



هيئة تقويم التعليم

Education Evaluation Commission

المركز الوطني للتقويم والاعتماد الأكاديمي

National Center for Academic Accreditation and Evaluation

**ATTACHMENT 5.**

**T6. COURSE SPECIFICATIONS  
(CS)**

**Jouf University**

**Differential Calculus**

**MTH 102**



## Course Specifications

Institution: <b>Jouf University</b>	Date: <b>26/12/1438</b>
College/Department: <b>Department of Mathematics.</b>	

### A. Course Identification and General Information

1. Course title and code: Differential Calculus – MTH 102			
2. Credit hours: 3 ( 2 , 0 , 2 )			
3. Program(s) in which the course is offered: B. Sc. in Mathematics (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course:			
5. Level/year at which this course is offered: 2 <sup>nd</sup> Level - 1 <sup>st</sup> Year			
6. Pre-requisites for this course (if any): Introductory Mathematics MTH 101			
7. Co-requisites for this course (if any): None			
8. Location if not on main campus: Faculty of Science, boys and girls.			
9. Mode of Instruction (mark all that apply):			
a. traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="10"/>
b. blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			



## B Objectives

1. What is the main purpose for this course?

Identify the basic concepts of Real numbers, Limits, Continuity and its Consequences, domain and range of functions, hyperbolic and inverse hyperbolic functions, Differentiation, The Chain Rule, Derivatives of polynomial, Exponential and Logarithmic Functions, Trigonometric and Inverse Trigonometric Functions, hyperbolic and inverse hyperbolic functions, Implicit Differentiation, Higher Order Derivatives and, Indeterminate Forms and L'Hopital's rule, local extrema, concavity, horizontal and vertical asymptotes, graphing curves, applications of extrema, related rates, Rolle's theorem, mean value theorem, Taylor and Maclaurine series in one variable and make the Students aware of the Mathematical Concepts, which will be further applicable in their Stream Studies

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)

1. There must be a well Set Library, with the Intranet and Internet Facilities for the Students, and Communication Instruments must be well installed and maintained.
2. The whole material needs to be implemented for Active Learning, with more animation, corrections and evaluation.
3. Working with students on producing quality research studies and encouraging them to do publishable work and use the Internet to search for reputable sites and good reference materials.
4. Depending on group work to solve the mixed class and track issues, some instructors tried to use the competition between students or groups as a way of evaluating students and exchange the skills between each other's.

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

### Course Description:

Real numbers, Limits, Continuity and its Consequences, domain and range of functions, hyperbolic and inverse hyperbolic functions, Differentiation, The Chain Rule, Derivatives of polynomial, Exponential and Logarithmic Functions, Trigonometric and Inverse Trigonometric Functions, hyperbolic and inverse hyperbolic functions, Implicit Differentiation, Higher Order Derivatives and, Indeterminate Forms and L'Hopital's rule, local extrema, concavity, horizontal and vertical asymptotes, graphing curves, applications of extrema, related rates, Rolle's theorem, mean value theorem, Taylor and Maclaurine series in one variable.



1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
<b>1.Limits and Continuity</b> a. Real numbers, Limits, Continuity and its Consequences b. The Limit of a Function c. Calculating Limits Using the Limit Laws d. domain and range of functions, hyperbolic and inverse hyperbolic functions. e. Limits at Infinity, Horizontal Asymptotes f. Derivatives and Rates of Change g. The Derivative as a Function	4	16
<b>2.Differentiation</b> a. The Chain Rule b. The Product and Quotient Rules c. Derivatives of polynomial ,Exponential and Logarithmic Functions d. Derivatives of Trigonometric and Inverse Trigonometric Functions, hyperbolic and inverse hyperbolic functions. e. Implicit Differentiation f. Higher Order Derivatives g. Intermediate Forms and L'Hospital Rule h. Rates of Change in the Sciences	5	20



<b>3. Applications of Differentiation</b>  a. local extrema, concavity, horizontal and vertical asymptotes  b. graphing curves, applications of extrema, related rates  c. Rolle's theorem ,mean value theorem ,  d. Taylor and maclorine series in one variable.	6	24
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2. Course components (total contact hours and credits per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planed	30	30	No	No	No	60
	Actual	30	30	No	No	No	60
Credit	Planed	2	1	No	No	No	3
	Actual	2	1	No	No	No	3

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

No

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		
1.1	-Conclude the central idea of limit and continuity,	a) Discussions.	a) Direct assessment



	and its application in a variety of problems;	b) Lectures. c) Tutorials. d) Writing assignments. e) Students are encouraged to make regular visits during office hours where they can ask any questions about the course.	components such as quizzes, home works, major and final exams. b) Self-assessment feedback. c) Teacher direct Observation assessment feedback.
1.2	-Identify the main theorems of calculus and its applications involving rates of change and the approximation of functions		
1.3	-Differentiate standard functions by applying the fundamental rules of differentiation;		
1.4	-Compute the optimal values of functions and handle the optimization problems		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	-illustrate the basic Concept of Differentiation	- Discussions raised during the lecture - To encourage teamwork and how to work collectively discussed and presented in workshops for discussions and evaluation by students - The application of problem-solving and decision-making skills -Home work, Exams	Follow-up duties - quizzes - ask questions during lectures - written tests quarterly and final test. -Exams
2.2	-Perform appropriate solutions for engineering problems based on analytical thinking		
2.3	-Show both theoretical issues and applications that may be useful in real life		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	-Illustrate how take up responsibility.	Cooperative learning - seminars	Direct observation of student behavior and attitudes. Self-evaluation by students for themselves
3.2	-Perform the work together, but should not simply copy work from each other	Lectures	
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	-Assess the skills to practice team work and present results.	Through duties - involved in providing classroom lectures - the use of computers and the Internet in the solution and deliver assignments and tests	Offers process - lessons using information technology design - the follow-up duties and discussed with students
4.2	-Appraise how to Use the computer skills and library.		
<b>5.0</b>	<b>Psychomotor</b>		
5.1	Not Applicable	Not Applicable	Not Applicable



5. 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	First Mid term Exam	6 <sup>th</sup> week	15%
2	Second Mid term Exam	12 <sup>th</sup> week	15%
3	Assignment Problem[ Activity (interactive workshops) ]	Agreement in (1-15) <sup>th</sup> week	10%
4	Final Exam	<b>At end of semester</b>	60%

#### 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 hr / week office hours , 6hr/week guidance hours.

#### E Learning Resources

List Required Textbooks

1. J. Stewart ,”Calculus: Early Transcendentals”, Brooks/cole, cengage Learning, 2012. ISBN-13: 978-0-538-49790-9

2. List Essential References Materials (Journals, Reports, etc.)

1. S. Lang “A First Course in Calculus”, 3<sup>th</sup> edition Springer Verlag, 1986.

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

[www.gigapedia.com](http://www.gigapedia.com)  
<http://en.wikipedia.org>  
[www.sciencedirect.com](http://www.sciencedirect.com)  
[www.springer.com](http://www.springer.com)

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

**Using MATLAB in the course whenever possible.**



## 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.) - The hall area must be proportional to the number of students. - Provide enough seats for students. - Nice Voice Instruments.
2. Computing resources (AV, data show, Smart Board, software, etc.) Not needed.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Not needed .

## G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching a) Student Course Evaluation Questionnaire b) Student opinion poll on the effectiveness of teaching
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department a) Evaluation of the lecturer by department coordinator. b) Observations and assistance from colleagues, independent assessment of standards achieved by students, independent advice on assignment tasks c) Departmental internal review of the course
3 Processes for Improvement of Teaching a) Conducting workshops given by experts on the teaching and learning methodologies b) Periodical departmental revisions of its methods of teaching c) Monitoring of teaching activates by senior faculty members d) Self-assessment feedback.
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) Check marking of student exam answer sheet by another expert staff member b) Giving students the exam key to check and compare their answers c) Providing samples of all kind of assessment in the departmental course portfolio of each course d) Check marking of a sample of examination papers or assignment tasks.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. a) The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils. b) Benefit from the characterization of courses at similar universities c) Take advantage of all new teaching methods and curriculum



Name of Course Instructor: \_\_\_\_\_

Signature: \_\_\_\_\_

Date Specification Completed: \_\_\_\_\_

27/1/1438 H

Program Coordinator: \_\_\_\_\_

Signature: \_\_\_\_\_

Date Received: \_\_\_\_\_

