

FEA – GENERAL EDUCATION

Date	Fall 2018-2019	Credits	4
Course Title	Mathematics II	Course Number	MATH 114
Pre-requisite (s)	MATH113	Co-requisite (s)	None
Hours	75	Out of Class Work Hours	150

Place and Time of Class Meeting

TO BE FILLED OUT BY THE INSTRUCTOR / ÖĞRETİM ELEMANI TARAFINDAN DOLDURULACAK.

Name and Contact Information of Instructor

TO BE FILLED OUT BY THE INSTRUCTOR / ÖĞRETİM ELEMANI TARAFINDAN DOLDURULACAK.

Book required

(The School recognizes the use of the textbook in the classroom as part of the educational methodology and strategy applied in diverse materials. The textbook is part of the curriculum and is used to reach the student in an effective manner in the classroom. Every student is expected to acquire and use the textbook.)

Thomas' Calculus, 13th Edition
George B. Thomas, Maurice D. Weir, Joel R. Hass
Pearson Education Inc.

Classroom expectations for students

Attendance Policy

Students are liable to attend every course, practical and laboratory work of the program they are enrolled and to take the exams and participate in academic work required for achieving the course. Student attendance to all courses is compulsory. Students who do not attend a minimum 70% of the theoretical courses and 80% of the practical courses will be considered as absent for the related courses. Students who do not meet the mandatory minimum requirement of attendance will fail the course. Students who fail a course for not fulfilling minimum attendance requirement are obliged to meet the attendance requirement when they re-take the course.

Student Tardiness Policy

Students are permitted to arrive to the class in the first 15 minutes after the scheduled start of the course; extension of tardiness time is in instructor's discretion.

Course Description (must correspond exactly to Catalog description)

This course will investigate techniques of Integration, improper integrals, infinite sequences and series, convergence tests, power series, radius of convergence and interval of convergence, term-by-term differentiation and integration of power series, vectors in 3-space, dot product and cross product of vectors, equations of lines and planes in space, quadratic surfaces, functions of several variables and their limits, continuity and partial derivatives, chain rule, directional derivatives, tangent planes and normal lines, local and absolute extrema, Lagrange multipliers, double and triple integrals, polar coordinates, change of variables, cylindrical and spherical coordinates, line integrals and surface integrals, Green, Stoke's and Gauss theorems.

Learning Objectives

At the end of this course the student will be able to:

- Distinguish between the indefinite integral and the definite integral.
- Define the definite integral as a limit of Riemann sums and interpret it as area.
- Explain the Fundamental Theorem of Calculus, showing how differentiation and integration are related.
- Evaluate an integral by the method of substitution.
- Use integrals to calculate areas between curves, volumes, work, and average value of a function.
- Evaluate integrals, using the techniques of integration by parts, using trigonometric identities and trigonometric substitution, and using partial fractions.
- Use the Midpoint Rule, Simpson's Rule, and the Trapezoidal Rule to find the approximate value of certain definite integrals.
- Evaluate the two types of improper integrals.
- Solve separable first-order differential equations.
- Use integrals to find arc length and area of a surface of revolution.
- Use integrals in applications to economics and biology.
- Determine whether or not a sequence of real numbers converges.
- Test a series for convergence or divergence, using the integral, ratio, root, and comparison tests.
- Test an alternating series for absolute convergence, conditional convergence, or divergence.
- Determine the radius and interval of convergence of a power series.

Topical Outline and Schedule

DATE		WEEK 1
SPECIFIC OBJECTIVES		<ul style="list-style-type: none"> • Table the basic integration formulas. • Calculate the integrals by using integration by parts. • Integrate the product of the powers of sines and cosines. • Eliminate the square root to calculate the integral. • Integrate the powers of $\tan x$ and $\sec x$.
TOPIC (S)		Syllabus. 8 Techniques of Integration 8.1 Integration by Parts 8.2 Trigonometric Integrals
LEARNING ACTIVITIES		Discussion of Syllabus. Review of the integration. Obtain the formula of the integration by parts by the aim of the product rule by discussion. Help the students to generalize the formula of the integration by parts for definite integrals. Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT		Review of the syllabus. Homework: Read Chapter 8
DATE		WEEK 2
SPECIFIC OBJECTIVES		<ul style="list-style-type: none"> • Evaluate the integrals by using trigonometric substitutions. • Integrate the rational functions by partial fractions. • Define improper integrals and classify them. • Investigate the convergence of the improper integral. • Test the convergence of an improper integral by using direct comparison test. • Investigate the convergence of an improper integral by using limit comparison test.
TOPIC (S)		8.3 Trigonometric Substitutions 8.4 Integration of Rational Functions Using Partial Fractions 8.7 Improper Integrals
LEARNING ACTIVITIES		Discuss the types of the improper integrals. Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT		Homework: Read Chapter 8, 10 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework I
DATE		WEEK 3
SPECIFIC OBJECTIVES		<ul style="list-style-type: none"> • Define the convergence and divergence of a sequence. • Calculate the limits of sequences. • Explain the related theorems and solve examples.

FEA – GENERAL EDUCATION

	<ul style="list-style-type: none"> Define the bound for a sequence. Define monotonic sequence. Define infinite series, sequence of the partial sums, convergence and divergence of the series. Explain the related theorems.
TOPIC (S)	10 Infinite Sequences and Series 10.1 Sequences, 10.2 Infinite Series,
LEARNING ACTIVITIES	Figure the sandwich theorem for sequences. Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 8, 10 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework I
DATE	WEEK 4
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Explain the tests of convergence of the series.
TOPIC (S)	10.3 The Integral Test 10.4 Comparison Tests, 10.5 The Ratio and Root Test
LEARNING ACTIVITIES	Illustrate the integral test. Figure the comparison test. Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 10 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework II
DATE	WEEK 5
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Explain the alternating series test. Define absolutely convergent series and explain its tests. Define power series and explain related theorems. Define Taylor and Maclaurin series.
TOPIC (S)	10.6 Alternating Series, Absolute and Conditional Convergence 10.7 Power Series 10.8 Taylor and Maclaurin Series,
LEARNING ACTIVITIES	Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 12 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework II
DATE	WEEK 6
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Explain the 3D coordinate system. Define the vectors and related terms. Explain the vector algebra operations of the vectors and the properties of them.

FEA – GENERAL EDUCATION

	<ul style="list-style-type: none"> • Calculate the angle between two vectors. • Define dot product and orthogonality. • Explain the properties of the dot product.
TOPIC (S)	12 Vectors and Geometry of Space 12.1 Three-Dimensional Coordinate Systems, 12.2 Vectors, 12.3 The Dot Product
LEARNING ACTIVITIES	Illustrate the parallelogram law. Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 12 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework III
DATE	WEEK 7
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • MIDTERM EXAM I • Define the cross product and the related terms. • Calculate the cross product of the vectors. • Explain the equations for a line. • Explain the equations for a plane. • Calculate the distance from a point to a plane.
TOPIC (S)	12.4 The Cross Product, 12.5 Lines and Planes in Space,
LEARNING ACTIVITIES	Illustrate the area a parallelogram Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 14 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework III
DATE	WEEK 8
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • MIDTERM I • Define the functions of several variables and related terms. • Define the limit of the functions of two variables. • Explain the properties of the limits of functions of two variables. • Define continuity of the functions of two variables. • Define partial derivative of a function and explain the related theorems. • Explain the chain rule for functions of two independent variables. • Explain the chain rule for functions of three independent variables. • Explain the chain rule for functions of three intermediate variables.
TOPIC (S)	14 Partial Derivatives 14.1 Functions of Several Variables, 14.2 Limits and Continuity in Higher Dimensions, 14.3 Partial Derivatives 14.4 The Chain Rule
LEARNING ACTIVITIES	Completion of exercises and problems.

FEA – GENERAL EDUCATION

OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 14 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework III
DATE	WEEK 9
SPECIFIC OBJECTIVES	
TOPIC (S)	
LEARNING ACTIVITIES	
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 14 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework IV
DATE	WEEK 10
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Explain the implicit differentiation. • Define the derivative of a function at a certain point in the direction of a vector. • Define gradient vector. • Explain the properties of the directional derivative and gradients. • Define tangent plane and the normal line. • Define linearization of a function. • Define the extreme values and related terms. • Explain the first derivative test for local extreme values. • Explain the second derivative test for local extreme values.
TOPIC (S)	14.5 Directional Derivatives and Gradient Vectors 14.6 Tangent Planes and Differentials, 14.7 Extreme Values and Saddle Points 14.8 Lagrange Multipliers
LEARNING ACTIVITIES	Sketch a graph to illustrate the definitions. Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 14, 15 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework IV
DATE	WEEK 11
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Explain the double integral concept. • Explain the Fubini's theorem. • Find the limits of integration. • Explain the properties of the double integral.
TOPIC (S)	15 Multiple Integrals 15.1 Double and Iterated Integrals over Rectangles, 15.2 Double Integrals over General Regions,
LEARNING ACTIVITIES	Graph a surface to explain the double integral. Completion of exercises and problems.
OUT OF	Homework: Read Chapter 14

FEA – GENERAL EDUCATION

CLASS WORK ASSIGNMENT	Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework V
DATE	WEEK 12
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • MIDTERM EXAM II • Calculate the area by the aim of the double integral. • Calculate a double integral by changing cartesian integrals into polar integrals.
TOPIC (S)	15.3 Area by Double Integration 15.4 Double Integrals in Polar Form MIDTERM EXAM II
LEARNING ACTIVITIES	Draw the new region to decide the limits of the integration. Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 15 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework V
DATE	WEEK 13
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Define volume by the aim of the triple integrals. • Calculate integrals in cylindiric and spherical coordinates. • Define Jacobian determinant. • Use substitution to calculate integrals.
TOPIC (S)	15.5 Triple Integrals in Rectangular Coordinates, 15.7 Triple Integrals in Cylindrical and Spherical Coordinates, 15.8 Substitutions in Multiple Integrals
LEARNING ACTIVITIES	Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 15 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework V
DATE	WEEK 14
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Explain the topics that students could not understand clearly.
TOPIC (S)	General Review
LEARNING ACTIVITIES	Completion of exercises and problems.
OUT OF CLASS WORK ASSIGNMENT	Homework: Read Chapter 15 Mylab (This course is based on Thomas' Calculus Global Edition, 13e Copyright 2015 Pearson Education) Doing Homework V
DATE	WEEK 15
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Final Exam.
TOPIC (S)	
LEARNING	

FEA – GENERAL EDUCATION

ACTIVITIES	
OUT OF CLASS WORK ASSIGNMENT	

Instructional Methods

In developing methodological strategies, it is best to discuss them between teachers and students in an environment of freedom and mutual agreement in order to ensure that the students make them their own and take responsibility for their execution and for attaining the goals of this course.

The following strategies may be used in this class:

1. A review of the literature.
2. Analysis of assigned readings.
3. Individual and group discussions.
4. Preparation of a didactic plan.
5. Preparation of lecture notes.

Instructional Materials and References

A Complete Course Calculus, 8th Edition.
Robert A. Adams, Christopher Essex
Pearson Canada Inc.
ISBN 978: 0321781079

Assessment Criteria and Methods of Evaluating Students

Grade	Coefficient
AA	4.00
BA	3.50
BB	3.00
CB	2.50

FEA – GENERAL EDUCATION

CC	2.00
DC	1.50
DD	1.00
FF	0.00
VF	0.00

Distribution of Grade Elements

In-Term Studies	Quantity	Percentage
Midterm I	1	20
Midterm II	1	20
Homework	5	20
Total	7	60
End-Term Studies	Quantity	Percentage
Final	1	40
Total	1	40
Contribution Of In-Term Studies To Overall Grade		60
End-Term Studies		40
Total		100

Date Syllabus Was Last Reviewed: September 14, 2018