	Limits - Properties of limits - Methods of calculating limits - Infinite limits.	6
3.	Connection - Properties of connection - Derivation - The relationship between differentiation and connection.	6
4.	Laws of derivation - Rule Series - Derivation of trigonometric functions - Derivation of logarithmic and exponential functions - Hyperbolic functions and their derivatives -	6
5.	Extreme values - Rolle's rule and mean value theorems -	6
6.	Normalization of functions and test of the first derivative - Concavity and test of the second derivative - Conic sections	6
7.	Definition of integration - Infinite integration - Integration of basic functions - Integrals of functions Hyperbolic and inverse hyperbolic - integrations of rational functions - definite integration and its properties -	6
8.	Calculating areas and volumes using integration	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	*Periodic Exams*	*During Semester*	*30%*
2.	*Assignments & Classroom Activities*	*During Semester*	*20%*
6.	*Final Exam*	*16-17*	*50%*
	Total		*100%*

*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	1. صالح السنوسى، معروف عبد الرحمن ، كمال الهادي عبد الرحمن ، يوسف الخميس : مبادئ التفاضل والتكامل (الجزء الأول)، 1421 هـ .
Supportive References	1. حسن حميدة ، تحسين غزال ، عبد الله الراشد: حساب التفاضل والتكامل (الجزء الثاني) ، مطبوعات جامعة الملك سعود، 1986. 2. J. Stewart, Calculus, Early Transcendentals 6th Edition, (2008) 3. Swokowski, Olinick, and Pence: Calculus, 6th Ed, 1996, John Wiley & Sons, New York.
Electronic Materials	
Other Learning Materials	https://math.libretexts.org/Special:Search?qid=&fpid=230&fpth=&query=introduction+to+calcus&type=wiki

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	*1 Lecture room(s) for groups of 50 students*
Technology equipment (projector, smart board, software)	*Smartboard, Data show, Blackboard, Internet*
Other equipment (depending on the nature of the specialty)	*none*

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Likert-type Survey CES) Indirect
Effectiveness of Students' assessment	Instructor & Course coordinator	Class room evaluation (direct & indirect
Quality of learning resources	Program coordinator	Indirect
The extent to which CLOs have been achieved	Assessment committee	Indirect
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physical Sciences Department Council
REFERENCE NO.	Meeting (3)
DATE	12/03/2024 -02/09/1445