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


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: Gökhan Benli (benli (at) metu.edu.tr)

Grading: Your grade will be based on two midterm exams, final exam, and an oral exam. All exams will be online. For details, please check the announcement about “the structure of the course” on the course home page.

Suggested textbook:

Robert A. Adams, Christopher Essex
CALCULUS
QA303.2.A33 2013

Reference Books: Calculus
James Stewart, Fifth Edition

Current Semester Course Home Page: http://www.ma120.math.metu.edu.tr/
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<th>Syllabus (Math 120) 2019-2</th>
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| 1    | Oct. 12-16  | 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    | Oct. 19-23  | 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 |
|      | Add Drop and Advisor Approvals                                                           |                         |
| 3    | Oct 26-30   | 9.4 Absolute and Conditional Convergence  
9.5 Power Series  
9.6 Taylor and Maclaurin Series                                                             | 9.4: 2,4,8,10,16,20,24,27  
9.5: 4,8,10,13,14,17,18,22,26,28,30  
9.6: 6,8,12,18,22,26,34,35,40 |
|      | Oct29th Thursday: National Holiday (Republic Day)                                        |                         |
| 4    | Nov 02-06   | 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  
10.3 The Cross Product in 3-Space                                                           | 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  
10.3: 3,5,14,17,20,23 |
| 5    | Nov 09-13   | 10.4 Planes and Lines  
10.5 Quadric Surfaces  
**Ch. 12:** Partial Differentiation  
12.1 Functions of Several Variables  
12.2 Limits and Continuity                                                                  | 10.4: 3,6,9,18,23,26,28,29  
10.5: 3,5,8,10,12,15,17,20,21  
12.1: 4,5,8,12,13,14,20,24  
12.2: 2,6,8,10,12,14,18 |
|      | Nov 10 Tuesday: Commemoration of Atatürk                                                |                         |
| 6    | Nov 16-20   | 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 |
| 7    | Nov 23-27   | 12.7 Gradients and Directional Derivatives  
12.8 Implicit Functions (“Systems of Equations” is not 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 |
|      | Nov 30- Dec 04 | 13.2 Extreme Values of Functions Defined on Restricted Domains  
13.3 Lagrange Multipliers                                                                  | 13.2: 3, 5, 7, 8, 9, 11, 17  
13.3: 1, 3, 5, 7, 9, 11, 19, 21, 22 |
| 8    | Dec 07-11   | **Ch. 14:** Multiple Integration  
14.1 Double Integrals  
14.2 Iteration of Double Integrals in Cartesian Coordinates  
14.4 Double Integrals in Polar Coordinates                                                   | 14.1: 5,13,15,18,19  
14.2: 1-27 odd  
14.4: 1-25 odd |
| 9    | Dec 14-18   | 14.5 Triple Integrals  
14.6 Change of Variables in Triple Integrals  
**Ch. 11:** Vector Functions and Curves  
11.1 Vector Functions of One Variable                                                          | 14.5: 2,4,6,7,9,10,14,15  
14.6: 2,3,4,6,10,12,16  
11.1: 8,10,16,18 |
| 10   | Dec 21-25   | 11.3 Curves and Parametrizations                                                          | 11.3: 1,2,3,4,6,8,17,18,24 |
| 11   | Dec 28- Jan 01 | **Ch. 15:** Vector Fields  
15.3 Line Integrals  
15.1 Vector and Scalar Fields  
National Holiday (National Sovereignty and Children's Day, Thursday)                       | 15.3: 2,6,8,13,14  
15.1: 2,3,6 |
|      | Jan 04-08   | 16.1 Gradient, Divergence, and Curl  
15.2 Conservative Fields  
15.4 Line Integrals of Vector Fields  
May 1st Labor and Solidarity Day (Friday)                                                     | 16.1: 3,4  
15.2: 2,6,9  
15.4: 4,6,8,9,13,22 |
| 13   | Jan 11-15   | **Ch. 16:** Vector Calculus  
16.3 Green’s Theorem in the Plane                                                            | 16.3: 1, 2, 3, 4, 5, 6, 7, 9 |