Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation
&
Assessment**

Course Specification

Institution: **University of Dammam**
College/Department: **Collegeof Sciences /Department of Mathematics**

A. Course Identification and General Information

1. Course title and code:**Calculus (1), Math 152**
2. Credit hours: **3**
3. Program(s) in which the course is offered: **Mathematics program**
4. Name of faculty member responsible for the course:
5. Level/year at which this course is offered: **2th level/ first year**
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any): **N/A**
8. Location if not on main campus: **College of Sciences – Girls Campus – Rayan City**

9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	✓	What percentage?	75%
b. Blended (traditional and online)		What percentage?	
c. E-learning	✓	What percentage?	25%
d. Correspondence		What percentage?	
f. other		What percentage?	

Comments: **The e-learning concerns the use of blackboard; flip teaching, online assessment, etc.**

B Objectives

1. What is the main purpose for this course?

On successful completion of this course students will be able to:

- evaluate various limit problems both algebraically and graphically.
- evaluate limits with indeterminate forms using L'hospital's rule.
- check the continuity of various types of functions.
- differentiate various types of functions using the differentiation rules: Powers, Sum, Difference, Product, Quotient Rules, Implicit and Logarithmic Differentiation.
- apply differentiation to find linear approximation, extrema, monotonicity, and concavity of functions.
- sketch the graph of some functions using differentiation.
- apply differentiation to solve some optimization problems.
- find antiderivative of some simple functions.
- understand the concept of indefinite integral as anti-derivative
- know standard indefinite integrals and basic rules of indefinite integration
- evaluate integrals by substitution with and without suitable hints
- evaluate integrals of rational functions by partial fractions
- evaluate integrals by a repeated use of integration by parts
- understand the concept of definite integral and know the basic properties of definite integrals
- know the fundamental theorem of calculus and be able to use it for evaluating definite integrals and derivatives of integrals with variable limits of integration
- understand the concept of area of regions with curvilinear boundaries, be able to find area between curves

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

- Create, improve and complete (beamer or power point) presentations.

- Update the course by comparing to the contents at other universities.

- Follow up on the latest books to select the most appropriate to update the contents.

- Create a question bank.

- Find web sites related to the topic.

- Focusing on generic skills.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Limits and continuity	4	12
Differentiation	4	12
Applications of derivatives.	3	9
Integration	3	9
Applications of definite integral	1	3

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other: Office hours	Total
Contact Hours	3*15=45	0	0		2*15	75
Credit	3*15	0	0		2*15	75

3. Additional private study/learning hours expected for students per week.

3 Hrs

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
	a. Know what continuity implies about a graph and behavior of a function b. Know the various interpretations of the derivative (velocity, rate of change, slope of tangent line) c. Solve basic optimization problems d. Understand the Mean Value Theorem for Derivatives e. Understand anti-derivatives and know the basic anti-derivative formulas f. Have an understanding of the Riemann Integral as a limit of Riemann sums	Interactive learning process through questions and answers in class. Worked examples through a sequential delivery of surveying lectures. Homework consisting in solving selected exercises.	Exams and homework are used to assess the acquired knowledge on the subject.
2.0	**Cognitive Skills**		
	a. Evaluate limits from a graph b. Evaluate limits at points of continuity c. Evaluate limits of indeterminate forms using algebraic simplifications and l'Hôpital's rule d. Determine points of discontinuity for functions defined as formulas or graphs e. Evaluate the derivatives of simple functions using a difference quotient f. Evaluate the derivatives of combinations of the basic elementary functions	Lectures are covered by different worked examples. Engage students in discussions with questions and answers. Homework consisting in solving selected	Homework include problems, solution of which requires scientific thinking, and applications of essential theorems and results of the course Oral and written tests. Explain and

		exercises. Encourage and develop self education.	communicate the corrected answers of the exams and quizzes. Research projects.
	g. Take the derivative using implicit and logarithmic differentiation h. Find tangent lines and be able to use them as linear approximations i. Find critical values, local extrema and the intervals of concavity for differentiable functions j. Find absolute extrema of constrained functions k. Solve problems involving related rates l. Be able to use both parts of the Fundamental Theorem m. Evaluate definite integrals using substitution n. Find the area between two curves and the volumes of solids of revolution o. Find arc lengths and areas of surfaces of revolution p. Understand the Mean Value Theorem for Integral		
3.0	**Interpersonal Skills & Responsibility**		
	• Punctual attendance of classes is required. • Students learn to manage their time. • Students should act responsibly and ethically in carrying out individual as well as group projects.	• Discussion . • Explanation . • Ask the students to search the internet & library. • Teach them how to cover missed lectures.	• Quizzes. • Ask the absent students about last lectures.
4.0	**Communication, Information Technology, Numerical**		
	• Cooperation between students. • Effective participation. • Students should illustrate how to search the internet &using software programs to deal with problems.	• Creating working groups. • Encourage students to ask good question to help solve problem.	• Discussion . • Home works .
5.0	**Psychomotor**		
	N/A	N/A	N/A

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)					
Course LOs #	**Program Learning Outcomes** **(Use Program LO Code #s provided in the Program Specifications)**				
	Limits And continuity	Differentia tion	Applications of derivatives.	Integration	Applications of definite integral
Knowledge	**Recall**	**Recall**	**Recall**	**Remember**	**Remember**
Comprehensi on	**Discuss**	**Discuss**	**Discuss**	**Summarize**	**Summarize**
Application	**Assess**	**Assess**	**Assess**	**Use**	**Use**
Analysis	**Conclude**	**Conclude**	**Conclude**	**Conclude**	**Conclude**
Synthesis	**Categoriz e**	**Categoriz e**	**Categorize**	**Validate**	**Validate**
Evaluation	**Judge**	**Judge**	**Judge**	**Judge**	**Judge**

6. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	**Quizz1**	**4**	**5%**
2	**Mid-term1**	**6**	**15%**
3	**Quizz2**	**8**	**5%**
4	**Mid-term2**	**11**	**15%**
5	**Homework**	**Every week**	**5%**
6	**Research project**	**15**	**5%**
7	**Final exam**	**As scheduled**	**50%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) 4 hrs/week for students' consultation and academic advice.

E Learning Resources

1. List Required Textbooks
 	
    ● G. Thomas, R. Finney, "Calculus and Analytic Geometry", Addison Wesley, 9th edition 1996.
    ● 2. R. Ellis, D. Gulick, "Calculus with Analytic Geometry", Academic Press, 5th edition 2000.
    ● 3. H. Anton, I.Bivens, Calculus: Seventh Edition, John Wiley & Sons. INC., 2002.

2. List Essential References Materials (Journals, Reports, etc.)
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
 	
    ● Lecture room with 20 seats.
    ● Smart class.

2. Computing resources (AV, data show, Smart Board, software, etc.)
 	
    ● Computer room with at least 10 systems
    ● Computer room with 20 seats

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or

attach list)

G   Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Student course evaluation at the conclusion of the course.
- Sample of assignments and tests.
- Observations and discussions during the semester.

2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Faculty assessment of the course and effectiveness of teaching delivery.
- Periodic self-assessment of the program.

3. Processes for Improvement of Teaching

- Participate to workshops on evaluation approaches and effective teaching methods to enable instructors to improve their teaching skill.
- Teaching method will focus on students' learning and on course learning outcomes.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- A Committee reviews samples of student work in this course to check on the standard of grades and achievements.
- An external faculty member evaluates the course material and the students' work to compare the standard of grades and achievements with those at his university.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Carry out Self- assessment at every two years and external assessment invited faculty members every four years. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.