هيئة تقويم التعليم

Education Evaluation Commission
المركز الوطني للتقويم والاعتماد الأكاديمي
National Center for Academic Accreditation and Evaluation

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS
(CS)

M 206 Multivariable Differential and Integral Calculus

1439/2018

Course Specifications

Institution:King Saud University		Date:	01/02/2018
College/Department: Science, Mathematics			

A. Course Identification and General Information

1. Course title and code: Multivariable Differential and Integral Calculus M 206
2. Credit hours:4(3+2+0)
3. Program(s) in which the course is offered. Actuarial and Financial Mathematics Program
4. Name of faculty member responsible for the course: Pr. Dr. Souhail Chebbi
5. Level/year at which this course is offered:6/3
6. Pre-requisites for this course (if any):MATH 106
7. Co-requisites for this course (if any):None
8. Location if not on main campus:
9. Mode of Instruction (mark all that apply):

9. Mode of Instruction (mark all that apply):

a. traditional classroom   X   What percentage?   100%

b. blended (traditional and online)   What percentage?

c. e-learning   What percentage?

d. correspondence   What percentage?

f. other   What percentage?

Comments:

B Objectives

1. What is the main purpose for this course?

The main purpose for this course is to introduce the following concepts:

1 Functions of several variables, their limits, continuity and partial differentiation.
2 Double integral, double integral in polar coordinates and application
3 Triple integral, triple integral in cylindrical and spherical coordinates and their applications
4 Sequences, their limits. Series, geometrical series, convergence tests for positive term series, alternating series and absolute and conditional convergence of series. .
5 Power series, power series representation of functions
6 McLaurin and Taylor series.

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)

· Using computers in teaching to support presenting the material.

· Creating a Web site for the material to be available to all students at any time.

· Home works and assignments to be marked in order to keep the students following the course.

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
Functions of several variables, their limits, continuity and partial differentiation	2	6
Double integral, double integral in polar coordinates and application	3	8

Triple integral, triple integral in cylindrical and spherical coordinates and their applications	2	7
Sequences, their limits	2	4
Series, geometrical series	2	4
convergence tests for positive term series, alternating series and absolute and conditional convergence of series	1	6
Power series, power series representation of functions	2	6
McLaurin and Taylor series	1	4

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

		Lecture	Tutorial	Laboratory/ Studio	Practical (visit to companies)	Other:	Total
Contact Hours	Planed	45	30		None		75
	Actual	45	30		None		75
Credit	Planed	4	2		None		5
	Actual	3	1		None		4

3. Additional private study/learning hours expected for students per week.　　8

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 be able to: Define the limit and continuity of a function of several variables; describe the partial derivative of a function of severable variables; State the chain rule for functions of severable variables. Outline the local and absolute extrema of functions of several variables.	Traditional lecture class room	Quizzes Midterm and final exams
1.2	Describe the double integral of a function of two variables, tell how to use it to find an area of a plan region, and describe the double integral of a function of two variables, and outline its use to find integrals which cannot be found in Cartesian coordinates .	Traditional lecture class room	Quizzes Midterm and final exams
1.3	Describe the triple integral of a function of three variables.	Traditional lecture class room	Quizzes Midterm and final exams
1.4	Write the definition of cylindrical and spherical coordinates and describe their use in finding integrals and volumes of a solid	Traditional lecture class room	Quizzes Midterm and final exams
1.5	Define the infinite sequence, their limits and properties	Traditional lecture class room	Quizzes Midterm and final exams
1.6	Outline the definition of infinite series, their properties, and the geometric series.	Traditional lecture class room	Quizzes Midterm and final exams
1.7	List all convergence tests for the positive term series (Integral, Comparison, Limit comparison, Ratio and Root). Alternating series, Absolute and Conditional Convergence	Traditional lecture class room	Quizzes Midterm and final exams
1.8	Define the power series, radius and interval of convergence, power series representations of functions, Taylor and McLaurin series..	Traditional lecture class room	Quizzes Midterm and final exams
2.0	**Cognitive Skills**		
2.1	Write the definition of functions of several variables, and finding their domain, limits and partial derivatives.	Problem solving	Quizzes Midterm and final exams
2.2	functions of several variables, and solve	Problem solving	Quizzes

		problems using chain rules.		Midterm and final exams
	2.3	Find local and absolute extrema of functions of several variables..	Problem solving	Quizzes Midterm and final exams
	2.4	Cartesian and polar coordinates and use them to calculate areas of plane regions and volumes of solids	Problem solving	Quizzes Midterm and final exams
	2.5	Evaluate triple integrals in Cartesian, cylindrical and spherical coordinates, and use them to calculate volumes of solids	Problem solving	Quizzes Midterm and final exams
	2.6	Test series for convergence using integral, comparison, limit comparison, ratio ,root, alternating series tests, and differentiate between the types of convergence	Problem solving	Quizzes Midterm and final exams
	2.7	Find radius and interval of convergence of power series and use power series to find the series representation of functions	Problem solving	Quizzes Midterm and final exams
	2.8	a Write Taylor and McLaurin series and use them to find the series representation of functions.	Problem solving	Quizzes Midterm and final exams
3.0	**Interpersonal Skills & Responsibility**			
	3.1	Study, learn and work independently.	-Encourage students to: - participate in class discussion. - participate in college and university activities. - be members of department committees and college committees.	
	3.2	Work effectively in teams.		
	3.3	Meet deadlines and manage time properly.		
	3.4	Exhibit ethical behavior and respect different points of view.		
4.0	**Communication, Information Technology, Numerical**			
	4.1	Present mathematics to others, both in oral and written form clearly and in a well-organized manner.	Encourage students to: - - use department and college computing facilities. - use e-mail, lms, internet, college anddepartment websites, and central library.	
	4.2	Use IT facilities as an aid to mathematical students. processes and for acquiring available information		
	4.3	Use library to locate mathematical information.		

5.0	Psychomotor		
	Not applicable	Not applicable	Not applicable

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	Tests, Quizzes	3	5%
2	First Midterm exam	6	25%
3	Tests, Quizzes	9	5%
4	Second Midterm exam	12	25%
5	Final	15 or 16	60%

D. Student Academic Counseling and Support

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)

1. 10 office hours weekly.
2. Encouraging students to get in touch with the instructor via e-mail.

E Learning Resources

1. List Required Textbooks
Calculus.
Authors: Earl W. Swokowski, Michael Olinick, Dennis Pence, and Jeffery A. Cole.Publisher:
PWS Pub. Co.; 6th edition (January 1994).

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

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
    1.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.
LMS (Bb), Webinars, TeamViewer, google apps, virtual classroom.

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.) Classrooms
2. Technology resources (AV, data show, Smart Board, software, etc.) AV, data show, Smart Board, LMS (Bb)
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
Surveys, Exams, quizzes
   1. An evaluation sheet for the course to be filled by the students at the end of each semester.
   2. Take the students' opinion about the course under consideration.
   3. Discussing the course with instructors who teach the same course.

2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
   1. The level of the students in solving homework and quizzes
   2. Colleagues' opinions about students' performance in this course.

3. Processes for Improvement of Teaching
   1. Encouraging students to get involved in the lecture.
   2. Getting the use of tutorial classes.
   3. Encouraging the students to read about the subject.

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)
   1. Common Examination
   2. Team grading.
   3. Exchanging experience by comparing students' results in other departments.
   4. Students who believe they are under graded can have their papers checked by a second reader.

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

1. Providing reviews to develop the assigned book content.
2. Providing a discussion for the course subject by a specialized committee.
3. View other math departments in well-known universities and getting help from them.
4. Consulting some course specialists for course evaluation.

Name of Course Instructor: Prof. Dr. Souhail Mohsen Chebbi

Signature: Date Specification Completed: 1/02/2016

Program Coordinator: Prof. Dr. Souhail Mohsen Chebbi

Signature   Date Received: 1/02/2016