Course Outline - FW 2018-19
The University of Western Ontario

1. Course Information

Course Name: Calculus 2503B, Advanced Calculus II.

Times and Location: Lectures M/W/F 13:30-14:30 in NS 7; Office Hour Th 08:30-09:20 MC 204 (Jan 10 to Feb 14), Fri 08:30-9:20 MC 204 (Mar 1 to Apr 5)

Pre-requisite Checking: To be enrolled in Calculus 2503B you must have achieved a minimum mark of 60% in Calculus 2502A. Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Dr. Geoff Wild, Associate Professor, Department of Applied Mathematics
Office: MC 255C
Email: gwild@uwo.ca (put "Calc 2503B" in the subject line)
UWO extension: 88784

3. Course Syllabus

Calendar Description: Integral calculus of functions of several variables: multiple integrals; Leibnitz' rule; arc length; surface area; Green's theorem; independence of path; simply connected and multiply connected domains; three dimensional theory and applications; divergence theorem; Stokes' theorem.

Learning Outcomes: By the end of this course you will be able to

- integrate real-valued and vector-valued functions of multiple variables in Cartesian, polar, cylindrical polar, and spherical polar coordinates as needed;

- apply the integration techniques you encounter to solve problems in other branches of mathematics and the natural sciences;

Expectations: The content of Calculus 2502A and its pre-requisites will be assumed. You will have mastered learning outcomes of these previous courses before enrolling in this one.

Tentative schedules of lectures and evaluations are provided below. Lectures will, among other things, provide you with more detailed learning outcomes, i.e. elaborations of the outcomes listed above. I recommend that you prepare for lecture beforehand by completing the corresponding textbook readings.

Evaluations will consist of a mix of Problem Sets, short In-Class Quizzes, and longer Examinations. My plan is to manage the evaluation of student performance using the Crowdmark software platform.

At a minimum, I expect that you (i) adhere to all academic and code-of-conduct policies set out by the university or described below, (ii) attend lectures, (iii) check the course OWL site (owl.uwo.ca) daily, (iv) complete all assigned readings and practice problems. Meeting these minimum expectations does not guarantee that you will pass the course.

Evaluations in Calculus 2503B and Calculus 2303B will occur concurrently and it is your responsibility to ensure you complete the appropriate evaluation. A student enrolled in Calculus 2503B who submits an evaluation meant for Calculus 2303B will be deemed to have missed said evaluation. In addition, no accommodation will be made for a student in Calculus 2503B who mistakenly begins an evaluation meant for students in Calculus 2303B.

4. Course Materials

Textbook: A copy of the 8th edition of *Multivariable Calculus* by James Stewart (published by Cengage) is required. The corresponding Student Solutions Manual is recommended.

Electronic Devices: To submit Problem Sets, you will require access to a cell phone or tablet equipped with a camera. Only the Sharp EL-510R(B) or the Sharp EL-510RN(B) scientific calculator will be permitted for In-Class Quizzes and exam, but neither will be required.

5. Methods of Evaluation

Total Course Grades: Calculation of total course grades will be based on grades received in each of four Problem Sets, each of two In-Class Quizzes, and each of two Examinations *provided you receive an aggregate passing grade on Examinations*. If your aggregate Examination grade is not at least 50%, then that aggregate grade will become your total course grade. For students who pass the Examination portion of the course, the total course grade will be calculated as follows:

In-Class Quiz 1	10	points	January 21
Problem Set 1	5	points	Due January 28 before 11:59 pm
Midterm Examination	20	points	Saturday February 9 (3 hrs), time and location TBA
Problem Set 2	5	points	Due February 15 before 11:59 pm
Problem Set 3	5	points	Due February 25 before 11:59 pm
In-Class Quiz 2	10	points	March 11
Problem Set 4	5	points	Due March 20 before 11:59 pm
Final Examination	40	points	April Exam Period (cumulative)
Total Course Grade	100	points	

Academic Accommodation: Requests for academic accommodation for any evaluation (or group of evaluations) that, together, contribute 10% or more to the total course grade must be made through the Office of the Dean for the student's home faculty. Typically, accommodation requests are not handled directly by the Dean, but are instead handled by the Academic Counsellors housed in the Dean's Office. The Academic Counsellors for students in the Faculty of Science can be found in NCB 280 (Tel. 519 661 3040, Email scibmasac@uwo.ca).

Students seeking accommodation on medical grounds are typically required to submit a completed Student Medical Certificate to Academic Counsellors. The certificate is available at

`http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf`

Other documentation associated with the request may be required, and students seeking any kind of academic accommodation should consult the university's Policy on Accommodation for Illness at:

`http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf`

Requests for accommodation for evaluations that contribute less than 5% of the total course grade will not be accepted. For Calc 2503B, this policy extends only to single Problem Sets. In particular, problems with electronic devices, computer issues, and difficulties related to internet access that ultimately lead to late submission of a Problem Set will not be accommodated.

Policy on Late Submissions: Any Problem Set received after the deadline will incur a penalty at a rate of 20% per day (including weekends and holidays). The deduction will be made on the total number of points available. E.g. a perfect Problem Set received no later than 24 hrs after the due date will receive 4 points, a Problem Set graded 75% and received no later than 24 hrs after the due date will receive 3 points, etc.

6. Additional Statements

Statement on Use of Electronic Devices: The only electronic devices whose use is permitted during In-Class Quizzes and Exams are the Sharp EL-510R(B) or the Sharp EL-510RN(B) scientific calculators. All other devices (e.g. music players, computers, cell phones, smart watches) are prohibited and cannot be accessible during In-Class Quizzes and Examinations. Sharing of permissible calculators during In-Class Quizzes and Examinations is also prohibited. Violation of any of these policies will be treated as an academic offence.

Statement on Academic Offences: Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

`http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf`

Additionally, computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Statement on Academic Support Services: Learning-skills counsellors at the Student Development Centre (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Statement on Mental Health: Students who are in emotional or mental distress should refer to Mental Health@Western

`http://www.uwo.ca/uwocom/mentalhealth/`

for a complete list of options about how to obtain help.

Statement on Accessiblity: Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

Date	Topic	Text	Practice Problems
Jan 7	Course Intro		
Jan 9	Double Integrals over Rectangles I	15.1	9, 11, 15-34 (odd)
Jan 11	Double Integrals over Rectangles II	15.1	35[†], 37-43 (odd), 44[†]
Jan 14	Double Integrals over General Regions I	15.2	1-9 (odd), 13, 15, 17-31 (odd)
Jan 16	Double Integrals over General Regions II	15.2	39, 45-55 (odd)
Jan 18	Double Integrals in Polar Coordinates	15.3	7-27 (odd), 29, 31, 35, 39, 40
Jan 21	In-Class Quiz on 15.1-15.3[*]		
Jan 23	Applications of Double Integrals	15.4	3, 11, 17, 27
Jan 25	Surface Area	15.5	1-11 (odd)
Jan 28	Triple Integrals I	15.6	3-21 (odd)
Jan 30	Triple Integrals II	15.6	39, 41
Feb 1	Triple Integrals in Cylindrical Polar Coordinates	15.7	17-27 (odd)
Feb 4	Triple Integrals in Spherical Polar Coordinates	15.8	25-37 (odd), 41, 43, 48
Feb 6	Change of Variable in Mult Integrals I[†]	15.9	1, 3, 11, 13
Feb 8	Change of Variable in Mult Integrals II[†]	15.9	15-27 (odd)
Feb 11	Vector Fields[‡]	16.1	
Feb 13	Line Integrals I	16.2	1-15 (odd)
Feb 15	Line Integrals II	16.2	17-21 (odd)
Reading Break			
Feb 25	Fund Theorem for Line Integrals I	16.3	3, 5, 7, 11, 13
Feb 27	Fund Theorem for Line Integrals II	16.3	3, 21, 23, 35
Mar 1	Green's Theorem I	16.4	1, 3, 5-13 (odd)
Mar 4	Green's Theorem II	16.4	19, 27
Mar 6	Curl and Divergence[‡]	16.5	1-7 (odd), 9-12, 13, 15, 23, 25, 27
Mar 8	Parametric Surfaces and Their Areas I	16.6	7-11[†] (odd), 19-25 (odd), 33, 35
Mar 11	In-Class Quiz on 16.3-16.5[*]		
Mar 13	Parametric Surfaces and Their Areas II	16.6	39-49 (odd)
Mar 15	Parametric Surfaces and Their Areas III	16.6	
Mar 18	Surface Integrals I	16.7	5-19 (odd)
Mar 20	Surface Integrals II	16.7	21-31 (odd)
Mar 22	Surface Integrals III	16.7	39, 47
Mar 25	Stokes' Theorem I	16.8	3, 5, 7, 9, 11[†]
Mar 27	Stokes' Theorem II	16.8	13, 15, 19
Mar 29	Stokes' Theorem III	16.8	
Apr 1	The Divergence Theorem I	16.9	1-13 (odd)
Apr 3	The Divergence Theorem II	16.9	25-31 (odd)
Apr 5	The Divergence Theorem III		
Apr 8	Leibnitz' Rule [†]		

[*]topics covered by In-Class Quiz are tentative   [†]Calculus 2503B, [‡]Calculus 2303B