



ATTACHMENT 5.

T6. COURSE SPECIFICATIONS (CS)

Analysis in Several variables

Math 482

1439H-2018G

Course Specifications

Institution: King Saud University	Date: 2/6/2018
College/Department : College of sciences/Math department.	

A. Course Identification and General Information

1. Course title and code: Analysis in Several variables, Math482			
2. Credit hours:3(2+2+0)			
3. Program(s) in which the course is offered. Bachelor's degree in mathematics, elective course. (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course Houcine Sadraoui			
5. Level/year at which this course is offered: 8 th level			
6. Pre-requisites for this course (if any): Math 246 and Math 481			
7. Co-requisites for this course (if any):			
8. Location if not on main campus:			
9. Mode of Instruction (mark all that apply):			
a. traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="100"/>
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?

To introduce the student to the basics of differential calculus in several variables: continuity, differentiability in several variables, the Taylor's formula and its application to find the minimum and maximum of such functions, integration in several variables and Fubini's theorem (as time permits)

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)

The use of smart-board and the black board , the use of computers for some illustrations and computations, some research relevant to the subject may be presented by students during the lecture time. Optimization problems may be presented as an application of some concepts of differential calculus.

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

Course Description:

The course covers the basics of calculus in several variables: continuity and differentiability of such functions , Taylor's formula , maxima and minima in several variables, integration in several variables and Fubini's theorem (as time permits).

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
The Euclidian space R^n	1	3
Linear transformations	1	3
Topology of The Euclidian space	2	6
Continuous functions on the Euclidian space.	1	3
Differentiability in R^n , the chain rule and differentiability properties.	2	6
Taylor's formula, quadratic forms, maxima and minima of functions, Lagrange multipliers	3	9
Inverse and implicit functions in several variables	2	6
Integration in several variables, Fubini's theorem and the change of variables formula.	3	9

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planned						
	Actual	30	15				45
Credit	Planned	2	1				3
	Actual						

3. Additional private study/learning hours expected for students per week. 6

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	To learn the basic concepts of differentiation of functions of several variables	Homework assignments, discussions during lectures. Students can present parts of the material with class discussions	Questions in the lecture, quizzes and exams. The students may be asked to solve problems on the black board.
1.2	Learn the importance of quadratic forms and Taylor's formula to determine minima and maxima of several variable functions.		
1.3	Learn the basic concepts of integration in several variables and Fubini's theorem and the change of variables formula.		
2.0	Cognitive Skills		
2.1	The student acquires the ability to use topology concepts and linear algebra concepts in several variables to solve continuity and differentiability questions.		
2.2	The student learns the skill of solving minima and maxima questions in several variables.		

2.3	The student is able to handle integration in several variables		
3.0	Interpersonal Skills & Responsibility		
3.1	The student is able to work independently and in a group.		
3.2	The student participates in discussions with others		
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			
5.0	Psychomotor		
5.1			
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	First midterm	7 th week	25%
2	Second midterm	13 th week	25%
3	Quizzes		10%
4	Final exam	16 th week	40%
5			
6			
7			
8			

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)

- There are 10 office hours available for the students each week
- Comments and questions are encouraged at the beginning of each lecture.
- 5 hours per week are available for academic guidance through the academic guidance unit

E Learning Resources

1. List Required Textbooks

- The principles of real analysis by S. Elsonoussi and M.A.Elgwaiz

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

- Multivariable calculus by L.Corwin and R. Szczarba is available in the library as well as other books
- Advanced Calculus by Fritz John is also available in the library.
- Foundations of modern analysis by Dieudonne', a somewhat more advanced book , is recommended.

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

Various sites offer material on differential calculus in several variables and are available to students

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.) <ul style="list-style-type: none"> Lecture room with 25 seats and good ventilation and lighting.
2. Technology resources (AV, data show, Smart Board, software, etc.) Smart Board is available
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 <ul style="list-style-type: none"> Course evaluation can help the teacher get some feedback. Discussions with students and with colleagues are useful for improvement.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> Discussions with peers and peer evaluation
3. Processes for Improvement of Teaching <ul style="list-style-type: none"> The university regularly invites experts on teaching improvement
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) <ul style="list-style-type: none"> Common exam for all sections Some exam papers can be marked by more than a teacher.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. <ul style="list-style-type: none"> The course material and the learning outcomes are periodically reviewed by the department for eventual improvement. Updating the textbook and other references.

Name of Course Instructor: __Houcine
Sadraoui_____



هيئة تقويم التعليم
Education Evaluation Commission

Signature: _____ Date Specification Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: 2/6/2018 _____