OKANAGAN COLLEGE

Course Outline

Course:	Math 112	**Title:**	Calculus I
Section:	071 (Kalamalka Campus)	**Semester:**	Winter, 2012
Instructor:	Jason Schaad	**Office:**	D362
Web page:	www.schaad.ca		
E-mail:	jschaad@okanagan.bc.ca		
Lectures:	MW 1900 - 2050 C344	**Labs:**	W (L71) 2100 - 2150 D229

Texts and other materials

Required: James Stewart, **Single Variable Calculus: Early Transcendentals**, Seventh Edition, Brooks/Cole, 2011, 0538497904, **JS**

Recommended: Daniel Anderson, etal., **Student Solutions Manual: Single Variable Early Transcendentals**, Seventh Edition, Brooks/Cole, 2011, 084004934X

A full scientific calculator is required and a graphing calculator is highly recommended. If you do not own one and do not know what to buy talk to your instructor. Note that the use of graphing calculators is allowed, even encouraged, on all work in this course. However, calculators with symbolic manipulation capabilities, such as the TI-89 or TI-nspire CAS, and hand held computers with QWERTY or similar keyboards are not allowed in any examinations.

Course Objectives To develop in the student an understanding of and skills in the use of the basic techniques of differential calculus. An integral part of the course will be an introduction to Maple, a computer algebra system, which will be used to enhance the student's understanding of the basic concepts of calculus as an aid in computation and visualization and to help them in solving problems. The main topics covered in the course are: an introduction to limits, their evaluation and interpretation; the derivative and its computation numerically, graphically and algebraically; the interpretation of the derivative as the slope of a tangent and as a rate of change, with applications in science; the development of the techniques of differentiation as applied to algebraic, exponential, logarithmic, trigonometric and inverse trigonometric functions; applications of differentiation to approximations, rates of change, curve sketching, and optimization.

Prerequisites Principles of Mathematics 12 with C+(67%) or better or OC Math 120 (Precalculus) with a passing grade

Transfer

UBC/UBCO	Math 100 (3)	UVic	Math 100 (1.5)
SFU	Math 151 (3)	UNBC	Math 100 (3)
TRU	Math 114 (3)	UCFV	Math 113 (3)

Evaluation

Quizzes	12%	
Computer Lab Tests & Exercises	12%	
Term Test One	12%	Monday, January 30
Term Test Two	12%	Monday, February 27
Term Test Three	12%	Wednesday, March 21
Final Exam	40%	

Note 1: A quiz will be administered during most Wednesday classes as indicated in Course Syllabus. A handout containing weekly Problem Sets will be distributed in the first week of classes, and Quiz Practice Problems will be posted on the course web page each week. The problems for each quiz will be selected from the Problem Set and Quiz Practice Problems for the week, or earlier weeks.

Note 2: Computer Lab Exercises will be given starting the second week of the classes. **These exercises will not be marked**. During the semester there will be two Computer Lab Tests based on the exercises. In addition, there will be two Computer Lab Assignments given during the semester that will be handed in for marking. It is not necessary to pass the Computer Lab portion of the course in order to pass the course.

Note 3: Term Tests will be held during the normal class period. Following each term test a written assignment, based on problems on the term test, to be handed in for marking will be distributed.

Note 4: When a student misses a term test he or she may apply to have the percentage mark for the in class portion of that test, not the written assignment, replaced by the percentage mark on the final exam. A valid reason must be provided as part of the application for this privilege.

Note 5: The Final Examination will be comprehensive and will be scheduled during the final examination period. It is your responsibility to insure that you will be available to write exams during this period.

Office Hours Office hours will be announced during the first week of classes. I guarantee that I will be available for consultation during these hours, either in my office or in the Success Centre, unless I inform you otherwise in advance or by posting a notice outside my office. Anytime that I am in my office students are welcome. Students are encouraged to consult with me on problems and course material at any time. **THE ONLY WAY TO LEARN MATHEMATICS IS BY DOING IT, AND IF YOU CAN'T DO IT YOURSELF, ASK FOR HELP!!!**

Week No. 1

Precalculus Review The material in Chapter One and Appendices A, B, and D is pre-calculus material and will be briefly covered in the lectures. It is your responsibility to read Chapter One and the Appendices carefully and make sure you are familiar with the material there.

Limits – tangent lines and velocities; introduction to limits; intuitive definition of the limit of a function, computing the limit of a function numerically

Week No. 2

Limits – one-sided limits; infinite limits; computing limits algebraically using limit laws; squeeze theorem

Reading: **JS**, Sections 1.1 (not covered in lecture)
JS, Sections 2.1 to 2.3

Week No. 3

Limits – the definition of continuity and its relation to limits; intermediate value theorem; limits at infinity and horizontal asymptotes; the use of limits in determining vertical and horizontal asymptotes

Reading: **JS**, Sections 1.2 to 1.4 (not covered in lecture)
JS, Sections 2.5 & 2.6

Week No. 4

Limits – limit examples

The Derivative – slope of the tangent line, velocity, and rate of change as derivatives; the derivative function

Reading: **JS**, Appendix D & Sections 1.5 & 1.6 (not covered in lecture)
JS, Sections 2.7 & 2.8

Week No. 5

The Derivative – computing the derivative using limits; higher derivatives; differentiability

Differentiation rules – the constant function, constant multiples, sums and differences; the power rule and derivatives of polynomial functions

Reading: **JS**, Sections 2.8 & 3.1

Week No. 6

Differentiation rules – exponential function rule; product and quotient rules

Reading: **JS**, Sections 3.1 & 3.2

Week No. 7

Differentiation rules – composite functions and the chain rule; derivatives of trigonometric functions

Reading: **JS**, Sections 3.4 & 3.3

Week No. 8

Differentiation rules – implicit differentiation; the derivatives of inverse trigonometric functions; derivatives of logarithmic functions; logarithmic differentiation

Reading: **JS**, Section 3.5

Week No. 9

Differentiation rules – derivatives of logarithmic functions; logarithmic differentiation

Applications of differentiation – rates of change in science and economics

Reading: **JS**, Sections 3.6 & 3.7

Week No. 10

Applications of differentiation – related rates; linear approximations and differentials

Reading: **JS**, Sections 3.9 & 3.10

Week No. 11

Applications of differentiation – local maximum and minimum values; critical numbers; absolute maximum and minimum values on a closed interval; Mean Value Theorem; first and second derivative derivative tests; intervals of increase and decrease; concavity and inflection points

Reading: **JS**, Chapter 3, Section 3.10 **JS**, Sections 4.1 to 4.3

Week No. 12

Applications of differentiation – application of derivatives to sketching the graph of a function; curve sketching; optimization

Reading: **JS**, Sections 4.5 & 4.7

Week No. 13

Applications of differentiation – optimization; l'Hopital's rule and indeterminate forms

Reading: **JS**, Sections 4.4 & 4.7

Week No. 14

Course review