Supportive References	Differential Calculus for PYP
Electronic Materials	• Blackboard @psau.edu.sa
Other Learning Materials	Paul's Online series

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms with seating facilities for at least 30 students
Technology equipment (projector, smart board, software)	• Providing classrooms with smart boards and data show
Other equipment (depending on the nature of the specialty)	N A

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Teaching	Students Peer Review/Class Room Observation	Indirect
Effectiveness of students assessment	Independent member teaching staff	Check marking by an independent member teaching staff of samples of student work.
Quality of learning resources	Students	Indirect
The extent to which CLOs have been achieved	Faculty Member	Direct
	Quality Unit of College and DDQ	Learning outcomes assessment.

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	OCT 2023

B. Course

C. Content

No	List of Topics	Contact Hours
1.	Real Numbers, Polynomials	6
2.	Functions, even and odd Functions, Limits and Continuity	6
3	Derivatives – First Principle, Chain Rule, Product Rule, Quotient Rule, Higher Order Derivatives	8
4	Trigonometric Functions and their derivatives, derivatives of Logarithmic and exponential functions	6
5	Hyperbolic and Inverse Hyperbolic functions and their derivatives	6
6	Applications – Related Rates, Tangent and Normal, Rolle's and Mean Value Theorems	8
7	Increasing and Decreasing functions, concavity, Maxima and Minima	8
8	Asymptotes, L Hospital's Rule	8
Total		56

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid Term Exam 1	6	20%
2.	Quiz (Atleast Two Quiz)	3,9	10%
3.	Homework /Assignment	-	10%
4	Activities – (Continuous)	-	10%
5	End Semester Exam (50%)	13	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	• Stewart, James. *Single Variable Calculus Early Transcendental*. (2011). • Lang, Serge. *A first course in calculus*. Springer Science & Business Media, ISBN **0387962018**. Anton, Howard, Irl C. Bivens, and Stephen Davis. *Calculus: Early Transcendentals*. John Wiley & Sons, 2021.

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures 3 * 14	42
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial 1 * 14	14
5.	Others (specify) – Office Hours (5 hours a week)	70*
	Total	126

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	Be familiar with the basic concepts of mathematics such as real numbers including intervals, functions, limits and continuity , derivatives and its uses	K1	1. Class Room Lectures 2.Interactive sessions	1. Two Internal Exams 2.At least two Quiz
1.2	Have thorough knowledge of differentiation and various techniques of differentiation	K4	3.Exclusive Office Hours for clearing doubts in small groups	3. End Semester Exam
2.0	Skills			
2.1	Be able to apply various techniques of differentiation, reproduce and apply theorems based on derivatives such as Rolle's Theorem, Mean Value Theorem, L'Hospital Rule	S1	1. Application oriented exercises during tutorial session. 2. Homework to improve the analytical skills	1.Homework 2.Assignments 3.Quiz 4.Mid Term and Final Exam
3.0	Values, autonomy, and responsibility			

4

A. General information about the course:

Course Identification

1. Credit hours: 3 (3,1,0)

2. Course type

a. University ☐ College ☒ Department☐ Track☐ Others☐

b. Required ☒ Elective☐

3. Level/year at which this course is offered: Preparatory Year / Foundation Year Level 1

4. Course general Description

Real numbers, polynomials, Functions, Limits & Continuity: Algebraic Functions – Exponential and Logarithmic Functions – Trigonometric Functions – Limits – Continuity. Derivatives: Techniques of Differentiation – Derivatives of Algebraic Functions – Derivatives of Exponential Functions– Derivatives of Logarithmic Functions – Derivatives of Trigonometric Functions – Equations of the Tangent and Normal – The Chain Rule – Inverse Trigonometric Functions – Hyperbolic Function and Inverse Hyperbolic Functions – Inverse Trigonometric Functions – Derivatives of Inverse Trigonometric Functions – Derivatives of Hyperbolic Functions – Inverse Hyperbolic Functions – Derivatives of Inverse Hyperbolic Functions – Calculation of the nth Derivatives – Differentiation of a composite functions – Differentiation of Implicit Functions. Applications to Calculus: Function graph – Rolle's Theorem – Mean value theorem – L'Hospital Theorem – Maxima and minima – Related Rates – Horizontal and vertical asymptotes

5. Pre-requirements for this course (if any): None

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

NIL

7. Course Main Objective(s)

The main objective of this course is to provide students with a strong foundation in mathematical concepts, especially in single variable differential calculus and its applications and equip them to take up various courses in Mathematics at various levels of study in the chosen STEM Program of their choice.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	4	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning	Elearning: In case of suspension of regular classes due to any unforeseen eventualities	Not applicable
4.	Distance learning		

Table of Contents:

Course Specification

Course Title:	**Differential Calculus**
Course Code:	**MATH 1050**
Program:	**B.Sc**
Department:	**Mathematics**
College:	**Science And Humanities**
Institution:	**Prince Sattam Bin Abdulaziz University**
Version:	**3**
Last Revision Date:	Oct **2023**