

SYLLABUS



TED UNIVERSITY

Semester: **2016-17 Fall**

Course Code: **Math-102**

Course Title: **Multivariable Calculus**

Instructor: Dr.Billur Kaymakçalan (Sec1)
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Office Hour: TBA
Place: A420

Instructor: Dr.Engin Özkan (Sec2-Sec3)
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Office Hour: TBA
Place: A420

Course Details:

Course Description: Vectors in R^2 and R^3 , Dot and Cross Products, Lines and Planes in R^3 , Functions of Several Variables and, Their Limit and Continuity, Partial derivatives, Directional Derivatives, Maximum-Minimum Problems, Lagrange multipliers. Double Integrals, Triple Integrals, Vector-Valued Functions and, Their Limits, Continuity and Derivatives, Curvature. Vector Fields, Line Integrals, Greens Theorem, Surface Integrals,Stokess and Divergence Theorem.

Course Learning Outcomes: On successful completion of this module, the students should be able to

- (K.) Recall notation, conventions, definitions, and theorems and certain examples and counter-examples.
- (A.) Perform vector operations such vector addition, scalar-vector multiplication, dot product and cross product.
- (A.) Relate vector operations to geometric notions and structures such as distance, projection, orthogonality, parallelism, lines and planes in R^3 .
- (A.) Solve Max-Min problems and problems of Lagrange multipliers for multi-variable scalar functions

- (A.) Calculate limits, partial derivatives, directional derivatives, and multi-integrals of multi-variable scalar functions in various coordinate systems.
- (A.) Compute limits, derivatives, integrals and curvature of vector valued functions.
- (A.) Calculate line integrals, divergence, gradient and curl of vector fields.
- (A.) Use main theorems of vector calculus such as Greens Theorem, Stokes Theorem and Divergence Theorem.

Blooms Taxonomy Levels: K. Knowledge, C. Comprehension, A.Application

Prerequisite(s): Math-101

Course Credit Hours/ECTS Credit : (3,2,0) 4/7

Classrooms: Announced in TEDU Portal

Teaching Assistant: TBA

Textbook: *Calculus, Single and Multivariable, 2nd Edition, Blank and Krantz*

Recomended Readings:

- James Stewart, Calculus, 7th Edition
- Thomas Calculus, 12th Edition
- Calculus, A Complete Course, 7th Edition, by Adams and Essex.

Grade Policy: *There will be 3 midterm exam. Quizzes and Practice hours on WebWork will be done in each week of lecture. Some of quiz and practice hour grades MAY be dropped. There will be extra credit work assigned via WebWork for interested student. Sometimes the answers of ECW may be requested in written homework form. There will be an oral presentation but the details will be announced later. The weights of exams, quizzes, WebWork, ECW and presentation will be divided as follows:*

WebWork Labs	% 10
Quizzes	%5
Extra Credit Work + Presentation	%10
Midterm Exam(s)	%20 + %20 +%20
Final Exam	% 25

Letter Grade Distribution:

90-100	AA	70-74	CC
85-89	BA	60-69	DC
80-84	BB	50-59	DD
75-79	CB	0-49	F
		-	FX

Course Policies and Some Remarks:

- **Attendance:** You are expected to attend all classes. You are not required but advised to attend all classes. Classes start on the hour. Please be respectful of your classmates by being on time. Cell phones should be turned off and kept out of sight. Please do not use your computers during class time.
- **General:**
 - You may use a graphing or software that does symbolic calculations. But you will NOT be allowed to use calculator during exams. It will be your responsibility to be familiar with the workings of the calculator.
 - Quizzes and exams are closed book, closed notes. In WebWork practice you can use your notes.
 - **Make-up quizzes or exams will not be given generally. If you have a legitimate reason for missing an exam, then you must arrange to make up the exam BEFORE the scheduled time of the exam. The only exceptions are illness or emergency (e.g. death in family, a traffic accident, etc.). In case of an illness or emergency you need to supply a documentation that supports your claim. The dates for Make-up exams for Finals are decided by Make-up Exam Commission according to the rules and regulation of TEDU. Please see the link <http://www.tedu.edu.tr/en-US/Content/Default.aspx?SectionID=114> . Also please read the document given in the link [http : //www.tedu.edu.tr/tr – TR/Content/Akademik/AkademikBelgeler/Yonetmelikler_eyonergeler.aspx](http://www.tedu.edu.tr/tr-TR/Content/Akademik/AkademikBelgeler/Yonetmelikler_eyonergeler.aspx)**
- **Practice Hour Lab Policy**
 - Students are expected to work independently. **Offering** and **accepting** solutions from others is an act of **plagiarism**. Discussion amongst students is encouraged, but when in doubt, direct your questions to the professor, tutor, or lab assistant.
 - During a practice hours lab session, if you Log into WebWork from outside of compute lab, log into WebWork from someone elses account other than yours, Use a cell phone, laptop or tablet to communicate someone in the lab or outside related or unrelated class work, submit or supply solutions of the problems assigned for someone else, act in a

manner that disrupts, distracts or disturbs the others in the class, you will get a 0 mark for that particular Practice Hours lab session.

Tentative Course Outline:

The weekly coverage might change as it depends on the progress of the class.

Week	Content
Week 1	• 9.1. Vectors in the Plane • 9.2. Vectors in 3D Space
Week 2	• 9.3. The Dot Product • 9.4. The Cross Product • 9.5. Lines and Planes in Space
Week 3	• 11.1. Functions of Several Variables • 11.2. Cylinders and Quadric Surfaces • 11.3. Limits and Continuity
Week 4	• 11.4. Partial Derivatives • 11.5. Differentiability and The Chain Rule
EXAM-1	• 11.6. Gradients and Directional Derivatives • 11.7. Tangent Planes
Week 6	• 11.8. Maximum and Minimum Values • 11.9. Lagrange Multipliers
Week 7	• 12.1. Double Integrals over Rectangles • 12.2. Integration over More General Regions
Week 8	• 12.3. Calculation of Volumes of Solids • 12.4. Polar Coordinates (Reading Assignment) • 12.5. Integrating in Polar Coordinates
Week 9	• 12.6. Triple Integrals • 12.7. Physical Applications (Reading) • 12.8. Other Coordinate Systems
EXAM-II	• 10.1. Vector-Valued Functions-Limits, Derivatives and Continuity • 10.2. Velocity and Acceleration • 10.3. Tangent Vectors and Arc Length
Week 11	• 10.4. Curvature • 13.1. Vector Fields • 13.2. Line Integrals
Week 12	• 13.3. Conservative Vector Fields and Path Independence • 13.4. Divergence, Gradient, and Curl • 13.5. Greens Theorem
Week 13	• 13.6. Surface Area and Surface Integrals • 13.7. Stokes Theorem • 13.8. The Divergence Theorem
EXAM-III	• Review, Student Evaluations

Important Dates:

Midterm #1	26.10.2016, 18.15pm
Midterm #2	30.11.2016, 18.15pm
Midterm #3	28.12.2016, 18.15pm

GOOD LUCK