MAT 119: Calculus with Analytic Geometry
(Spring 2014)

Credit: (4-2)5

Catalog description: Functions, limits, continuity and derivatives. Applications: extreme values, the Mean Value Theorem and its applications, graphing. The definite integral. Area and volume as integrals. The indefinite integral. Transcendental functions and their derivatives. L'Hospital's Rule. Techniques of integration. Improper integrals.

Course Objectives: The sequence Math 119-120 is the standard complete introduction to the concepts and methods of calculus, taken by all engineering students. The emphasis is on concepts, solving problems, theory and proofs. All sections take uniform midterm and final exams. Students develop their reading, writing and questioning skills in mathematics.

 Course Coordinator: İbrahim Ünal
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Course Website: http://math.ncc.metu.edu.tr/math119
(*Course grades and general course announcements will be posted on the course website. The website also contains links to WeBWorK and further course resources. Students are responsible for regularly checking the course web page for updates and announcements.*)

Exams and Grading: Course grades are determined by (online) homework, short exams (organized by the teaching assistants), two (non-cumulative) midterm exams, and a cumulative final exam.

- ❖ **Midterm Exams :** (2x) **22.5 %**
- ❖ **Final Exam: 35 %**
- ❖ **Short Exams:** (3x) **7 %**
- ❖ **WeBWorK: 4%**
    Total: 105%

Homework: There will be online homeworks. The online homeworks are assigned and graded using the online WeBWork system.

Short Exams: There will be 3 short exams, and each is worth 7% of your total grade. Problems in short exams will be chosen from the suggested problems which can be found on the course web site, and from the previous WebWork assignments.

Suggested Problems: Due to the limitations of WeBWork, complete mastery of subject material will require solving additional theoretical problems. For each lecture, additional suggested problems are chosen from the textbook. The list of these problems is available on the course website, and short exam problems will be chosen out of them.

Textbook: *Calculus*, James Stewart, 7th Metric International ed., 2012. *(Available at the bookstore)*

Reference Books:
- ➢ George B. Thomas et. al., *Thomas' Calculus* 11th ed.
- ➢ Robert A. Adams, *Calculus, A Complete Course* 5th ed.
- ➢ Howard Anton, *Calculus with Analytic Geometry* 5th ed.

Make-up Policy: In order to be eligible to enter the make-up examination for a missed examination, a student must have a documented or verifiable and officially acceptable excuse.
It is not possible to make up multiple missed exams. The make-up examination for all exams will be after the final exam, **and will include all topics**.

Missed Short Exam Policy: At most one short exam may be missed with a valid, acceptable excuse. This short exam's grade will be replaced by the average grade of the other exams.

NA Grade Policy: Students who doesn't attend any of the exams will automatically be given an NA grade for the course. Students with NA grade are not eligible to take re-sit exams.

Cheating Policy: Cheating on any midterm or short exam will result in any of the following: (1) immediate score of 0 on that exam, (2) immediate grade of FF in the course, (3) forwarding the case to the university disciplinary committee.

Math Help Room: The mathematics help room in T-103 is a room staffed by mathematics faculty and teaching assistants where students may gather to ask questions, work on homework, or view exams. *Students are also invited to seek out instructors in their offices.*

Lectures

Section 1	Mon 8:40-10:30 Wed 8:40-10:30	TZ-22
Section 2	Mon 13:40-15:30 Thu 8:40-10:30	TZ-22
Section 3	Tue 15:40-17:30 Thu 15:40-17:30	TZ-22
Section 4	Tue 15:40-17:30 Thu 15:40-17:30	SZ-24
Section 5	Mon 15:40-17:30 Thu 10:40-12:30	SZ-24

Recitations

Recitation 1	Fri 11:40-13:30	SZ-25
Recitation 2	Fri 15:40-17:30	SZ-25
Recitation 3	Thu 8:40-10:30	SZ-25
Recitation 4	Wed 8:40-10:30	SZ-25
Recitation 5	Wed 8:40-10:30	SZ-24

Instructors

INSTRUCTOR	SECTION	OFFICE	PHONE	E-MAIL
İbrahim Ünal	Sections 1, 2, 3	R-134	2916	uibrahim@metu.edu.tr
Salih Durhan	Section 4	R-142	2923	sdurhan@metu.edu.tr
Erhan Gürel	Section 5	SZ-32	2942	egurel@metu.edu.tr

Assistants

ASSISTANT	RECITATION	OFFICE	PHONE	E-MAIL
Münevver Çelik	Recitations S1,S2,S3,S4	SZ-43	2953	mucelik@metu.edu.tr
Arda Buğra Özer	Recitations S5	SZ-36	2946	abozer@metu.edu.tr

Course Structure: There will be 28 lectures given by the instructors, each lasting 2 class hours. The actual timing of the lectures may differ slightly from section to section because of the holidays, but the total number will be the same. Besides these lectures, there will be recitations, 2 hours per week, during which the assistants will solve extra problems. The table below is a rough guideline for the content of course lectures. Professors may reorder content as necessary/desired. The section numbers below are from the textbook, *Calculus*, by James Stewart, 7th International metric ed., 2012.

SCHEDULE

Week 1: Feb.17-21	1	**Chapter 1. Functions and Limits** §1.4: The Tangent and Velocity Problems. §1.5: The Limit of a Function.
	2	§1.6: Calculating Limits Using the Limit Laws. §1.8: Continuity.
Week 2: Feb.24-28	3	§1.7: The Precise Definition of a Limit.
	4	**Chapter 2. Derivatives** §2.1: Derivatives and Rates of Change. §2.2: The Derivative as a Function.
Week 3: Mar.3-7	5	§2.3: Differentiation Formulas. §2.4: Derivatives of Trigonometric Functions.
	6	§2.5: The Chain Rule. §2.6: Implicit Differentiation.
Week 4: Mar.10-14	7	§2.8: Related Rates.
	8	§2.9: Linear Approximations and Differentials. **Chapter 3. Applications of Differentiation** §3.1: Maximum and Minimum Values.
Week 5: Mar.17-22	9	§3.2: The Mean Value Theorem. §3.3: How Derivatives Affect the Shape of a Graph.
	10	§3.4: Limits at Infinity, Horizontal Asymptotes
Week 6: Mar.24-28	11	§3.5: Summary of Curve Sketching.
	12	§3.7: Optimization Problems.
Week 7: Mar.31-Apr.4	13	§3.8: *Newton's Method (Reading Assigment)* §3.8: Antiderivatives
	14	**Chapter 4. Integrals** §4.1: Areas and Distances. §4.2: The Definite Integral.
Week 8: Apr.7-11	15	§4.3: The Fundamental Theorem of Calculus. §4.4: Indefinite Integrals and the Net Change Theorem.
	16	§4.5: The Substitution Rule. **Chapter 5. Applications of Integration** §5.1: Areas between Curves. §5.5: Average Value of a Function.
Week 9: Apr.14-18	17	§5.2: Volume. §5.3: Volumes by Cylindrical Shells.
	18	**Chapter 6. Inverse Functions; Exp, log, and trig** §6.1: Inverse Functions. §6.2: Exponential Functions and Their Derivatives. §6.2*: The Natural Logarithmic Function.

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Week 10: Apr.21-25	19	**§6.3:** Logarithmic Functions. **§6.3*:** The Natural Exponential Function. **§6.4:** Derivatives of Logarithmic Functions. **§6.4*:** General Logarithmic and Exponential Functions.
	➢	**Holiday: Wed. 23th April**
	20	**§6.6:** Inverse Trigonometric Functions. **§6.7:** *Hyperbolic Functions (Reading Assignment)*. **§6.8:** Indeterminate Forms and L'Hospital's rule.
Week 11: Apr.28-May.2	21	**Chapter 7. Techniques of Integration** **§7.1:** Integration by Parts
	22	**§7.2:** Trigonometric Integrals
	➢	**Holiday: Thu. 1st May**
Week 12: May.5-9	23	**§7.3:** Trigonometric Substitution
	24	**§7.4.1:** Integration of Rational Functions by Partial Fractions (I, II).
Week 13: May.12-16	25	**§7.4.2:** Integration of Rational Functions by Partial Fractions (III, IV).
	26	**§7.7:** Approximate Integration. **§7.8:** Improper Integrals
Week 14: May.20-23	➢	**Holiday: Mon. 19th May**
	27	**Chapter 8. Further Applications of Integration** **§8.1:** Arc Length.
	28	**§8.2:** Area of a Surface of Revolution.
FINAL EXAMS: May 26 - June 7		

Important Dates

- **February 17**: Classes Start
- **February 24-28**: Add-Drop
- **April 23**: HOLIDAY (Wednesday)
- **April 25**: **Last day for WITHDRAWAL from courses**
- **May 1**: HOLIDAY (Thursday)
- **May 19**: HOLIDAY (Monday)
- **May 23**: Classes End
- **May 26-June 7**: Finals Period
- **June 16**: Grades Announced
- **June 18-20**: Resit Exams