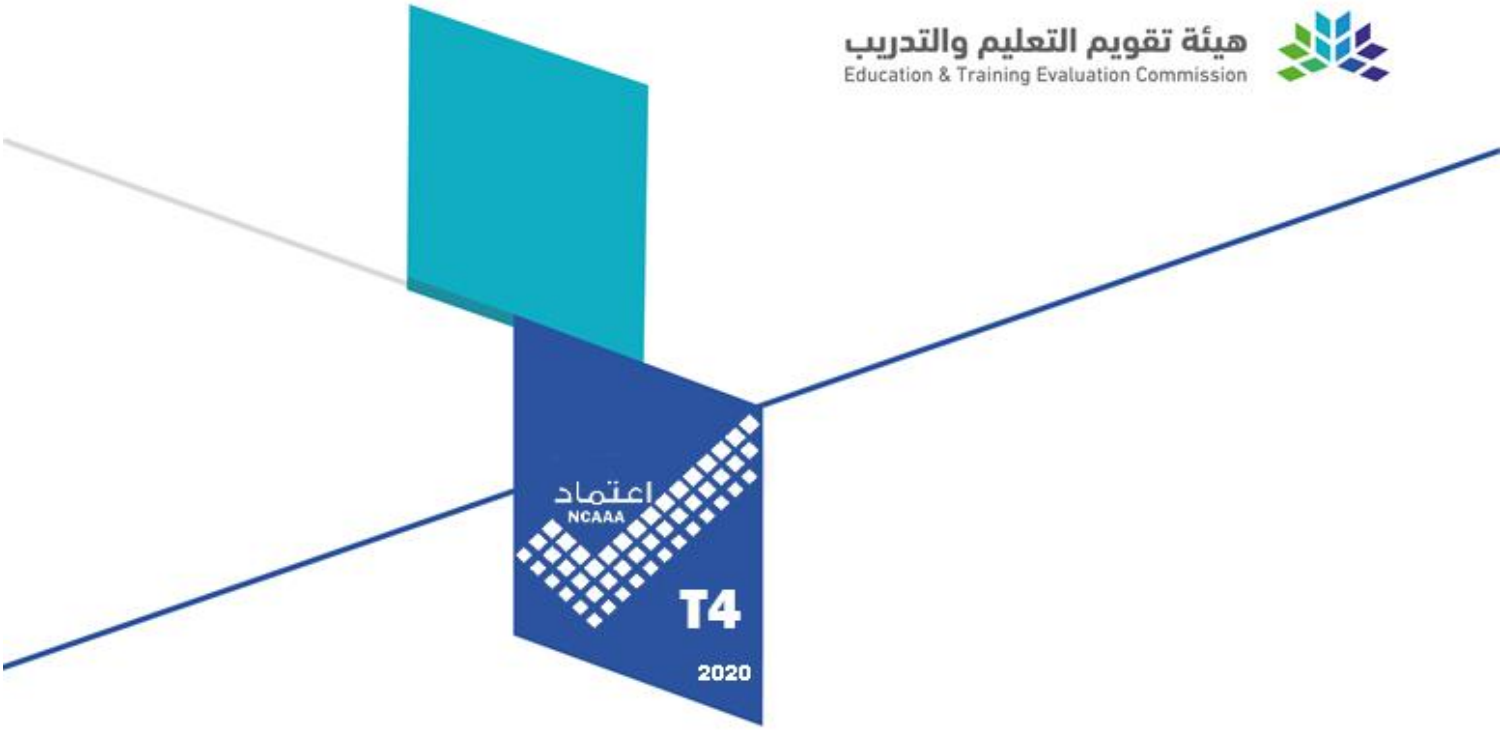
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Calculus**
Course Code:	**201 Math**
Program:	**Chemistry and Physics**
Department:	**Mathematics**
College:	**Science**
Institution:	**Jazan University**

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A. Course Identification

1. Credit hours: 3	**Work Load: 166.2**	**ECTS: 5.5**
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐		
3. Level/year at which this course is offered: Level 3/Year 2		
4. Pre-requisites for this course (if any)**: 100 Math**		
5. Co-requisites for this course (if any)**: No**		

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	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**42**
2	**Laboratory/Studio**	
3	**Tutorial**	**3**
4	**Others** (specify)	
	Total	**45**

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to provide students with

- Types of functions, domain of the functions, graphical representation of functions, properties of functions, composite functions, inverse functions.
- **Limits and continuity**: limit by definition, theorems, limits and continuity of trigonometric functions.
- **Derivatives of functions**: differentiation rules, chain rule, implicit and parametric differentiation, higher derivatives.
- **Applications of differentiation:** The absolute and local maximum and minimum values of a function, Roll's Theorem, The Mean Value Theorem, critical points, increasing and decreasing, concavity, Infliction point, vertical and horizontal Asymptotes and graph of curves.

Integrations: Indefinite Integration, Definite Integration, and method of calculations, application of definite integration.

2. Course Main Objective

After finishing the course, the student is expected to be familiar with the following:

- Show the importance of differentiation and integration in branches of science and Geometry and recognize the relationship between differentiation and integration.

- Understand the basic rules of differentiation, integration and their applications.
- Develop the student's logical thinking and providing students with skills necessary to solve problems.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Distinguish mathematical concepts relevant to Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations	K1
1.2	Identify background science, features and structure of mathematical problem in Mathematics problems Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations	K2
1.3	Explain notations and concepts required for the solution of Mathematical problem in Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations	K3
2	**Skills :**	
2.1	Apply theoretical, computational or practical aspect relevant to Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations	S1
2.2	Compute numerical quantities for various parameters to approximate the solution in Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations.	S2
2.3	Apply various mathematical rules, techniques and theorems in Application on Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations.	S3
2.4	Solve mathematical problem using critical thinking in Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations.	S4
3	**Values:**	
3.1	Cultivate a mathematical attitude and nurture the interest.	V1
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	V2
3.3	Inculcating values and ethics in thought, expression and deed.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Functions	9
2	Limits and continuity	9
3	Derivatives	9
4	Applications of differentiation	9
5	Integration	9
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 and Understanding**		
1.1	Distinguish mathematical concepts relevant to Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.2	Identify background science, features and structure of mathematical problem in Mathematics problems Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.3	Explain notations and concepts required for the solution of Mathematical problem in Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.0	**Skills**		
2.1	Apply theoretical, computational or practical aspect relevant to Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations	Lectures, problem solving, web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.2	Compute numerical quantities for various parameters to approximate the solution in Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations.	Lectures, problem solving, web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.3	Apply various mathematical rules, techniques and theorems in Application on Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations.	Lectures, problem solving, web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.4	Solve mathematical problem using critical thinking in Functions, Limits and continuity, Derivatives of functions, Applications of differentiation, and Integrations.	Lectures, problem solving, web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
3.0	**Values**		
3.1	Cultivate a mathematical attitude and nurture the interest.	Group work, problem solving, web based work	Assignments
3.2	Realize the importance of responsibilities through different	Group work, problem solving, web based work	Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	modes of practice, competition and related activities.		
3.3	Inculcating values and ethics in thought, expression and deed.	Group work, problem solving, web based work	Assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework	3	5%
2	First exam.	6	20%
3	Second exam.	12	20%
4	Homework	14	5%
5	Final exam.	16	50%

***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 :

Each group of students assigned to a member of staff who will be available for help and academic guidance office hours at specific hours on daily basis. At least be available 8 hours per week.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Z J. Stewart, Calculus, Early Transcendental, 6th edition, Brooks/ Cole Publishing Company, (2008).
Essential References Materials	Z Calculus, J. Stewart, 5 Edition, Brooks/ Cle Publishing Company, (2003). Z Calculus, R. E. Larson, R. P. Hostetler, and B. H. Edwards, 7 Edition, Houghton Mifflin Company, (2002) Z Calculus, G. B. Thomas, Early Transcendentals, 11 Edition, Addition-Wesley, New York (2006) Z Calculus,E. Swokowski, M. Olinic, and D. Pence, 6 Edition, PWS Publishing Company, (1994)
Electronic Materials	Web sites related to calculus available on the internet.
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom, Computer lab.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show; Smart Board, Mathematics software.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (Course Evaluation Survey)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect

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	**Board Of Mathematics Department**
Reference No.	**12th Meeting Of The Board Of Mathematics Department 1441-1442**
Date	**14/6/1442 A. H.; 27/1/2021 A. D.**