

Course Outline
Applied Mathematics 1201b
Calculus and Probability with Biological Applications
Winter 2019

Instructor

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Office Hours: Check tpattend.youcanbook.me weekly!

Course Summary

Differential Equations: modelling, equilibria, separable equations.

Fundamentals of Linear Algebra: vectors, matrices, eigenvalues.

Systems of Differential Equations: homogenous and non-homogeneous systems.

Introductory Probability: discrete and continuous random variables.

*Mathematical Biology Applications:*¹ game theory, population genetics, disease modelling, more.

Lectures

MWF – 12:30pm - 1:30pm, NCB101

Help Centre Hours

In lieu of weekly tutorials, this course will feature *drop-in* sessions four days a week. The AM1201 Help Centre will run **Tuesday through Friday** from 3:30pm - 5:30pm in MC204. Help Centre will commence on *Thursday, January 10th, 2018*.

Requirements

Prerequisite(s): One or more of Calculus1000A/B, 1100A/B, 1500A/B or Math1225A/B.

Note: You must have passed Calc1000 to get credit for AM1201b. No exceptions will be made.

Antirequisite(s): The former Calculus1201A/B.

Textbook

Required: *AM1201 Course Manual* by T. Pattenden, & L.M. Wahl.

This textbook was written as a set of *pre-populated notes* and will be used in lectures. We will fill in blanks, examples, and more as we go through the course material. Practice problems are also included in this text, with solutions to be posted on OWL throughout the course. The problems in the textbook will be considered sufficient practice of course material. A **free PDF** of the manual will be available through OWL, however the Bookstore will have hardcopies available for purchase.

Previous Text: *Biocalculus: Calculus, Probability, and Statistics for the Life Sciences (Custom Edition)* by J. Stewart and T. Day.

This book was used previously in the course, and has excellent practice problems and has some supplementary descriptions of topics covered in our course. It is not necessary for you to acquire a copy, but may be helpful as an extra tool for studying for tests and assignments.

¹If time permits.

Evaluation

Weekly MapleTA Assignments	10%
Term Test #1 (January 27th, no make-up)	20%
Term Test #2 (March 2nd)	20%
Final Examination (scheduled by registrar)	50%

Who Should Take This Course?

This course was designed because many students in the biological sciences at Western take Calculus1000, and then one other half course which is their final course in mathematics. AM1201b pulls together small pieces of four other math courses (Calculus, Linear Algebra, Differential Equations, and Probability) that are especially relevant and useful in biology and medicine. However, AM1201b does not cover enough material in these areas to serve as a prerequisite for further courses in mathematics. **If you might be interested in taking further courses in mathematics, you should not take AM1201b.** Also, if you have already taken a course on Linear Algebra or Differential Equations, you should not take AM1201b.

Assignment Logistics

Assignments will be administered through the on-line application MapleTA. Students are expected to register through Maple TA (see OWL for registration details), and complete assignments through this application. **Students will need to purchase MapleTA before Reading Week, otherwise they forfeit their assignment mark.** MapleTA will cost each student \$25.00 (+ HST).

A “pre-assignment”, worth no marks, will be “due” on January 13th, 2018 at 11:00pm. The pre-assignment is designed to allow you to practice various problems you may encounter on future assignments. It is also assigned to ensure you have access to and can use the application without any problems. After the pre-assignment, all other assignments will be due weekly through Maple TA (subject to change due to Reading Break and/or other holidays – see OWL announcements for details). The **lowest assignment grade** for each student will be dropped. There are absolutely no make-up assignments or extra work to make up for missed assignments.

Computers in the “GenLabs” on campus are able to access Maple TA and assignments can be easily done there. You are welcome to use your own computer as well, however **computer problems** or **internet problems** will not be accepted as a reasonable excuse for missing a deadline. If you use a non-Western computer, **you do so at your own risk.** Therefore, it is not recommended you leave assignments to the last minute!

Additional Notes

Examination Structure: Examinations will be constructed such that (approx) 75% of the evaluation will be four-option multiple choice problems, where students will answer on instructor provided sheets. The other (approx) 25% of the examination will consist of one or two *hand-written* problems, where students are expected to show their steps and demonstrate their ability to do the mathematics taught in class. Topics for each term test will be announced in lecture and on OWL. Topics will be weighted appropriately to the amount focused on in lecture. The practice problems at the end of each section of the course manual will be the best guide for your studying. The final examination will be cumulative of all topics taught in the course. All examinations will be marked and released to students via Crowdmark (details on OWL).

Students that wish to see their examination in person must attend the instructor office hours.

Practice, practice, practice: The material in this course is really fun and challenging, but it builds quickly. Practice problems will be available at the end of each section of the course manual, and it is recommended you complete them all. It is best if you book fixed times in your weekly schedule to work on AM1201b practice problems.

Taking notes: Although the course manual is structured in a pre-populated format, completed notes will not be available on OWL. Research shows that taking handwritten notes during class is the best way to “absorb” the material. If you miss a lecture, you can get notes from a friend or colleague in the course.

Working together: Working in pairs or groups, talking about problem solving strategies and studying together is encouraged. The real reason we have weekly assignments in this course is **not** assessment, but rather to give you incentive to keep up with the material!

Hardware: We will use the standard Faculty of Science policy and standard Faculty of Science calculators for both term tests and the final examination. To quote the Faculty of Science guidelines: “The Sharp EL-510R(B) or Sharp EL-510RN(B) are the only calculator models permitted during exams. All other brands and Sharp models will be confiscated. Proctors and instructors for tests and exams do not lend calculators. It is your responsibility to bring the correct calculator and to ensure that it is in proper working order. Its not a bad idea to bring a spare calculator of the same model! The sharing or exchanging of calculators during tests or exams is strictly forbidden. Aside from the specified calculator, no other electronic devices (phones, iPods, etc.) may be in your possession during exams, even for timekeeping purposes.”

Extra help: There will be many hours each week during which you can obtain one-on-one extra help on course material. The drop-in Help Centre will run at regular times each week. A document listing times and locations for this extra help is available under “Resources” on OWL. Private tutors are also available; search for the “Tutor Referral Service” or “Private Tutor List” at Western.

Need to miss the tests or final? There will be no make-ups for the first term test; instead, the mark will be re-weighted to the second term test. Course instructors in the Faculty of Science are not allowed to approve accommodation for course requirements that are worth more than 10% of any final grade. **Therefore, permission to miss an exam, for either the term tests or final, must be obtained from the Academic Counsellors in your faculty. Talk to the counsellors first.** After you talk to them, they will email the permission to the instructor. The course coordinator will then contact you to confirm re-weighting (term test #1) or to confirm the date and time for the make-up (term test #2 and the final). **If you miss the deadline for accommodation,** we cannot administer any extra accommodation during regular exam times. It is your responsibility to ensure you receive your accommodation by the correct deadlines set by Academic Counselling.

University Policies

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. Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help. Additional student-run support services are offered by the USC, <http://westernusc.ca/services>. The website for Registrarial Services is <http://www.registrar.uwo.ca>.

Accessibility: 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.

Code of Student Conduct: To foster a supportive and enriching academic environment that is conducive to learning and free inquiry, Western has a Code of Student Conduct (<http://www.uwo.ca/univsec/pdf/board/code.pdf>). You can expect your instructor to promote this environment and also respect each students unique views and opinions. Because Western is also a part of your environment, we expect the same from you. Activities that disturb another students right to this environment will not be tolerated; these include talking in class about matters irrelevant to the course and using electronic devices inappropriately. You can also expect your instructor to come prepared, on time, and eager to help you learn. In turn, we expect that you will come prepared, on time, and ready to learn.

Academic Dishonesty: Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf. 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.

Illness when writing exams: It is Faculty of Science policy that a student who chooses to write a test or exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress after the fact will not be considered. In AM1201b, there is no opportunity for a reweight of the other course components after the test or exam has been written. Arguing “I did not want to write a heavily weighted final is not a valid reason for writing the midterm test while ill. If you are ill, obtain medical documentation (see below) and do not write.

Missed Course Components: If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation **to the Academic Counselling Office of your home faculty** as soon as possible. If you are a science student, the Academic Counselling Office of the Faculty of Science is located in WSC 191, and can be contacted at 519-661-3040 or scibmsac@uwo.ca. Their website is http://www.uwo.ca/sci/undergrad/academic_counselling/index.html. A student requiring academic accommodation due to illness must use the Student Medical Certificate (https://studentservices.uwo.ca/secure/medical_document.pdf) when visiting an off-campus medical facility. For further information, please consult the universitys medical illness policy at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

Missed Midterm or Final Exam: If you miss the midterm, and if your facultys Academic Counselling Office has approved your circumstances, then you may write the makeup midterm which will be available during the week after the midterm. If you are unable to write the make-up, the weight of the midterm will be shifted to the Final Exam. There are no other possibilities or re-weightings. In particular, to remain fair to other students, it will not be possible to shift more weight onto the assignment component of the course. If you miss the Final Exam, contact your facultys Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam). You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

Equal Opportunity and Evaluation Policy: The university is committed to academic integrity and has high ethical and moral standards. All students will be treated equally and evaluated using the criteria presented in this course outline and their respective weights. The evaluation criteria are based strictly on actual achievement, not on effort. Claims of an excellent academic history, of attendance in the course components, or of personal issues (family, relationship, financial, etc.) cannot be used to justify a higher grade in the course because they are not criteria for evaluation. There is no extra work available for extra credit or to “make up” another grade. We do not offer any extra assignments, essays, problem sets, or other work of any kind to any student. The requirement for a higher grade in order to, for example, maintain a scholarship, enter a program, or obtain a higher GPA for various reasons, is not a justifiable reason for increasing your grade. If we increased or “bumped your grade (i.e. gave you a grade that you did not legitimately earn), it would be unfair to the other students and also a great disservice to the scholarships and programs who are evaluating all students on the basis of their grades. This means, for example, if you receive 58% in the course we will not “bump” your grade to a 60%; you will simply need to take the course again if you need 60%.

Tentative² Schedule of Course Material

WEEK OF...	TOPICS COVERED	ASSESSMENT(S) DUE & OTHER NOTES
January 7	§1.1 - §1.2	Maple TA Assignment #0 (Jan 11)
January 14	§1.3 - §1.5	Maple TA Assignment #1 (Jan 20)
January 21	§1.6 - §1.8	Term Test #1 (Jan 27) & Maple TA Assignment #2 (Jan 28)
January 28	§2.1 - §2.3	Maple TA Assignment #3 (Feb 3)
February 4	§2.4 - §2.6	Maple TA Assignment #4 (Feb 10)
February 11	§2.7 - §2.8	NO CLASS FEB 15
February 18	READING BREAK	Maple TA Assignment #5 (Feb 25) <i>Note the one day delay due to the reading break</i>
February 25	LinAlg Review + §3.1 & §3.2	Term Test #2 (Mar 2)
March 4	§3.3 - §3.5	Maple TA Assignment # 6 (Mar 10)
March 11	§3.6 + §4.1 - §4.2	Maple TA Assignment #7 (Mar 17)
March 18	§4.3 - §4.5	Maple TA Assignment #8 (Mar 24)
March 25	§4.6, §4.7 & §5.1	Maple TA Assignment #9 (Mar 31)
April 1	§5.2 & §5.3 + Review	Maple TA Assignment #10 (Apr 7)
April 8	Review	

²The schedule may change as we go through the material. This is dependent on speed and timing of lectures.