Western Science

Department of Mathematics

Calculus 1501B – Calculus II
for Mathematical and Physical Sciences
Winter 2023-2024
Course Outline

1. Course Information

Section	Dates	Time	Room	Instructor
LEC 001	M/Tu/W/F	8:30am – 9:30am	3M-3250	J. Adamus
LEC 002	M	12:30pm – 1:30pm	NSC-1	R. Shafikov
LEC 002	Tu/W/Th	12:30pm – 1:30pm	SEB-1200	R. Shafikov

There are 4 lectures per week. These lectures may take the form of a supplementary lesson, problem session, or a discussion, depending on the week. A list of suggested exercises will be provided in OWL to supplement the weekly lectures.

Prerequisites: A minimum mark of 60% in one of Calculus 1000A/B, Calculus 1500A/B, Numerical and Mathematical Methods 1412A/B, the former Applied Mathematics 1412A/B.

Antirequisites: Calculus 1301A/B, Numerical and Mathematical Methods 1414A/B, the former Applied Mathematics 1414A/B, the former Applied Mathematics 1413.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) 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

Instructors	Email	Office	Phone	Office Hours
Dr. Janusz Adamus (Course Coordinator)	jadamus@uwo.ca	MC-122	86525	TBA
Dr. Rasul Shafikov	shafikov@uwo.ca	MC-271	86529	TBA

Email Communication with Instructors: If you have questions you can email your instructor. Your email must comply with the following rules:

- You must use your **UWO email address**
- You must include "**CALC 1501B**" in your title
- You must include your **full name** as it appears on your UWO ID in the body of the message
- You must include your **student number** in the body of the message
- **Never reply directly to an announcement email** sent from the OWL website

Not following any of these rules may create confusion and may result in unexpected delays.

Feedback on calculus should be sought through office hours, in class, or via the Math Help Centre. The Help Centre will open on January 22. Remember to check announcements on the course OWL page before contacting your instructor. Instructors will endeavour to reply to student inquiries within five business days, although response times may be longer depending on the volume of emails received. It is your responsibility to ensure you raise your concerns in a timely manner.

3. Course Syllabus, Schedule, Delivery Mode

Students who intend to pursue a degree in Mathematics, Applied Mathematics, Statistics, Actuarial Sciences, Physics or Astronomy should take this course. The main topics are:

- Review of integration and continuity
- The Intermediate Value Theorem, the Extreme Value Theorem, the Mean Value Theorem and their consequences
- Mathematical induction
- Techniques of integration (substitution, integration by parts, trigonometric integrals, inverse trig substitutions, partial fractions)
- Constructing new functions using integration
- Improper integrals, the Gamma function
- Sequences, convergence, the Monotone Convergence Theorem
- Series, Taylor series with applications
- Parametric curves with applications
- Polar coordinates
- First order linear and separable differential equations with applications.

Differences between CALC 1501B and CALC 1301B: Both CALC 1301 and CALC 1501 introduce students to elementary integration techniques, sequences, and series. However, CALC 1501 also covers topics that are not discussed in CALC 1301, and a special attention is given to definitions, theorems, and their logical dependence. At the end of CALC 1501B, students should be able to:

- give rigorous definitions of limits and continuity
- use mathematical induction in simple arguments
- state and use some important theorems such as the Intermediate Value Theorem, the Extreme Value Theorem, the Mean Value Theorem, the Fundamental Theorem of Calculus, the Fundamental Theorem of Algebra, and the Monotone Convergence Theorem
- give the rigorous definition of definite integral in terms of upper and lower sums

- define rigorously some transcendental functions as logarithms, exponentials, and the Gamma function
- use simple integration techniques to find antiderivatives of standard elementary functions
- solve first order, separable or linear, initial value problems
- represent standard elementary functions as power series and address their convergence
- use the notions seen in class to solve various problems, and to learn how to assemble them logically in order to prove some elementary mathematical statements.

The following is a tentative schedule of the course topics (subject to change without notice):

Week	Dates	Material (from the Lecture Notes)
1	Jan 8 -- 12	Sections 1.1 -- 1.3
2	Jan 15 -- 19	Mathematical Induction, Sections 2.1 -- 2.3
3	Jan 22 -- 26	Sections 2.4 -- 2.6
4	Jan 29 – Feb 2	Chapter 3
5	Feb 5 -- 9	Chapter 4
6	Feb 12 -- 16	Chapter 5 / cut-off point for Midterm
7	Feb 19 -- 23	Reading Week
8	Feb 26 -- Mar 1	Sections 6.1 -- 6.3
9	Mar 4 -- 8	Sections 6.4, 6.5
10	Mar 11 -- 15	Sections 7.1, 7.2
11	Mar 18 -- 22	Sections 7.2, 7.3
12	Mar 25 -- 28	Chapter 8
13	Apr 1 -- 5	Chapter 9
14	Apr 8	Review

Key Sessional Dates :

Classes begin: January 8, 2024

Reading Week: February 17 – 25, 2024

Classes end: April 8, 2024

Exam period: April 11 – 30, 2024

Contingency plan

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructors.

4. Course Materials

Recommended Text: *Calculus: From the Mean Value Theorem to Polar Coordinates*, by R. Shafikov, available at UWO Bookstore

Optional: *Single Variable Calculus: Early Transcendentals* (any edition), by J. Stewart, Cengage/Brooks Cole. This is another text sometimes used for first year calculus. While it is not required that you have access to this text, some students may benefit from an additional resource.

Students are responsible for checking the course OWL site (http://owl.uwo.ca) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: http://owl.uwo.ca.
If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Gradescope (https://www.gradescope.ca/) will be used as a grading platform for written work in the course. A free account will be created on your behalf, although you will be required to verify the account and change the password during the first weeks of class. Details regarding the set-up of your account and the submission requirements for your written work will be posted on OWL. It is the responsibility of the student to ensure their homework assignments are submitted in the correct PDF format. Submitting work in an improper format may result in your work not being graded, and this cannot form the basis of a regrade request. Additionally, the midterm test may be scanned by the course staff and uploaded to Gradescope for grading and viewing.

WeBWorK will be used for weekly quizzes. These assignments are individualized and should be submitted online. The deadline for the assignments is strictly enforced. You can login to WeBWorK on https://webwork.math.uwo.ca/webwork2/
WeBWorK is a free open-source platform. For more information on WeBWorK see https://webwork.maa.org/wiki/Student_Information

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Assessment	**Weighting**	**Date**
WeBWorK quizzes	10% (total)	Weekly, starting in the 2nd week
1st Assignment	5%	Released Jan 12, due Jan 26, 11:59pm
2nd Assignment	5%	Released Feb 2, due Feb 16, 11:59pm
Midterm Test	30%	Mar 1, 7pm - 9pm
3rd Assignment	5%	Released Mar 8, due Mar 22, 11:59pm
4th Assignment	5%	Released Mar 22, due Apr 5, 11:59pm
Final Exam	40%	Scheduled by the Registrar Office (3 hrs)

- The assignments are designed to prepare students for the exams
- Midterm test will be 120 minutes in duration and will consist of a mixture of short answer and multiple-choice-style questions. *This will be a closed book exam.*
- Make-up midterm will be held one week after the scheduled midterm (+/- one day if necessary to avoid conflicts with other exams)
- The final exam will be cumulative, 180 minutes in duration, and will consist of a mixture of short answer and multiple-choice-style questions. *This will be a closed book exam.*
- **Note that cellphones, calculators, cheat sheets, textbooks, and any other aids will NOT be allowed during the examinations.**

6. Student Absences

Students who experience an extenuating circumstance (illness, injury or other circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

i. For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration
ii. Submitting appropriate documentation for non-medical absences to the Academic Counselling office of their Faculty of Registration.

The above regards assessments worth less than 10% of the overall course grade as well as those worth 10% or more.

Note that, in all cases, students are required to contact their instructor within 24 hours of the end of the period covered.

Students should also note that individual instructors **are not permitted** to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences must be submitted to the Academic Counselling office of a student's Home Faculty.**

For the Student Medical Certificate (SMC), see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

Missing an evaluation component will result in a grade of zero unless appropriate permission is sought and granted.

Late Assignments: Unless an academic consideration is granted, 10% will be taken off for each day after a due date. No assignment will be accepted more than 5 days after the due date.

Missed Assignments: Students who are granted an academic consideration for a missing assignment will get the other components of their evaluation reweighted. For example, if only one written assignment (5%) is missing, the course grade will be computed out of 100 - 5 = 95 instead of 100.

Missed Midterm: Students who are granted an academic consideration **no later than 5 days after the midterm** will get a make-up exam. Students who are granted an academic consideration and who are not

able to complete the scheduled make-up will get their evaluation reweighted. That is, their course grade will be computed out of 100 - 30 = 70 instead of 100.

Absences from Final Examinations: If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (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" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

6. Accommodation and Accessibility

Religious Accommodation
When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

https://www.edi.uwo.ca/.

Accommodation Policies
Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf.

7. Academic Policies

The website for Registrarial Services is http://www.registrar.uwo.ca.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

The use of calculators and other electronic devices during the term test or final exam is prohibited.

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.

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/counselling/.

Students who are in emotional/mental distress should refer to Mental Health@Western (https://uwo.ca/health/) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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 Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (https://learning.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.

Additional student-run support services are offered by the USC, https://westernusc.ca/services/.