COURSE SYLLABUS

Sultan Qaboos University College of Science

Department of Mathematics and Statistics

MATH 2108 **Calculus II**

Course Coordinator: Ziyad Al-Sharawi (Office 0224) **Spring 2012**

Credit Hours: 3 **Pre-requisite:** Calculus I (Math 2107)

Contact Hours: 4 per week **Format:** 2 Lectures and 2 Tutorials.

Textbook: Calculus: Early Transcendental Functions, Smith-Minton, McGraw Hill, 2008. (SQU Special Edition, Book II).

Office Hours: Office hours will be announced separately. Instructors will have their office hours posted outside their offices. Students are advised to visit their instructors during their office hours or by appointment.

Course Description: This is the second course in a series of three calculus courses. The course builds on the topics taught in Calculus I, and deals primarily with applications of integration such as calculating areas, volumes, length of curves; the techniques of integration of various functions; proper and improper integrals. The course also deals with sequences, series and their convergence, power series and their convergence as well as differentiating and integrating power series. Included also are the ideas of polar coordinate system, the polar curves and some basic polar calculus.

Course Objectives: Upon completion of this course, students should know how to: use integration to find the area between two curves, volumes by slicing and cylindrical shells, the length of a plane curve, and the area of a surface of revolution; use various methods of integration such as integration by parts, trigonometric substitutions, using partial fractions and tables of integrals; determine the convergence of improper integrals; determine the convergence of sequences and series, find the radius and interval of convergence of power series, find and use Maclaurin or Taylor series, differentiate and integrate power series; sketch polar curves and find the area between curves in polar coordinates.

Assessment: The course will be graded A to F, and the grades will be composed of the following weighted components:

Component	Week	Date	Day & Time	MARKS
Quiz 1	3		Class Time	15
Quiz 2	5		Class Time	15
Quiz 3	8		Class Time	15
Quiz 4	14		Class Time	15
Homework	11		Class Time	20
Test I	6	March 12, 2012	(Mon. 06:15-07:15)	80
Test II	12	April 23, 2012	(Mon. 06:15-07:15)	80
Final Exam	16	May 19, 2012	(SAT. 11:30-02:30)	160
Total				400

Remarks about the assessment components: (i) If a student misses an exam or a quiz without a valid excuse, the mark in that test will be zero. Absentees with genuine reasons will be treated separately. An official letter (the form is available in moodle) supported by proper documents must be submitted to the instructor within one week from return to class. However, there will be no make-up quizzes or tests. Any assigned grade will be based on the performance on the remaining part of that assessment components. (ii) The instructor may assign some points for attempting the tutorial assignments, and those points will be considered part of the ones allocated for the graded homework.

The Homework: A homework will be given in Week 10. The main objective of the homework is to improve students skills in handling mathematical problems and writing mathematical solutions. Past experience shows that many students copy from each other without achieving this main objective. Therefore, the solution of the homework will not be collected, but rather a quiz out of the homework (exactly out of the homework) will be given at the end of Week 11 (Tutorial Time). This quiz is called "Homework-Quiz." Certainly, good understanding of the homework and good practice in writing the solution will improve your performance in the "Homework-Quiz." Students are required to practice writing the complete, mathematically correct and neatly written solution for each question. Missing the "Homework-Quiz" will result in a zero grade in this component.

Course Contents & Weekly Schedule:

Week	Sec.	Remarks	Title
1 Feb. 04	5.1		Area between two curves
2 Feb. 11	5.2 5.3		Volumes: Slicing; disks and washers Volumes by cylindrical shells
3 Feb. 18	5.4 6.1	 Mostly independent study Quiz 1	Arc length and surface area Review of formulas and techniques
4 Feb. 25	6.2 6.3		Integration by parts Trigonometric techniques of integration
5 Mar. 03	6.4 6.5	Quiz 2 self study	Integration using partial fractions Integration tables
6	6.6	Test I	Improper integrals
7 March 17	8.1 8.2	 Test I	Sequences of real numbers Infinite series
8	8.3	Quiz 3	The integral & comparison tests
9	8.4		Alternating series
10	8.5	Homework posted	Absolute convergence & the ratio test
11	8.6	Homework due	Power series
12 Apr. 21	8.7 8.8	Test II The ideas of examples 1-5	Taylor series Applications of Taylor series
13	9.4		Polar coordinates
14	9.5	Quiz 4	Calculus and polar coordinates
15		Wrapping up	
16		Final Exam	

Instructors: Calculus II (Spring 2012) is taught by the following instructors. A * beside an office number means the second or new math building.

Instructor	Z. Al-Sharawi	M. Rhouma	M. Rakha	S. Karaa	B. Alghabshi
Section	10	20	30	40	50
Office	0224*	0227*	0226*	127A	0150
Instructor	A. Alabri	S. Zaman	B. Alghabshi	A. Alabri	F. Al-Kharousi
Section	60	70	80	90	100
Office	0150	0203	0150	0150	0132
Instructor	A. Purnama	Z. Al-Sharawi			
Section	110	120			
Office	0128	0224*			

Tutorial Problems and Homework Exercises: Some suggested exercises are listed below. Please read the examples given in your book, then do/attempt the suggested exercises at home, and come to the tutorial to discuss the difficulties you have faced in the attempted exercises. The instructor's job is not to solve the homework for you, but to assist/guide you to overcome the difficulties in your homework. The instructor may assign some additional problems. In addition, students are encouraged to do other relevant exercises from the textbook. Also, the instructor may give some marks for doing the suggested exercises before the tutorial.

Sec.	**Practice Problems**	**Tutorial Problems**
5.1	2,3,8,9,11,22,23,26,45,49	1,4,10,12,19,21,24,27,48,50
5.2	2,3,6,18,25,31,32,33,35	1,5,17,20,27,36,37,39
5.3	3,12,13,26,28,30,32,38	1,4,9,15,17,23,27,29,31,35
5.4	6,10,12,13,36,40,50	5,7,8,9,11,14,38,42,51,52
6.1	5,10,15,22,24,31,32,47	3,8,17,20,21,30,35,38,48
6.2	7,12,22,27,30,39,40,41,47,56	2,5,6,10,14,15,17,25,29,33,42,57,63
6.3	2,8,12,20,21,26,33,35	1,3,9,11,13,15,17,22,27,36
6.4	3,9,14,21,22,23,37	1,6,11,18,28,34,38
6.5	1,4,6,8,12,15,23,37	
6.6	1,3,6,8,13,18,26,34,38,39,45,53-58	2,4,5,10,12,14,16,23,27,46,59,60
8.1	2,4,6,11,15,21,22,30,35,38,41,55,58	1,3,12,16-18,20,23,26,28,31,32,36,37,42,45,57
8.2	27,28,33,35,36,47,48	1-22,32,34,49
8.3	3,7,9,10,11,14,20,24,25,32,42-44,56	1,5,8,12,13,15,19,20,21-23,26,41,55,57
8.4	3,8,15,21,28,36,41	1,6,10,16,19,33,35,39,40
8.5	1,13,17,23,27,34,43	3,7,11,19,22,26,31,41,42
8.6	1,9,16,21,31,36,40	3,12,14,19,26,32,33,37,38,41,44
8.7	5,8,9,10,13,23,29,32,35	1,3,6,7,11,14,24,31,33,34,38,39
8.8	11,15,33,35,41	7,13,17,34,36,42,44
9.4	30,31,38,35,41,44,50	1-26,29,32,33,37,39,47,57-62
9.5	5,7,18,20,30,35,47	1,3,9,19,25,26,29,36,48

Assistance: Feel free to visit the course instructors during their office hours. If the assigned office hours are not suitable for you, feel free to ask your instructor for an appointment.

Attendance: Attendance is compulsory. Any student who misses 10% (6 contact hours) of the total course hours will be sent a warning notice, and who misses 20% (12 contact hours) or more of the total course hours will be barred from taking the Final Examination according to the University Regulations. Also, if a student misses a class, then he/she is responsible for all the information given or announced in class.

Punctuality: You are required to attend your class on time. Late attendance is not acceptable, the instructor has the right to close the door and not welcome anyone who is late.

Sharing Material: You are not allowed to share calculators or any other material during exams or quizzes.

Cellular Phones: Turn off your cellular phone or put it on silent mode before entering the class. Also, cellular phones are not allowed to be used as calculators or for any other purpose.

Academic Dishonesty: All forms of academic dishonesty are prohibited and penalties are decided depending on the department/university rules and regulations. Academic dishonesty includes (but not limited to) cheating, plagiarism, copying, collusion, falsification, signing for someone's else, . . . etc. For more details, please see pages 36 and 37 of SQU Undergraduate Academic Regulations, Third Edition, 2005.

Other Remarks: The following remarks are worth stressing.

- Topics for the quizzes, the tests and the final will be announced well in advance.
- Information and announcements related to the course will be posted on the Moodle.
- Students must check their emails and visit the Moodle regularly for any new postings.
- Student's involvement in class through answering questions or seeking clarifications is highly encouraged.
- If there is an idea that needs more clarity, the student must ask the instructor for further explanation either during the class or during her/his office hours.
- By the end of each week, students must be done with all readings, understanding and problem solving as assigned for that week to be well prepared for any quizzes or to understand new ideas in the week that follows. Don't procrastinate, procrastination is the thief of time.
- Students must not share any materials (calculators, pencils,... etc) during quizzes, tests and exams.
- All requests for a review of the answer scripts must be made to the instructor during the class on the same time the tests are returned.
- The instructor/grader reserves the right to deny revision of tests if the answer script is deemed suspicious, e.g. evidence of overwriting...etc. Also, penalties according to university regulations could be imposed.

Learning Outcomes:

- Use definite integrals to calculate the area between two curves.
- Use definite integrals to formulate and calculate the volume of a solid of revolution by the methods of disks and cylindrical shells.
- Apply definite integrals to calculate the length of a plane curve, and the surface area of a solid of revolution.
- Evaluate integrals using integration by parts, elementary substitutions, trigonometric substitution, or partial fractions.

- Identify an improper integral and determine its convergence or divergence.
- Determine whether a sequence of real numbers is increasing or decreasing; evaluate the limit to determine the convergence of a sequence.
- Evaluate the sum of a geometric series and a telescoping sum.
- Determine the convergence of series, using: kth term test, integral test, ratio and root tests, comparison and limit comparison tests.
- Classify the alternating series into absolutely convergent, conditionally convergent, or divergent; and approximate the sum of a convergent alternating series.
- Apply the ratio or root test to determine the radius and interval of convergence of power series.
- Construct Maclaurin or Taylor series using: The definition, substitution, differentiation and integration.
- Use the series to calculate sums of particular series evaluated at specific values of the variable, evaluate some special or unusual limits, and approximate definite integrals.
- Formulate and calculate the length of a curve, and the area between curves in polar coordinates.
- Sketch curves in polar coordinates, and convert from polar into cartesian coordinates and vice-versa.

Good Luck