

King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 106 – Applied Calculus
Syllabus 2018-2019 (Semester 182)

Title: Applied Calculus (Math 106)

Credit: 3-0-3

Textbook: Introductory Mathematical Analysis (for Business, Economics, and the Life and Social Sciences), by E. Haeussler, R. Paul and R. Wood, 13th edition, Pearson, 2014.

Course Description: The derivative. Rules for differentiation. Derivative of logarithmic, exponential, and trigonometric functions. Differentials. Growth and decay models. Definite and indefinite integrals. Techniques of integration. Integrals involving logarithmic, exponential and trigonometric functions. Integration by tables. Area under a curve and between curves. Functions of several variables. Partial derivatives and their applications to optimization.

Prerequisite: One-year preparatory mathematics or its equivalent

Learning Outcomes: By the end of the course, the student is expected to be able to:

- differentiate functions using the appropriate techniques from the following: power rule, product rule, quotient rule, chain rule;
- differentiate exponential functions, trigonometric functions and logarithmic functions;
- find the relative minima and/or maxima, absolute minimum and/or maximum and the inflection point(s) using differentiation;
- solve problems about optimization and exponential growth and decay using the concept of differentiation of a function of one variable.
- integrate some algebraic and trigonometric functions (and understand the relationship between the derivative and the integral of a function);
- use the Fundamental Theorem of Calculus to evaluate the integral of a function;
- calculate the area between two curves;
- classify extreme values of a function of two variables and apply them to optimization problems;
- apply the techniques of differentiation and integration to various applications in business and economics.

Grading Policy:

Exam I: 25% (100 points): MCQ

Exam II: 25% (100 points): MCQ

Class Work: 15% (60 points). The average of each section should be in the interval [42,45].

Final Exam: 35% (140 points): comprehensive & MCQ.

Exam Questions: The questions of the exams are *based on* the examples, homework problems and the exercises of the textbook.

Remark:

- No makeup quiz will be given under any circumstance. If a student misses a quiz, his grade for this quiz will be zero unless an official excuse from student affairs is presented on time; in this case the average of the other quizzes shall be considered for the missing quiz.
- **Missing One of the Two Common Major Exams I or II:** No makeup exam will be given under any circumstance for Major Exam I or II. If a student misses a major exam, his grade for that exam will be zero unless an official excuse from student affairs is presented on time; in this case, his grade in that exam will be determined by the existing formula of the department which depends on his performance in the other major and in the final exam.

Attendance: Attendance is a University Requirement. A DN grade will be awarded to any student who accumulates more than 9 unexcused for UTR classes, or 6 for MW classes.

Academic Integrity: All KFUPM policies regarding ethics apply to this course.

Tips on how to enhance your problem-solving abilities:

1. Please do all the homework assignments on time.
2. You are urged to practice (but not memorize) more problems than those in the list of HW problems.
3. You should always try to solve a problem on your own before reading the solution or asking for help.
4. If you find it difficult to handle a certain type of problems, you should try more problems of that type.
5. You are encouraged to solve some of the review problems at the end of each chapter.
6. The knowledge you get doing homework and reviewing the class lectures will make exam problems easier to tackle.
7. Solve old exams as part of your preparation for the major and final exams.
8. Try to make good use of the office hours of your instructor.

Syllabus 106 (semester 182)

week	Dates	Section	Material	Homework
1	Jan. 6- 10	10.1	Limits	18, 22, 32, 40, 43
		10.2	Limits (cont'd)	2, 15, 30, 39, 45, 50, 52, 58
		10.3	Continuity	6, 11, 22, 30, 36
2	Jan. 13- 17	11.1	The derivative	12, 15, 18, 20, 25, 27
		11.2	Rules for differentiation	22, 33, 60, 72, 78, 85
		11.3	The derivative as a rate of change	8, 10, 12, 16, 21, 27, 40, 41
3	Jan. 20- 24	11.4	Product & quotient rule	9,15, 28,37,57,66
		11.5	The chain rule & the power rule	
4	Jan. 27- 31	12.1	Derivative of logarithmic functions	16, 18, 20, 24, 28, 30, 32, 50
		12.2	Derivative of exponential functions	10, 14, 16, 22, 28, 30, 38,39
5	Feb. 03- 07	12.4	Implicit differentiation	10, 14, 20, 22, 30, 34
		12.5	Logarithmic differentiation	7, 10, 14, 18, 20, 27
		12.7	Higher order derivative	2, 8, 14, 30, 33, 35
6	Feb. 10- 14	Catch up/Revision		
Major Exam I [10.1 – 12.7], MCQ , Wednesday, Feb. 13, 2019				
7	Feb. 17- 21	13.1	Relative extrema	16, 18, 30, 38, 48, 52
		13.2	Absolute extrema on a closed interval	2, 10, 12
		13.3	Concavity	12, 28, 40, 42, 60, 68
8	Feb. 24- 28	13.4	The second derivative test	5, 6, 8, 10, 12
		13.5	Asymptotes	14, 20, 22, 34, 35, 45
		13.6	Applied maxima and minima	4, 15, 18, 22, 26
9	Mar. 03- 07	14.1	Differentials	12, 14, 20, 22, 29
		14.2	The indefinite integral	8, 10, 18, 27, 30, 45
10	Mar. 10- 14	14.3	Integration with initial conditions	5, 7, 11, 14,15
		14.4	More integration formulas	9, 12, 15, 33, 35, 52
		14.5	Techniques of integration	6, 12, 23, 30, 40, 44, 53,63
11	Mar. 17- 21	14.7	Fundamental theorem of calculus	16,36 ,42 ,44,48
		14.9	Area between curves	1, 3, 5, 20, 33, 37,46,58
Major Exam II [13.1 – 14.5], MCQ, Wednesday, Mar. 20, 2019				
12	Mar. 24- 28	15.1	Integration by parts	6, 8, 12, 18, 20, 24, 32
		15.3	Integration by tables	

13	Mar. 31- Apr. 04	Handout	Derivative and integrals of trigonometric Functions	
14	Apr. 07- 11	17.1	Partial derivatives	2,8, 18, 20, 24, 30, 35
		17.4	Higher order partial derivatives	6, 8, 12, 18, 20,21, 23
15	Apr. 14- 18	17.6	Maxima and minima	4, 9, 17, 19, 22, 26, 29

Final Exam (Comprehensive), MCQ , Saturday, April 27th, 2019 at 7.00 PM