MATH 120 Calculus of Functions of Several Variables

Course Number and Title: MATH 120 Calculus of Functions of Several Variables

METU Credit & ECTS Credit: (4-2)5 & 7.5

Catalogue Description: Sequences and infinite series. Power series. Taylor series. Vectors and analytic geometry in 3-space. Functions of several variables: limits, continuity, partial derivatives. Chain rule. Directional derivatives. Tangent planes and linear approximations. Extreme values. Lagrange multipliers. Double integrals. Double integrals in polar coordinates. General change of variables in double integrals. Surface parametrization and surface area in double integrals. Triple integrals in Cartesian, cylindrical and spherical coordinates. Parametrization of space curves. Line integrals. Path independence. Green's theorem in the plane.

Course Objectives: The sequence Math 119-120 is the Standard complete introduction to the concepts and methods of calculus. It is taken by all engineering students. The emphasis is on concepts, solving problems, theory and proofs. All sections are given a uniform midterm and a final exam. Students will develop their reading, writing and questioning skills in Mathematics.
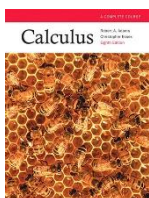
Prerequisites: Math 119

Course Coordinator: Dr. Muhiddin Uğuz

MidTerm1:	30 Points **(April 16th, 2022 Saturday at 09:30)**
MidTerm2:	30 Points **(June 04th, 2022 Saturday at 09:30)**
Final Exam:	40 Points **(June 23rd, 2022 Thursday at 09:30)**
Quiz:	5 Points (bonus)

For more details about exams and grading, see the announcements on the Course Home page.

Suggested textbook:

Robert A. Adams, Christopher Essex
CALCULUS
A Complete Course Calculus. Eight (or newer) Edition.
ISBN 978 0-321-78107-9
QA303.2.A33 2013

Reference Books: Calculus
James Stewart, Fifth Edition

Current Semester Course Home Page: http://www.ma120.math.metu.edu.tr/

Week	Dates	Syllabus (Math 120) 2021-2	Suggested Problem List
1	March 07-11	**Ch. 9: Sequences, Series, and Power Series** **9.1 Sequences and Convergence**	**Worksheet on Sequences and Series** 9.1:6,8,10,17,18,19,24 ,26,29,31,35
2	March 14-18	**9.2 Infinite Series** **9.3 Convergence Tests for Positive Series**	9.2: 4,6,8,10,12,14,26,27,28,29,30,31 9.3: 4,6,12,16,18,20,24,26,38,42
3	March 21-25	**9.4 Absolute and Conditional Convergence** **9.5 Power Series**	9.4: 2,4,8,10,16,20,24,27 9.5: 4,8,10,13,14,17,18,22,26,28,30
4	March 28-April 01	**9.6 Taylor and Maclaurin Series** **9.7 Applications of Taylor and Maclaurin Series** **Ch. 10: Vectors and Coordinate Geometry in 3-Space** **10.1 Analytic Geometry in Three Dimensions** **10.2 Vectors**	9.6: 6,8,12,18,22,26,34,35,40 9.7: 6,7,12,16,18,24 10.1: 6,19,22,27,32,36,40 10.2: 4,13,16,18,22,26,31
5	April 04-08	**10.3 The Cross Product in 3-Space** **10.4 Planes and Lines** **10.5 Quadric Surfaces**	10.3: 3,5,14,15,17,20,23 10.4: 3,6,9,18,23,26,28,29 10.5: 3,5,8,10,12,15,17,20,21
6	April 11-15	**Ch. 12: Partial Differentiation** **12.1 Functions of Several Variables** **12.2 Limits and Continuity** ☺**Midterm 1 (April 16th, 2022 Saturday at 09:30)**	12.1: 4,5,8,12,13,14,20,24 12.2: 2,6,8,10,12,14,18
7	April 18-22	**12.3 Partial Derivatives** **12.4 Higher-Order Derivatives** **12.5 The Chain Rule** **12.6 Linear Approximations**	12.3:4,5,6,11,12,16,17,21,24,28,31,36,39 12.4: 4,10,16 12.5: 4,8,16,18,29,30 12.6: 4,6,10,16
8	April 25-29	**12.7 Gradients and Directional Derivatives** **12.8 Implicit Functions** *("Systems of Equations" is <u>not</u> included)* **Ch. 13: Applications of Partial Derivatives** **13.1 Extreme Values**	12.7: 4,8,10,17,18,19,22,26,36 12.8: 2,5,6,11 13.1: 1, 3, 6, 7, 9, 11, 17, 19, 24, 26
9	May 05-06	May 02—04 Religious holiday (Holiday eve Sunday) **Review**	
10	May 09-13	**13.2 Extreme Values** of Functions Defined on Restricted Domains **13.3 Lagrange Multipliers** **Ch. 14: Multiple Integration** **14.1 Double Integrals**	13.2: 3, 5, 7, 8, 9, 11, 17 13.3: 1, 3, 5, 7, 9, 11, 19, 21, 22 14.1: 5,13,15,18,19
11	May 16-20	**14.2 Iteration of Double Integrals** in Cartesian Coordinates **14.4 Double Integrals in Polar Coordinates** **14.5 Triple Integrals** National Holiday (Commemoration of Atatürk & Youth and Sports Festival, Thursday)	14.2: 1-27 odd 14.4: 1-25 odd 14.5: 2,4,6,7,9,10,14,15
12	May 23-27	**14.6 Change of Variables in Triple Integrals** **Ch. 11: Vector Functions and Curves** **11.1 Vector Functions of One Variable** **11.3 Curves and Parametrizations** **Ch. 15: Vector Fields** **15.1 Vector and Scalar Fields**	14.6: 2,3,4,6,10,12,16 11.1: 8,10,16,18 11.3: 1,2,3,4,6,8,17,18,24 15.1: 2,3,6
13	May 30-June 03	**16.1 Gradient, Divergence, and Curl** **15.2 Conservative Fields** ☺**Midterm 2 (June 04th, 2022 Saturday at 09:30)**	16.1: 3,4 15.2: 2,6,9
14	June 06-10	**15.3 Line Integrals** **15.4 Line Integrals of Vector Fields**	15.3: 2,6,8,13,14 15.4: 4,6,8,9,13,22
15	June 13-17	**Ch. 16: Vector Calculus** **16.3 Green's Theorem in the Plane**	16.3: 1, 2, 3, 4, 5, 6, 7, 9
	☺**Final Exam (June 23th, 2022 Thursday at 09:30)**		

IMPORTANT: **The rules and regulations below are subject to change in the case the university or YÖK changes their decisions about Spring 2022 Semester.**

Class Attendance
Attendance during lectures and recitations will not be taken. However, you are strongly suggested to attend the lectures and recitations. Also there will be frequent pop-up quizzes in recitation hours.

Make up for Exams and Assignments
You can have at most one make-up exam. In order to be able to take the make-up exam, you must present a reasonable excuse (such as a medical report or an academic leave or a COVID-19 positive result) to **wwwma120@metu.edu.tr before** the date of exams to be replaced by the make-up exam.

Final Exam Entrance Conditions and NA Grade
If your two midterm scores (each one out of 100 points) add up to less than 20 points (out of 200 points in total), then you cannot take the final exam and will receive an NA grade from the course.

Information for Students with Disabilities
Students who experience difficulties due to their disabilities and wish to obtain academic adjustments and/or auxiliary aids must contact ODTU Disability Support Office and/or course instructor and the advisor of students with disabilities at academic departments (for the list: http://engelsiz.metu.edu.tr/en/advisor-students-disabilities) as soon as possible. For detailed information, please visit the website of Disability Support Office: https://engelsiz.metu.edu.tr/en/

Academic Honesty
The METU Honour Code is as follows: "Every member of METU community adopts the following honour code as one of the core principles of academic life and strives to develop an academic environment where continuous adherence to this code is promoted. The members of the METU community are reliable, responsible and honourable people who embrace only the success and recognition they deserve, and act with integrity in their use, evaluation and presentation of facts, data and documents."