Course Syllabus

AL AKHAWAYN UNIVERSITY   **School of Science and Engineering**

CALCULUS I: DIFFERENTIAL AND INTEGRAL CALCULUS (MTH 1303)

Spring 2024

Credits, contact hours, Categorization of credits

Credits	Contact hours	Categorization of credits
3		Math and basic science

Instructor's information

Instructor: Prof. Fouad Chaatit

Location: B7 Room 08

Extension: 2109

Textbook and supplemental materials

- **Textbook:** Calculus by Ron Larson and Bruce Edwards Houghton Mifflin, 11th. Edition. Read the text before coming to the classroom
- **Pre-recorded video instruction**: Students can watch videos (lessons and examples) on https://www.larsoncalculus.com/ before coming to the classroom.

Specific Course Information

- **Course description:** The emphasis of this course is on problem solving, not on the presentation of theoretical considerations. While the course necessarily includes some discussion of theoretical notions, its primary objective is not the production of theorem-provers. The syllabus for MTH 1303 includes most of the elementary topics in the theory of real-valued functions of a real variable: limits, continuity, derivatives, maxima and minima, integration, trigonometric, logarithmic, and exponential functions and techniques of integration.

Prerequisite: Precalculus

Intended Learning Outcomes:

The emphasis in this course is on problem solving, not on the presentation of theoretical considerations. While the course necessarily includes some discussion of theoretical notions, its primary objective is not the production of theorem-provers. The syllabus for MTH1303 includes most of the elementary topics in the theory of real-valued functions of a real variable:

1. limits, continuity, derivatives, maxima and minima, optimization
2. integration, trigonometric, logarithmic and exponential functions and techniques of integration.

Quizzes: Quizzes and homework will be worth 27% of the total grade. There will be no make-up.

Grading: There will one midterm worth 37%.

The final examination is worth 36% of the total grade. In addition, a grade may be assigned for attendance.

Attendance: It is the student's responsibility to attend every class as stated in the general AUI regulations and policies. Absences will be monitored and AUI policies will be enforced.

Time Requirement: It is expected that a student spends an absolute minimum of six to nine hours a week outside of class on solving homework problems, working on assignments, going over the sections on the textbook and reviewing class notes. Class material is posted on Canvas.

Tests and Deadlines

Midterm and Deadlines

Midterm: February 29th, 2024

 Note that the catalogue lists the last day to drop the course with a W as March 12th, 2024 , while April 4th. is the last day for a "WP" or "WF". Our last class day is May 7th. 2024

Homework Each chapter has a set of recommended exercises. They are posted on your portal. You are highly encouraged to do section's exercises before getting to the subsequent section.

Support Videos: Each chapter has a set of recommended videos. They are posted on your portal.

Academic Integrity

Students are reminded about AUI regulations on cheating and plagiarism as outlined in the catalogue. In particular "complete honesty is required of students in the presentation of any and all phases of course work as their own. This applies to quizzes of any length, as well as to all examinations, daily reports, lab work and term papers" including online assessments of all kinds.

 CLE Tutoring Services

The Center for Learning Excellence (CLE) at Al Akhawayn University aims to assist students to study and **prepare for different** courses. The CLE offers Learning Groups, walk-in sessions, and private tutoring sessions for regular tutees. These sessions are usually held in the afternoons, starting at 2 p.m., by well-qualified students.

The CLE is located in Bldg 7/ Room 115. Contact: cle@aui.ma, by phone at extension 4357, or stop by anytime during our working hours

MTH1303

Differential and Integral Calculus (Tentative Syllabus)

Lectures	Sections	Topics
Lecture 1	1.1&1.2	Limits and Techniques for evaluating limits
Lecture 2	1.3&1.4	Continuity and one-sided limits
Lecture 3	1.5&2.1	Infinite Limits, the Derivative and the Tangent Line Problem
Lecture 4	2.2, 2.3	Techniques of Differentiation.
Lecture 5	2.4, 2.5	The Chain Rule. Implicit Differentiation.
Lecture 6	2.6	Related Rates.
Lecture 7	3.1	Extrema on an Interval
Lecture 8	3.2	Rolle's Theorem and The Mean Value Theorem.
Lecture 9	3.3, 3.4	The First Derivative Test. Concavity and the Second Derivative Test.
Lecture 10	3.5 & 3.6	Limits at infinity, Curve sketching.
Lecture 11	3.7	Optimization Problems

Lecture 28 Review and testing

New ABET Student Outcomes

New Computing SOs

(1) Analize a complex computing problem and to   yes
apply principles of computing and other relevant
disciplines to identify solutions

(2) Design, implement, and evaluate a computing-
based solution to meet a given set of computing
requirements in the context of the program's
discipline

(5) Function effectively as a member or leader of
a team engaged in activities appropriate to the
program's discipline

(4) Recognize professional responsibilities and
make informed judgments in computing practice
based on legal and ethical principles

(3) Communicate effectively in a variety of
professional contexts

Engineering Student Outcome

(1) Identify, formulate, and solve complex engineering
problems by applying principles of engineering,   yes
science, and mathematics

(2) Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

(3) Communicate effectively with a range of audiences

(4) Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

(5) Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

(6) Develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions

(7) Acquire and apply new knowledge as needed, using appropriate learning strategies

- **Required:** Basic Sciences Requirements

Specific Goals of the Course

Upon successful completion of this course, students are expected to

ILO1- Compute limits and understand the concept of continuity of a function of a single variable. (ABET CAC SO 1, EAC SO 1)

ILO2- Understand the concept of a derivative using different approaches. (ABET CAC SO 1, EAC SO 1)

ILO3- Use differential calculus in different contexts such as optimization, related rates, and other applications.(ABET CAC SO 1, EAC SO 1)

ILO4- Understand indefinite integrals, appreciate the use of Riemann sums to compute definite integrals and apply these to derive the Fundamental Theorem of Calculus (ABET CAC SO 1, EAC SO 1)

ILO5- Apply differential and integral calculus to transcendental functions. (ABET CAC SO 1, EAC SO 1)

ILO6- Use trigonometric substitutions to compute integrals. (ABET CAC SO 1, EAC SO 1)

Topics to be covered

Weeks	Sections	Topics
1	1.1&1.2	Limits and Techniques for evaluating limits
	1.3&1.4	Continuity and one-sided limits
2	1.5&2.1	Infinite Limits, the Derivative and the Tangent Line Problem
	2.2, 2.3	Techniques of Differentiation.
3	2.4, 2.5	The Chain Rule. Implicit Differentiation.
	2.6	Related Rates.
4	3.1	Extrema on an Interval
	3.2	Rolle's Theorem and The Mean Value Theorem.
5	3.3	The First Derivative Test.
	3.4	Concavity and the Second Derivative Test.

| | 8.8 | Improper Integrals |
| *15* | | Review and testing |

Course Summary:

Date	Details	Due
Tue Jan 30, 2024	🚀 **MTH1303 Quiz 1 Chapter 1** **(https://aui.instructure.com/courses/9903/assignments/84060)**	due by 11:20am
Tue Feb 13, 2024	🚀 **MTH1303 Quiz 2 Chapter 2** **(https://aui.instructure.com/courses/9903/assignments/84057)**	due by 11:20am
Mon Feb 26, 2024	🚀 **MTH1303 Quiz 3 Chapter 3** **(https://aui.instructure.com/courses/9903/assignments/84061)**	due by 11:20am
Thu Feb 29, 2024	🚀 **MTH1303 Midterm** **(https://aui.instructure.com/courses/9903/assignments/84062)**	due by 11:30am
	📝 **Roll Call Attendance** **(https://aui.instructure.com/courses/9903/assignments/84066)**	