![CAMOSUN COLLEGE]	***School of Arts & Science*** ***MATHEMATICS DEPARTMENT*** **MATH 189-001** **Technical Mathematics 3** **2008Q1**

COURSE OUTLINE

1. Instructor Information

(a)	Instructor:	Raymond Lai	
(b)	Office Hours:	See the schedule below, or by appointment	
(c)	Location:	Centre for Business and Access (CBA) Room 152	
(d)	Phone:	370-4491	Alternative Phone:
(e)	Email:	lai@camosun.bc.ca	
(f)	Website:	http://lai.disted.camosun.bc.ca/	

	Monday	Tuesday	Wednesday	Thursday	Friday
07:30-08:20	Office Hour	Office Hour	Office Hour	Office Hour	
08:30-09:20					
09:30-10:20					
10:30-11:20	Office Hour	Office Hour	Office Hour	Office Hour	
11:30-**12:20**	Office Hour	Office Hour	Office Hour	Office Hour	
12:30-1:20	Math 189 (001) TEC 174	Math 189 (001) TEC 181	Math 189 (001) TEC 174	Math 189 (001) TEC 174	
1:30-2:20		Math 189 (001) TEC 181			

2. Intended Learning Outcomes

Upon completion of this course the student will be able to:

1. Use the Addition Rule and the Addition Rule for Non-disjoint Sets, the Multiplication Rule, factorials, permutations, and combinations in the statement and solution of counting problems.
2. Use the Addition Rule, Multiplication Rule, Contingency Tables, Probability Trees, and the Rules of Probability and of Conditional Probability to state and solve probability problems. Determine whether events are independent or dependent, and whether events are mutually exclusive.
3. Produce a stem and leaf plot, Pie Chart, Histogram, Frequency Polygon, Relative Frequency Polygon and Ogive for given data.
4. Find the Arithmetic Mean, Median, and Mode of raw data. Use the weighted mean formula to find the Arithmetic Mean. Use the probability formula $\overline{x} = \sum P(x) \cdot x$ to find the Arithmetic Mean of data represented in a frequency table.
5. Find the Population and Sample Variance and Standard Deviation of raw data, weighted data and data presented in a frequency table.
6. Apply the Empirical Rule or Tchebyshev's Theorem to make a table showing the expected percentage of scores, the actual number of scores, and actual percentage of scores which fall within one, two, and three standard deviations of the mean.
7. Use the Expected Value formula to find the Population and Sample Variance and Standard Deviation of weighted data, and of probability distributions. Determine the expected value in application problems.
8. Apply the Binomial Probability Formula to the solution of statistics problems. Determine the mean, variance, and standard deviation of any binomial Distribution. Determine when the Binomial Distribution is appropriate for the solution of statistics problems.
9. Calculate the mean, variance, and standard deviation of the Poisson distribution. Solve problems involving the calculation of Poisson probabilities. Identify when it is appropriate to use the Poisson distribution as an approximation to the binomial distribution, and under appropriate conditions, use the Poisson distribution as an approximation to the binomial distribution.
10. Use the Standard Normal Table to solve standard normal problems. Use z-scores to compare results from distributions with different means and standard deviations. Use the Standard Normal Table to solve non-standard normal problems by converting them to standard normal problems.
11. Determine a point estimate for the mean. For given sample or population data, determine 90%, 95%, and 99% confidence intervals for the mean. Use the Central Limit Theorem to estimate probabilities that means will be in certain intervals. Determine the size of a sample required for a given degree of confidence.
12. For given sample or population data, use standard chi-square tables to determine 90%, 95%, and 99% confidence intervals for the variance, and approximate confidence intervals for the standard deviation.
13. Determine a constant k so that y = kf(x) is a probability density function on the interval [c, d]. Use the expected value formulas to find the mean, variance, and standard deviation of a given continuous probability distribution. Solve problems that involve calculating probabilities using continuous, uniform, and exponential distributions. Develop and use the formulas for the mean, variance, and standard deviation of the uniform and exponential distributions.

14. Given (x, y) data points, determine the regression line (least squares line), and find and interpret the coefficients or correlation and determinations.
15. Given (x, y) data points, determine least squares curve of the form
$y = a + bf(x)$ or of the form $y = Be^{kx}$. Use least squares to fit linear, quadratic, and cubic curves to given data points. Use regression curves to predict future results.
16. Use the techniques of Separation of Variables and Integrable Combinations to solve linear first order and first degree DEs. Use the Linear Differential Equation of First Order formula to solve linear first order and first degree DEs.
17. Solve second order linear constant coefficient homogeneous and non-homogeneous DE's. State and solve elementary application problems involving second order linear constant coefficient homogeneous and non-homogeneous DE's.
18. Use eigenvalues to solve Systems of Linear First-Order Differential Equations.
19. Recognize and solve the second-order Euler equation by the auxiliary equations method and by the eigenvalue method.
20. Use Euler's Method and the Runge-Kutta Method to approximate the solution to DEs by numerical methods.
21. Use calculators and computers for solving equations and using applications as noted above.

3. Required Materials

(a)	Texts	Stats: Trushel, Peter J. and Chi-Ming Leung, *Intermediate Statistics*, Camosun College bookstore 2006. Wash: Washington, Allyn J., Basic Technical Mathematics with Calculus (Metric Version), 7th or 8th Edition, Addison-Wesley Publishing Company.
(b)	Other	***Recommended Calculator*** **Texas Instruments TI-89 or TI-89 Titanium**

4. Course Content and Schedule

Prerequisites   Math 187 or (Math 175 or Math 101 and Math 110)

Organization
In-class workload: 5 hours lecture per week
Out-of-class workload: 5-10 hours per week (or more for students with weak background)

First day of instruction: Monday 22 September 2008
Last day to drop quarter courses (Fee Deadline): Monday 6 October 2008
Last day to withdraw without a failing grade: Monday 10 November 2008
Last day of instruction: 5 December 2008
No class on: Monday 13 October 2008 (Thanksgiving Day), and
                 Tuesday 11 November 2008 (Remembrance Day)

Course Content

The course will follow the textbook fairly closely, covering the following topics:

Differential Equations

Hours	Reference (week)	Topic
1	Wash 30.1	Solutions of Differential Equations
1	Wash 30.2	Separation of Variables
1	Wash 30.3	Integrable Combinations
1	Wash 30.4	The Linear Differential Equation of the First Order
3	Wash 30.5	Elementary Applications
1	Wash 30.6	Second-Order Homogeneous Equations
1	Wash 30.7	Auxiliary Equations with Repeated or Complex Roots
2	Wash 30.8	Solutions of Non-homogeneous Equations
2	Wash 30.9	Applications of Higher-Order Equations
1	Notes	Euler's Equation
1	Notes	Euler Method
1	Notes	Runge-Kutta Method

Statistics and Probability Topics

Hours	Reference	Topic
2	stats 1	Counting Techniques
2	stats 2	Introduction to Probability
1	stats 3	Introduction to Statistics
2	stats 4	Pictures of Data
1	stats 5	Measures of Central Tendency
2	stats 6	Measures of Variation
1	stats 7	Interpretations of Standard Deviation
1	stats 8	Expected Value
2	stats 9	Binomial Distribution
1	stats 10	Poisson Distribution
2	stats 13	The Normal Probability Distribution
1	stats 14	Sampling Distributions, Point Estimates, Confidence Intervals for μ
2	stats 15	Sampling Distributions, and Confidence Intervals for Variance
1	stats 16	Continuous Probability Density Functions
1	stats 17	Linear Regression
1	stats 18	Non-linear Regression

5. Basis of Student Assessment (Weighting)

Assignment
- A list of suggested exercises from the textbook is provided at the end of this outline.
- Complete solutions will be posted online at the class's website. You can also find a copy of the solution guide on reserve in the library (it contains complete solution for both odd- and even-numbered exercises).

Term Tests
- There will be 5 term tests, one on each of the following weeks:

week 2	week 4	week 6	week 8	week 10
30 Sept	14 Oct	28 Oct	12 Nov	25 Nov

- Complete understanding of the examples discussed in class and the suggested exercises from the textbook will be essential for success on the term tests.
- Complete solutions will be posted online at the class's website.

Final Examination
- The final exam will cover the entire course and will be 3 hours long.
- As stated on page 34 in the current college calendar 2008 – 2009, "students are expected to write tests and final examinations at the scheduled time and place." Exceptions will only be considered due to **emergency** circumstances as outlined in the calendar. Holidays or scheduled flights are not considered to be emergencies.
- Final examination period December 8 – 12, 2008 (specific date, time, and location TBA)

The final grade will be calculated according to the following breakdown:

5 Term Tests	Final Exam.
$5 \times 10\% = 50\%$	50%

Note: For grade inquiry, email your request with your Camosun student ID no.

6. Grading System

Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at **camosun.ca** for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	*Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	*In progress*: A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. *(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)*
CW	*Compulsory Withdrawal:* A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services or the College web site at camosun.ca.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**.
It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services and on the College web site in the Policy Section.

How to do well in the course and where to get help
1. Do not skip classes.
2. Start working on the exercises as soon as we finish a section.
3. It is important to understand the principles involved rather than to memorize a method of solution – try variations of questions.
4. Studying in groups is an efficient way to learn mathematics; however, make sure you can solve problems yourself.
5. Extra help available from assistant at the Interurban Math Room: Technologies Centre (TEC) Room 142 (phone: 370-4492). This drop-in centre is freely available for your use to work on math homework and to seek help from the tutor on staff (see hours posted on door).

Suggested examples and exercises to practice from the texts. Practice as many exercises as you can (try at least one in every group in each section). Instead of reading examples in the text, try solving them yourself and compare your answers with the ones in the text.

(Chapter.)Section	Try at least one in each group (Eg for example and # for exercise)			
Wash 30.1	Eg1	Eg(3 ,4, 5), #(5, 9, 19, 21, 31)		
Wash 30.2	Eg(1, 3, 4), #(5, 11, 21, 25		Eg5, #(35, 37, 39)	
Wash 30.3	Eg1	Eg2, #(5, 7, 21)	Eg4, #13	
Wash 30.4	Eg(2, 3, 4), #(9, 13, 21, 25)		Eg5, #(31, 33	
Wash 30.5	Eg1, #(6, 7)	Eg2, #(10, 11)	Eg3, #(13, 16)	
	Eg4, #(30, 32, 34)		Eg5, #(35, 36)	Eg6, #(39, 40)
Wash 30.6	Eg(4, 5) #(7, 11, 17)		Eg6, #(25, 27)	#(29, 30, 31)
Wash 30.7	Eg(3, 7), #(24, 29, 35)		Eg8	
	Eg(4, 5, 6), #(13, 21, 33, 34)		#(31)	
Wash 30.8	Eg(2, 3, 4)	Eg(5, 6, 7),#(21, 23, 25, 27)		Eg8, #35
	Eg9, #(29, 31)			
Wash 30.9	Eg(1, 2, 3), #(11, 12)		Eg(4, 5), #17	Eg6, #(23, 24)
Euler's Equation	Eg(1, 2), #(1, 2, 4, 5, 9)			
Euler's Method	Wash P.991 Eg1, Handout Eg(1,2), Handout #(1, 2)			
Runge-Kutta Method	Wash P.992 Eg2, Handout #(1, 2)			
stats 1	Eg(1-1-1, 1-1-2), #4		Eg1-2-3	Eg1-3-1, #11
	Eg1-3-2	Eg1-4-1	Eg1-4-2	Eg1-4-3, #10
	Eg(1-5-1, 1-5-2)		Eg(1-6-1, 1-8-4)	
	Eg(1-8-3, 1-9-5)		Eg1-10-6	
stats 2	#(1, 3)	Eg(2-4-1, 2-6-4), #10	Eg2-5-2	
	Eg2-5-3	#(7, 11)	#(9, 13)	Eg2-9-1, #15
	Eg2-10-1			
stats 3	Eg(3-5-1, 3-6-2), #17			
stats 4	Eg4-2-2	Eg4-3-1, #9	Eg4-4-2	Eg4-5-1, #13
	Eg(4-6-2, 4-7-3), #3			
stats 5	Eg5-2-first,	Eg(5-3-1, 5-4-2), #17		Eg5-6-1
	Eg(5-7-2, 5-7-3, 5-7-4)		#(1, 3)	#19
stats 6	Eg(6-1-first, 6-1-second)		Eg(6-3-1, 6-3-2), #23	
	Eg(6-4-1, 6-5-2), #(9, 19)		Eg(6-7-1, 6-7-2), #17	
stats 7	Eg(7-1, 7-4-3, 7-5-4)	Eg(7-2-1, 7-3-2), #(3, 11)		#13
stats 8	Eg8-2-1, #5	Eg(8-3-3, 8-3-4, 8-3-5), #(11, 15, 17, 19)		
stats 9	Eg(9-1, 9-2)	Eg(9-4-1, 9-4-2, 9-5-3), #(1, 9, 11, 21, 25)		
	Eg9-5-4, #18	Eg9-6-2, #(6, 17)		
stats 10	Eg(10-3-1, 10-4-2), #4		#8	#(5, 14)
stats 13	Eg(13-2-first, 13-2-2 to 13-3-7), #(8, 13)			#(4, 5, 7)
	Eg(13-5-first, 13-5-2, 13-6-4 to 13-6-6), #(11, 19, 21, 24)			
stats 14	Eg14-3, #4	Eg14-4, #(2, 9)	Eg14-5, #(13, 20)	#16
stats 15	Eg15-3, #(1, 7, 10)			
stats 16	#(1, 7)	#(13, 17)	Eg(16-2-1, 16-3-1)	
	#8	Eg(16-3-2, 16-4-2)		#(9, 19)
stats 17	Eg(17-3-1, 17-4-2)		Eg17-8, #(2, 3, 5)	
stats 18	Eg(18-1-1, 18-5-3, 18-6-4), #(6, 11)			Eg18-1-2, #(1, 2)