CONCORDIA UNIVERSITY
FACULTY OF ENGINEEING AND COMPUTER SCIENCE
ENGR 233:   Applied Advanced Calculus - Winter 2015
Course web site: Meta Moodle

Instructor:
Contact Info:
Office Hours:
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Course objectives:

To ensure that students acquire the mathematical knowledge and skills needed in their engineering courses and to provide a basis for the more advanced techniques which are needed in subsequent years of their study program. Over the course span, students should master the necessary knowledge and skills to be able to solve mathematical problems at an appropriate level in: Vectors and vector functions; Functions of several variables; Parametric representation of curves and surfaces; Differential vector calculus; Integral calculus for vectors; Double and triple integrals; Line and surface integrals; Stokes' Theorem; Divergence Theorem; Applications in engineering including fluid dynamics, heat conduction, waves,…

At the end of this course, the student will be able to:
- Define and explain the concepts listed above
- Apply rules and techniques to solve problems
- Identify, formulate engineering problems into mathematical forms and solve them.

Textbook: *Advanced Engineering Mathematics:* D G Zill & W S Wright, Jones and Bartlett, 4th ed.

Evaluation	*Description*	*Weight*
Assignments	Assignments are posted on the course web site. However you do not hand in the solutions and they are not graded. The midterm test and final exam are based on the assignments and lectures.	**0 %**
Workshops/ Bonus quiz	To be held **during tutorial sessions**. Bonus quizzes may pop-up during the regular class time slots.	**15%**
Midterm Test	Tuesday **March 3, 2015 @ 8:30 PM** (Location TBA during class). A term test missed for any reason, including illness, cannot be made up. **If you miss the midterm test for a legitimate excuse, you will take an oral exam in the week following the midterm (do not get sick).**	**25%**
Final Exam	Date TBD. Additional information below	**60%**

NB: Final exam: Students are responsible for finding out the date and time of the final exam once the schedule is posted by the Examination Office. Any conflicts or problems with the scheduling of the final exam must be reported directly to the Examination Office, not to your instructor.

NB: NO CALCULATOR, NO BOOKS are allowed in test and final exam.
A formula sheet will be provided during the midterm test and final exam.

Class Attendance: Students are expected to attend all classes and tutorials and are responsible for any missed work. **Up to a 5% bonus points (to supplement tutorial workshop marks to bring them to the maximum 15%) will be awarded to all students who submit their pop-up quizzes during regular classes.**

Course outline

Wk	Theme	Reference	Assignment Problems*
1	7-1 Vectors in 2-Space 7-2 Vectors in 3-Space 7-3 Dot product	297-302 307-306 307-311	7-1: 21,30,50,31 7-2: 24,27,29,43,47 7-3: 12,15,17,21,31,39,41,45,46,48
2	7-4 Cross product 7-5 Lines and Planes in 3-Space	313-318 320-325	7-4: 3,13,41,44,45,47,48,51,52 7-5: 3,21,27,31,34,39,47,51,59,63
3	9-1 Vector functions 9-2 Motion of a curve 9-3 Curvature. Components of Acceleration	440-445 446-448 450-454	9-1: 1,4,5,8,24,25,26,27,29,33,35, 38,39,41,42,45 9-2: 3,5,9,11,13,14,18,19 9-3: 9,10,12,17,18,21,22,23,24
4	9-4 Partial Derivatives 9-5 Directional Derivative 9-6 Tangent Planes and Normal Lines	454-459 460-464 466-459	9-4: 2,3,6,9,15,21,24,26,27,33,34, 36,39,42,48,49,51,55 9-5: 3,6,12,14,15,18,24,27,28,33,41,43 9-6: 3,4,14,15,37,39,40
5	9-7 Divergence and Curl 9-8 Line Integrals (to be continued)	469-473 475-482	9-7: 7,9,11,13,15,21,24,27,30,32,37,40 9-8: 3,4,6,9,15,16,21,27,28,30,33,36,40
6	9-8 Line Integrals (end) 9-9 Independence of Path	475-482 483-492	9-8: 3,6,9,15,21,27,30,33,36,40 9-9: 3,6,15,18,21,24,26,27
	Term Test (Mon Mar 03,2014 @8:30pm)		Sections 7-1 through 9-9
7	9-10 Double Integrals	493-499	9-10: 5,9,15,18,21,24,27,33,36,39,42,45 62,65
8	9-11 Polar Coordinates 9-12 Green's Theorem	501-505 505-509	9-11: 3,6,11,12,24,27,29,30,33 9-12: 3,4,6,8,9,12,18,19,23,24,25,27
9	9-13 Surface Integrals 9-14 Stokes' Theorem	511-516 518-522	9-13: 3,6,15,18,30,33,36,37 9-14: 3,6,9,12,13,18
10	9-15 Triple Integrals del operator in cylindrical and spherical coord	523-531	9-15: 3,6,9,15,21,23,24,27,32,34,45,48, 51,54,57,69,72,75,78,81
11	9-16 Divergence Theorem	533-538	9-16: 3,6,9,12,15,17,18,22
12	9-17 Change of Variables in Multiple Integrals	539-545	9-17: 3,5,7,8,9,10,13,15,17,23,25,27
13	Miscellaneous & Review		9: 51,53,56,57,58

*Some of assignments will be discussed and reviewed in each tutorial.

Notes:
1. Your principal task in the course is to learn to solve the assigned problems. **Solving the assigned problems is vital to learning the course material**. The quizzes, class test and final exam are based on the assigned problems (tutorials, assignments, in-class examples, etc.).
2. **You are training to be a professional engineer**. Consequently, we expect you to behave like a professional. A professional engineer is polite, considerate and respectful of others. It is rude, inconsiderate, and disrespectful to your fellow students and to the professor to talk in class.   No one can learn if you are chatting to your neighbor!
3. Cell Phones are not allowed in the class room. You lose attendance points if you use a cellphone.
4. Computers are allowed if you use them for course materials. No surfing on the web, please.
5. **All Concordia University students must abide by the University's Academic Code of Conduct** (Concordia University Undergraduate Calendar Section 16.3.13). Any suspected violation of the Code will be turned over to a University Committee for investigation. No cheating in any way is tolerated. Penalties can be as severe as dismissal from the University.