Course Specification
(Bachelor)

Course Title:	Calculus-1
Course Code:	105 Math-4
Program:	BSc in Computer and Network Engineering
Department:	Mathematics
College:	Computer Science and Information Technology
Institution:	Jazan University
Version:	2024
Last Revision Date:	9/2024

Table of Contents

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 1 / Year 1

4. Course general Description:

- **Functions:** Functions and their graphs, Types of functions shifting, stretching and reflecting, Inverse Functions, Inverse Trigonometric Functions.
- **Limits and Continuity:** Limit of function, Calculating limits using the limit laws, Continuity, Limits at Infinity, Horizontal Asymptotes.
- **Derivatives of functions**: Differentiation Formulas, Derivatives of polynomials and exponential functions, The Product and Quotient Rules, Derivatives of Trigonometric functions, The Chain Rule , Implicit Differentiation and Higher Derivatives, Derivatives of Logarithmic functions, Hyperbolic Functions and its inverse, L´ Hospital rule and indeterminate forms.
- **Applications of differentiation**: Maximum and Minimum Values, Mean Value Theorem.
- **Integrations:** The anti-derivative method for finding area, anti-derivatives. Indefinite integrals, integral formulas.

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

6. Co- requirements for this course (if any): None

7. Course Main Objective(s):

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

- Functions
- Limits and Continuity
- Differentiation
- Integration
- Show the importance of differentiation and integration in branches of computer science, algorithmic computation and Geometrical presentation and also recognize the relationship between differentiation and integration.
- Understand the basic rules of differentiation, integration and their applications in computer science and technology.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100%
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	52
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	8
5.	Others (specify)	
	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	*Distinguish mathematical concepts relevant to Functions, limit and continuity, differentiations and integrations.*	K1	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, Proof, Short answer), Quizzes, Assignments.
1.2	*Identify background, features and structure of Mathematics problems of functions, limit and continuity, differentiations, Chain rules, integrations by substitution and by parts.*	K2	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, Proof, Short answer), Quizzes, Assignments.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.0	Skills			
2.1	*Apply theoretical or practical aspects relevant to functions, limit and continuity, differentiations, Chain rules, integrations by substitution and by parts.*	S1	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, Proof, Short answer), Quizzes, Assignments.
2.2	*Compute numerical quantities for functions, limit and continuity, differentiations, Chain rules, integrations by substitution and by parts.*	S2	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, Proof, Short answer), Quizzes, Assignments.
2.3	*Apply various mathematical rules, techniques and concepts in functions, limit and continuity, differentiations, Chain rules, integrations by substitution and by parts.*	S3	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, Proof, Short answer), Quizzes, Assignments.
3.0	Values, autonomy, and responsibility			
3.1	Cultivate a mathematical attitude and nurture the interest.	V1	Group work and interactive discussion.	Assignments, Discussion.

C. Course Content

No	List of Topics	Contact Hours
1.	Functions	12
2.	Limits and Continuity	12
3	Derivatives of functions	12
4	Applications of differentiation	12
5	Integrations	12
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Home Assignment and Quiz	3	5%
2.	Mid Exam 1	7	20%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
3.	Home Assignment and Quiz	10	5%
4	Mid Exam 2	12	20%
5	Final Exam	15	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	*Barnett-Ziegler-Byleen, Pre-calculus, custom edition, McGraw-Hill, ISBN 13: 9780390204172, King Saud University, complied by Samir H. Saker.* *J. Stewart, Calculus, Early Transcendentals, 6th edition, Brooks/ Cole Publishing Company, (2008).* *H. An*
Supportive References	*Calculus, G. B. Thomas, Early Transcendentals, 11 Edition, Addition-Wesley, New York (2006) Calculus, R. E. Larson, R. P. Hostetler, and B. H. Edwards, 7 Edition, Houghton Mifflin Company, (2002)* *Precalculus, Michael Sullivan, Pearson publication, 9th* 1. *edition.*
Electronic Materials	Web sites dedicated to Discrete mathematics available on the internet.
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
Facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom equipped with projector, whiteboard, and sufficient seating arrangements.
Technology equipment (Projector, Smart board, Software)	Power point presentations and other hand-outs posted on the course web site.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect Evaluation (Course Survey)- Indirect peer evaluation
Effectiveness of students assessment	Students, Program assessment committee	Direct/ Indirect (Course Survey)
Quality of learning resources	Students, Faculty members	Indirect (Course Survey)
The extent to which CLOs have been achieved	Instructor	Direct/Indirect (Course Survey)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	**Board Of Mathematics Department**
REFERENCE NO.	**2417**
DATE	**29/03/1446 A. H.; 02/10/2024 A. D.**