



Course Specification

— (Bachelor)

Course Title: **Calculus-1**

Course Code: **MATH26111**

Program: **Stream of Sciences and Engineering**

Department: **Mathematics**

College: **Science**

Institution: **University of Bisha**

Version: **4**

Last Revision Date: **9 August 2023**



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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

A. University College Department Track Others
B. Required Elective

3. Level/year at which this course is offered: (1st level / 1st year)

4. Course general Description:

This course covers the basic elements and concepts of differentiation. It is designed as a preparatory course for the students of the stream of sciences and engineering. The topics included are those that are most commonly used or referred to in the literature.

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

Nil

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

Nil

7. Course Main Objective(s):

The main purpose of this course is to provide the first-year students with basic knowledge, skills and attitudes in calculus emphasis on differentiation and its applications in science and engineering.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	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	45
2.	Laboratory/Studio	-----
3.	Field	-----
4.	Tutorial	-----
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: By successfully completing this course it is expected that the student will be able to:			
1.1	Define basic concepts of functions.	K1	Lecture Discussion Active Learning Cooperative Learning	Exercises or Written Tests
1.2	State definitions and theorems about limits and continuity.	K1	Lecture Discussion Active Learning Cooperative Learning	Exercises or Written Tests
1.3	State definitions related to differentiation and its applications.	K1	Lecture Discussion Active Learning Cooperative Learning	Exercises or Written Tests
2.0	Skills: By successfully completing this course it is expected that the student will be able to:			
2.1	Apply concepts and theorems to investigate functions' properties.	S1	Lecture Discussion Active Learning Cooperative Learning	Exercises or Written Tests
2.2	Find different types of limits. Discuss continuity.	S1	Lecture Discussion Active Learning Cooperative Learning	Exercises or Written Tests



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.3	Solve problems related to applications of differentiation.	S1	Lecture Discussion Active Learning Cooperative Learning	Exercises or Written Tests
3.0	Values, autonomy, and responsibility			
3.1	Apply theoretical ideas in real life problems.	V1	Lecture Discussion Active Learning Cooperative Learning	Exercises or Written Tests

C. Course Content

No	List of Topics	Contact Hours
1.	Functions: Sets and Subsets, Operations on Sets, Real Numbers and Intervals, Functions of One Variable, Graph of Function, Polynomials	3
2.	Functions: The Absolute Value Function, Piecewise-defined Function, Rational Function, Power Function, Arithmetic Operations on Functions	3
3.	Functions: Trigonometric and Inverse Trigonometric Functions, Exponential and Logarithmic Functions.	3
4.	Limits and Continuity: Limits, One-Sided Limit	3
5.	Limits and Continuity: Techniques for Computing Limits, Limits Properties	3
6.	Limits and Continuity: Infinity Limits, Limits at infinity.	3
7.	Limits and Continuity: Continuity, Continuity on an Interval, Properties of Continuous Functions, Types of Discontinuity.	3
8.	Derivatives: Differentiability and Tangent Line, One Sided Derivative,	3





9.	Derivatives: Differentiation Formulas of Some Algebraic Functions, Derivatives of Trigonometric Functions	3
10.	Derivatives: Derivatives of Composite Functions: The Chain Rule, The Derivatives of Logarithmic and Exponential Functions,	3
11.	Derivatives: Derivatives of Inverse Trigonometric Functions, Derivatives of Hyperbolic Functions, Derivatives of Parametric Functions	3
12.	Derivatives: Derivatives of the Implicit Functions, Higher Order Derivatives, Indeterminate Forms and L'Hopital's Rule, linear Approximation, Differentials.	3
13.	Application of Differentiation: Increasing or Decreasing Functions and Differentiation,	3
14.	Application of Differentiation: Concavity and Inflection Points, Analysis and Graphing of Functions	3
15.	Application of Differentiation: Absolute Maxima and Minima and Optimization Problems	3
Total		45

The matrix of consistency between the contents and the learning outcomes of the course

Course Learning Outcomes							
Topics	1.1	1.2	1.3	2.1	2.2	2.3	3.1
1	√			√			
2	√			√			
3		√			√		
4		√			√		
5		√			√		√
6			√			√	√
7			√			√	√
8			√			√	√
9			√			√	√
10			√			√	√



D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Exercises	3 rd , 8 th	10%
2.	Quizzes	4 rd , 9 th	10%
3.	Midterm Exam	7 th , 12 th	30%
4.	Final Exam	End of Semester	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	1. Saud Abdullah Al-Owyed, Ahmed Elhassanein Elsayed and Khaled Suliman Aboodh "General Mathematics" Al Motanabi Book Shop (2021). 2. Howard Anton, Ir Bivens and Stephen Davis, "Calculus Early Transcendentals" 11th Ed. John Wiley & Sons, Inc, USA, (2016).
Supportive References	James Stewart, Daniel Clegg, Saleem watson "Calculus Early Transcendentals" 9th Ed. Cengage Learning, USA, (2020).
Electronic Materials	University course management system (Blackboard).
Other Learning Materials	1. Saud Abdullah Al-Owyed, Ahmed Elhassanein Elsayed and Khaled Suliman Aboodh "General Mathematics" Al Motanabi Book Shop (2021). 2. Howard Anton, Ir Bivens and Stephen Davis, "Calculus Early Transcendentals" 11th Ed. John Wiley & Sons, Inc, USA, (2016).

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms for 30 students
Technology equipment (projector, smart board, software)	Smart board.
Other equipment (depending on the nature of the specialty)	-----

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students.	Indirect.
Effectiveness of Students assessment	Peer Reviewer.	Indirect.
Quality of learning resources	Students.	Indirect.
The extent to which CLOs have been achieved	Program Leaders	Direct.
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Mathematics department
REFERENCE NO.	
DATE	

