Faculty of Science | Department of Mathematics and Statistics
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Course Outline
Math 101: Calculus II

Welcome to Math 101: Calculus II. The objective of this course is to acquire more tools from calculus that will be useful in your future careers in math, engineering, economics, physics, or any other science. We want to train you to become competent and confident experts in the art of problem solving. It may seem like there are a lot of formulae to remember, but it is easy to do if you **understand** how they work, and have sufficient practice in applying them. Thank you, and we wish you a productive and rewarding term.

Instructors

Tom (William) Thompson   **Office:** DTB A553   **Email:** `wthompso@uvic.ca`

Office Hours and Assistance

Office Hours TBD

Drop-in Help The Mathematics & Statistics Assistance Centre is a welcoming space where students can go to work, on their own or in groups, and to discuss math & stats problems. The Centre is staffed with talented Teaching Assistants who are happy to discuss primarily first and second year course material with you. Please see `http://www.uvic.ca/science/math-statistics/current-students/undergraduate/msac/` for more information.

Math Club Students in Undergraduate Mathematics and Statistics (SUMS) was founded in 2014 as the reincarnation of a previous undergraduate course union that had been inactive for a few years. Please see `http://www.uvic.ca/science/math-statistics/current-students/undergraduate/sums/index.php` for more information.

General Course Information

Number of Units 1.5

Pre-requisites MATH 100 or MATH 109, or permission of the department.

Grade in Calculus I If your grade in Math 100 or 109 is less than $C+$, statistics show that with 95% probability your grade in Math 101 will be F. If you intend to succeed in Math 101 course this term, you need to drastically change your learning approach, and to focus on fixing your existing weaknesses from Pre-Calculus and Calculus I.

Learning Objectives

By the end of the semester, you will have learned many integration techniques, but being able **to perform each individual technique** is not enough to successfully complete this course. It is also crucial to learn how to determine **when to use each technique**. You

will learn several applications of the integral by finding volume of solids, arc-length of curves, and solving exponential growth and decay problems. Can you find all values of t that satisfy the equation $t^3 = -8$? We will learn how to find all three **distinct** solutions to this equation using complex numbers. In this course, we will learn about parametric equations. This is something that helps model a large variety of scenarios we encounter in many of the sciences. We will learn what these equations look like and how to do some familiar calculus with these types of equations. Our final unit of the course will be looking at infinite sequences and series (which are infinite lists of numbers and an infinite sum of numbers). We will learn what it means for these things to converge and diverge, and we will learn a variety of tests to check this. Again, much like integration techniques, we will learn these tests separately but the main goal is to learn when it is appropriate to apply each test.

Course Material and Online Resources

Textbook *Thomas' Calculus Early Transcendentals, 14th Edition*, Weir and Hass, published by Pearson/Prentice Hall. If you do not have a MyMathLab code from the previous term, you may purchase a print copy of the textbook packaged together with access to MyMathLab (see below) from the UVic bookstore. If you do not want a print copy, you are not required to purchase one – MyMathLab comes with an e-book version of the textbook.

MyMathLab (MML) This is a required tool, which you will use to study the material and complete weekly assignments. If you purchased the text bundled with access to MML then you do not need to purchase an MML access code. If you did not purchase a new print copy, then you must purchase an access code to MML separately. MML access codes are available at the UVic bookstore. MML comes with an e-book version of the text and an e-book version of the Student's Solution Manual. You may access MML for a free 14-day trial if you are not yet ready to purchase it; as long as you eventually purchase access your work and scores will be preserved. **If you have purchased the MML access code for Math 100 less than 15 months ago, it still works and can be used in Math 101, and Math 200**. If you are repeating Math 101 course and if you are experiencing difficulty adding new MyMathLab course, use 14-day trial option to start working on your assignments, and email your lecture instructor immidiately for the solution to the problem.

Instructor's Solution Manual This contains full solutions to almost all problems in the textbook, even and odd. Copies of the manual are available in the Math and Stats Assistance Centres.

Course webpage The course webpage is on `http://coursespaces.uvic.ca`. I will make frequent use of CourseSpaces to post course announcements, answer student questions, and record student grades. It is your responsibility to read announcements posted on CourseSpaces. If you do not have regular access to your own device that can access CourseSpaces, you can use one of the many computers available to students on campus.

Calculator If a calculator is allowed in tests and examinations in a course offered by the

Department, then the only acceptable calculator is the Sharp EL-510R or the Sharp EL-510RNB. It may be purchased at the UVic Bookstore or elsewhere for about $13. A calculator **is** permitted in this course.

Class Meetings

Lectures There are two sections of Math 101 that meet concurrently the following time:

Section A01/A02: MWTh 2:30 pm - 3:20 pm ECS 123

Prepare for each lecture by briefly reading the relevant section of the textbook; this should take only 10 - 15 minutes. You do not need to understand everything, but you will get much more out of lecture if you are already familiar with the relevant definitions. Attendance in lectures is expected, except in the case of illness, accident, family affliction, or religious observation. You should take notes during lecture; they will not be provided for you.

Tutorials All tutorials meet on Tuesdays, but your time depends on your tutorial section. Tutorials are mandatory supplements of the lectures. You will spend a portion of each tutorial working with the tutorial TA on one or two worksheet questions related to the previous week's lectures, and spend the remaining portion of each tutorial working in small groups on the worksheets. Your tutorial TA will facilitate your group's discussion by assigning the groups, asking probing questions, giving hints, occasionally answering questions (sometimes with another question), and having groups explain solutions to each other. You will submit your handwritten complete detailed solutions to these worksheets the following week by uploading them on CourseSpaces, so participate actively in your tutorials in order to maximize the amount of assistance you get. You must attend the tutorial for which you are registered, as the tutorial TA will take attendance at each tutorial, and 2% of your course grade will be based on your attendance.

Evaluation and Grading

Your final percentage grade will be computed according to the following scheme.

Components	Dates	Weights
Take-home MML Quizzes	Most Weeks	8%
Tutorial worksheets	Most Tutorials	7%
Tutorial attendance	Most Tutorials	2%
Midterm 1 (in lecture)	May 30	19 %
Midterm 2 (in lecture)	July 4	19 %
Final Examination	TBA	45%

Grading Percentage scores will be converted to letter grades according to the university-wide standard table (`http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/grading.html`).

Online Homework/Quiz Online homework will be assigned through the MyMathLab system. Each week you will have a collection of homework questions posted on My-MathLab that relates to material recently covered in class. This work is not for marks, but you must earn a minimum grade of 75% on the homework before you will be given an access to the corresponding online take-home quiz (which is for marks). The on-line quiz will consist of few questions to be completed at home before the posted due date. Each question on the quiz will be of the same difficulty level as questions in the corresponding homework. You are expected to complete the quiz on your own without any outside assistance.

Homework is due at 10:59pm on Sundays, and the amount of time needed will vary greatly by student. The corresponding 30-minute-long quiz is due on the same day at 11:59pm. Each assignment will be available for at least a week, so you should start it several days before it is due. The purpose of the homework is to practice your skills, with instant feedback so you can gauge your own level of understanding. For most problems, you will be able to attempt it an unlimited number of times, and you will have access to the "Help Me Solve This" and "View An Example" buttons. You are also free to get help from other students, the Math & Stats Assistance Centre, and the instructors' office hours. The purpose of the quiz is to provide you with a formative feedback about your internalization of the studied material, in preparation for the upcoming examinations. All quizzes will be equally weighted. Your lowest quiz score will be dropped. Notice that you can continue to work on assignments after they are due, but will not have an access to the quizzes after they are due. "Getting Oriented" homework must be completed to unlock the rest of the homework assignments.

Tutorial assignments During most tutorials, you will be given a new tutorial worksheet to work on this week. Because your tutorial TA will take attendance, you must attend the tutorial for which you are registered. You may work with other students during the tutorial, but **the final product you submit for marking on CourseSpaces must be your own work**. Talk to your tutorial TA if you are uncertain about how much collaboration is permitted. Each solution to the assigned tutorial worksheet must be uploaded on CourseSpaces before next Monday, 12:00 noon, without acceptions.

Your lowest tutorial assignment score will be dropped, and nothing is due in the first tutorial (May 15).

Midterms Each midterm is 50 minutes long, to take place in your lectures, as indicated in the table above. Your midterms will be returned to you in your tutorial (check your tutorial section number on MyPage).

Final Examination Off-schedule final examinations (i.e. deferred examinations) are given only in accordance with the university policy as outlined in the Calendar. If you are unable to write a final examination due to illness, accident or family affliction, please refer to the following webpages for detailed instructions how to proceed: `http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/concessions.html` and `http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/exams.html`. Students are **strongly advised not to make plans for travel or employment**

during the final examination period as special arrangements will not be made for examinations that conflict with such plans.

Supplemental Examinations. The Department of Mathematics and Statistics does not award 'E' grades or offer Supplemental Examinations in any of its courses.

Accessibility Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach your instructor and/or the Centre for Accessible Learning (CAL) as soon as possible. The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations `http://www.uvic.ca/services/cal/`. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Commitment to Inclusivity and Diversity The University of Victoria is committed to promoting, providing and protecting a positive, supportive and safe learning and working environment for all its members.

Policies and Ethics

Specific to Math 101:

Missing midterms No midterm extensions or make-ups will be offered. If you are unable to write a midterm due to serious illness then you must provide adequate documentation to your lecture instructor as soon as possible, if a student misses one midterm test with a justification then their missing midterm mark will be redistributed between the final exam and the rest of their course work without exceeding a total of 60% on the final exam. If you miss two midterms for valid reasons with appropriate documentation, you will need to meet with your instructor to discuss your course work reweighting.

Missing homework/quiz No homework/quiz extensions or make-ups will be offered. If you are unable to complete a homework assignment and/or quiz due to technical difficulties then that quiz will be the quiz that is dropped. If you are unable to complete a homework assignment and/or quiz due to serious illness or religious observance, then you must provide adequate documentation to your lecture instructor as soon as possible, and the quiz will be excused. The instructor reserves the right to deduct up to 10% from the midterm mark for any student who misses one homework/quiz (tutorial or tutorial assignment) before that midterm, without justification.

Missing tutorial and tutorial assignments If you are unable to attend a tutorial due to serious illness or religious observance then you must provide adequate documentation to your tutorial TA as soon as possible. If you unable to complete the tutorial worksheet due to serious illness, then you must provide adequate documentation to your lecture instructor as soon as possible, and the tutorial assignment will be excused. A student missing more than one tutorial or tutorial assignment before the midterm might not be allowed to write that midterm.

Re-mark requests If you believe that your midterm has been incorrectly marked, you must write a short (at most 1 page) explanation and staple it to the front of your midterm. This request must be submitted to your course instructor **in lecture** no later than the Monday after midterms are returned to you. Late re-mark requests, or requests submitted outside of lecture, will not be considered except in the case of absence due to serious illness or religious observance.

Departmental Policies:
(See `https://www.uvic.ca/science/math-statistics/current-students/undergraduate/course-policies/index.php` for more information.)

Attendance The university Calendar states 'Students are expected to attend all classes in which they are enrolled.' (see `http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/attendance.html`). Our courses are conducted on that basis. If you miss an announcement (information concerning midterms, corrections to assignment, etc.) because you did not attend class, you must accept the consequences of not having learned of the change.

Guidelines on Religious Observances Where classes or examinations are scheduled on the holy days of a religion, students may notify their instructors, at least two weeks in advance, of their intention to observe the holy day(s) by absenting themselves from classes or examinations. Instructors will provide reasonable opportunities for such students to make up work or missed examinations.

Academic Integrity Academic integrity is intellectual honesty and responsibility for academic work that you submit individual or group work. It involves commitment to the values of honesty, trust, and responsibility. It is expected that students will respect these ethical values in all activities related to learning, teaching, research, and service. Therefore, plagiarism and other acts against academic integrity are serious academic offenses.
The responsibility of the institution
Instructors and academic units have the responsibility to ensure that standards of academic honesty are met. By doing so, the institution recognizes students for their hard work and assures them that other students do not have an unfair advantage through cheating on essays, exams, and projects.
The responsibility of the student
Plagiarism sometimes occurs due to a misunderstanding regarding the rules of academic integrity, but it is the responsibility of the student to know them. If you are unsure about the standards for citations or for referencing your sources, ask your instructor. Depending on the severity of the case, penalties include a warning, a failing grade, a record on the students transcript, or a suspension.
It is your responsibility to understand the University's policy on academic integrity: `http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/academic-integrity.html`

How to Succeed in This Course

Visit CourseSpaces There is a forum set up for class discussion, which the instructors will monitor fairly regularly. Feel free to *answer* questions there as well as ask them; the instructors will chime in if we spot any errors. If you have a question about course policies, it is almost certain to be answered in an announcement (or this course outline) – so please check before emailing!

Check your progress Read the feedback your TA gives you on your tutorial assignments – that is a good indication of how your midterm solutions would be marked. Keep an eye on the CourseSpaces grade book to see your current expected grade in the course.

Email the instructors If you have not yet learned the value of being wrong, you might find it uncomfortable to ask a question publicly. You can always email the instructors instead. Due to the number of students enrolled in each lecture, if you ask a question whose answer already appears in the Course Outline or in a post on CourseSpaces we will probably just send you a link. Our reply time will of course depend on many factors. Please be aware that we might keep very different hours than you do! If you will see your instructor in the next 48 hours, you might get a faster reply by asking your question in person.

Set up your MML account Please do not wait to get your MML account set up. Some basic setup advice is available on our CourseSpaces page, as well as information about how to get advanced troubleshooting assistance. If you do not have regular access to your own device that can access MML, you can use one of the many computers available to students on campus. You might need to enable both cookies and pop-ups in order for MML to work properly. Be aware that because of all the help available to you on MML homework, a score of less than **90%** is alarming – if you make use of all the available assistance and enter your answers carefully then you should be able to solve nearly all of the problems correctly.

Use the MML Study Plan The Study Plan in MyMathLab is customized to you – if there's a section that is giving you trouble then go work through the Study Plan for that section. You can quiz yourself (as many times as you like; there is no penalty for failing the Study Plan quizzes) to see if you have mastered the material.

Start preparing early Homework is due on Sundays, but you can (and *should*) start it several days before that. If you are able to maintain a constant moderate level of work then you will not have intense weeks that are hard to keep up during. Begin reviewing for the midterms a week or two ahead of time, by re-working tutorial worksheets and homework assignments.

Important administrative dates in Spring 2018

- Classes begin: May 7, 2018

- Victoria Day: May 21, 2018

- Fee Deadlines and Drop Dates:

    - Last day to drop with 100% fee reduction: May 19, 2018
    - Summer term fee deadline: May 31, 2018
    - Last day to drop with 50% fee reduction: June 9, 2018
    - Last day to drop: July 4, 2018

- Reading Break: July 2-3, 2018

- BC Day: August 6, 2018

- Last day of classes: August 3, 2018

- Examination period: August 7 - 21, 2018

Suggested Problems

Section	Fourteenth Edition
6.1 Volumes Using Cross Sections	1-63 odd
6.2 Volume Using Cylindrical Shells	1-43 odd, 46-50 all
6.3 Arc Length	1-15 odd, 17(a,b only)-23(a,b only) odd, 25-29 all, 37
7.1 The Logarithm Defined as an Integral	1-51 odd; After Ch.6: 53, 54, 55, 56
7.2 Exponential Change and Separable Differential Equations	1-49 odd
7.3* Hyperbolic Functions	1-81 odd, 82, 84-86 all
8.1 Using Basic Integration Formulas	1-45 odd, 51, 53; After Sect.6.3: 46, 47, 48
8.2 Integration by Parts	1-57 odd, 77-81 odd; After Ch.6: 59-64 all; After Sect.7.3: 83, 84;
8.3 Trigonometric Integrals	1-67 odd, 72, 76; After Ch.6: 69, 71, 74, 75
8.4 Trigonometric Substitutions	1-57 odd, 58, 59(a), 61, 63; After Ch.6: 60, 62, 64
8.5 Integration of Rational Functions by Partial Fractions	1-71 odd, 74; After Ch.6: 73
8.8 Improper Integrals	1-71 odd, 75, 79; After Ch.6: 73, 76(a), 77, 78
Appendix 7 Complex Numbers	see page AP-34, exercises 1-23 odd, 26, 28, 29, 30
10.1 Infinite Sequences	1-109 odd, 114, 117-141 odd
10.2 Infinite Series	1-99 odd, 100
10.3 The Integral Test	1-47 odd, 50, 51-57 odd
10.4 Comparison Tests	1-55 odd, 59-62 all, 67-72 all
10.5 Absolute Convergence; The Ratio and Root Tests	1-67 odd
10.6 Alternating Series and Conditional Convergence	1-81 odd, 88-91 all
10.7 Power Series	1-57 odd, 62, 63
10.8 Taylor and Maclaurin Series	1-41 odd, 42
10.9 Convergence of Taylor Series	1-47 odd, 48
10.10* Applications of Taylor Series	1-53 odd, 66-69 all, 71
11.1* Parameterizations of Plane Curves	1-43 odd, 49
11.2* Calculus with Parametric Curves (No Areas of Surfaces of Rev.)	1-29 odd, 41-44 all
11.3 Polar Coordinates	1-67 odd, 68
11.4 Graphing Polar Coordinate Equations	1-31 odd
11.5 Areas & Length in Polar Coordinates	1-31 odd

Note: Sections marked with the ***** will be covered in this course if time permits to do so in all lecture sections of the course.

All material covered in lectures, tutorials and in the recommended questions is expected to be included in the Midterm and Final Examinations.

Course Schedule (subject to change)

Week of	Topics	Important Dates
7/5/18	Review: Antiderivatives Section 8.1: Basic Integration Formulas Section 6.3: Arc-length (AL, perfect square)	Mon May 7 - first day of classes No tutorial this week
14/5/18	Section 7.1: Logarithms & Exponents Section 8.2: Integration by parts	Tutorial (Section 7.2: Exponential Change)
21/5/18	Section 8.3: Trig Integrals Section 8.4: Trig substitutions (revisit AL)	Tutorial (worksheet is due)
28/5/18	Section 8.5: Partial Fractions **Midt#1:** Wed May 30 Sections 10.1: Infinite Sequences	Tutorial (worksheet is due) *Tested 6.3, 7.1, 7.2, 8(1-3)*
4/6/18	Section 8.8: Improper Integrals Sections 10.2: Infinite Series	Tutorial (worksheet is due)
11/6/18	Sections 10.3: Integral Test Sections 10.4: Comparison Tests Section 10.5: Ratio and Root Tests	Tutorial (worksheet is due)
18/6/18	Appendix 7: Complex Numbers Sections 11.1* & 11.2*: Parametric Curves	Tutorial (worksheet is due)
25/6/18	Section 11.3: Polar Coordinates Section 11.5: Area in Polar Coordinates	Tutorial (Section 11.4: Graphing Polar Coords.; worksheet is due)
2/7/18	No lecture on Monday **Midt#2**: Wed July 4 Section 10.6: Alternating Series Test	Reading Break July 2-3 No tutorial on Tuesday *Tested 8.4,8.5,8.8,10(1-5),11(1-5)*
9/7/18	Section 10.7: Power Series Section 10.8: Taylor / Maclaurin Series	Tutorial (worksheet is due)
16/7/18	Section 10.9: Convergence of Taylor Series Section 10.10*: Applications of Taylor Series	Tutorial (worksheet is due)
23/7/18	Section 6.1: Volume; Cross-Sections Section 6.2: Volume; Cylindrical Shells	Tutorial (worksheet is due)
30/7/18	Section 7.3*: Hyperbolic Functions	Tutorial (worksheet is due)
Exam Period	7/8/18 – 17/8/18	Final exam date TBD

Note: Sections marked with the ***** will be covered in this course only if time permits to do so in all lecture sections of the course. All material covered in lectures and tutorials can be included in the Final Examination.