



**Catalog Description:**

Multiple integrals, line integrals; matrix algebra; linear (ordinary and partial) differential equations.

**Prerequisite:**

Major, pre-major, or minor in BiomedE, CEEGS, FABEng, MatScEn, CBE, or WeldEn; and: 1172, 2153, 1544 (154), 254.xx, 263.xx, 263.01H, or 264H

**Exclusions:**

Not open to students with credit for 2174 or 5520H; or with credit for both (i) 2415 (415), 2255 (255) or 4512 (512) and (ii) 2568 (568 or 571).

**Text:**

*Math 2177, Custom Edition for OSU*, Pearson, ISBN-13 978-1-256-82676-7 or ISBN-10 1-256-82676-6 –**OR**– the textbooks listed below.

**Topics List:**

**PART ONE: Multivariable Integral Calculus**

Textbook Sections from *Calculus for Scientists and Engineers: Early Transcendentals*, by Briggs, Cochran, Gillett and Shulz, Chapters 13-15

<b>2177 Custom</b>	<b>Original Text</b>	<b>Topic</b>
1.8	13.8	Maximum/Minimum Problems
1.9	13.9	Lagrange Multipliers
2.1	14.1	Double Integrals over Rectangular Regions
2.2	14.2	Double Integrals over General Regions
2.3	14.3	Double Integrals in Polar Coordinates
2.4	14.4	Triple Integrals
2.5	14.5	Triple Integrals in Cylindrical and Spherical Coordinates
2.7	14.7	Change of Variables in Multiple Integrals
3.1	15.1	Vector Fields
3.2	15.2	Line Integrals
3.3	15.3	Conservative Vector Field

*Midterm 1*



**PART TWO: Matrices and Linear Systems of Equations**

Textbook Sections from *Introduction to Linear Algebra*, by Johnson, Riess, and Arnold, 5<sup>th</sup> edition, Chapter 1: Matrices and Systems of Linear Equations

2177 Custom	Original Text	Topic
4.1	1.1	Introduction to Matrices and Systems of Linear Equations
4.2	1.2	Echelon Form and Gauss-Jordan Elimination
4.3	1.3	Consistent Systems of Linear Equations
4.4	4.4	Applications (optional)
4.5	1.5	Matrix Operations
4.6	1.6	Algebraic Properties of Matrix operations
4.7	1.7	Linear Independence and Nonsingular Matrices
4.8	1.8	Data Fitting, Numerical Integration and Numerical Differentiation

Midterm 2

**PART THREE: 2nd Order Constant Coefficient O.D.E.'s**

Textbook Sections from *Calculus for Scientists and Engineers: Early Transcendentals*, by Briggs, Cochran, Gillett and Shulz, Chapter 16 and Appendix C

2177 Custom	Original Text	Topic
5.1	16.1	Basic Ideas
Appx C	Appx C	Complex Numbers
5.2	16.2	Linear Homogeneous Equations
5.3	16.3	Linear Nonhomogeneous Equations
5.4	16.4	Applications

Midterm 3

**PART FOUR: Fourier Series & Partial Differential Equations**

Textbook Sections from *Fundamentals of Differential Equations and Boundary Value Problems*, by Nagle, Saff and Snider, 8<sup>th</sup> Edition, Chapter 10

2177 Custom	Original Text	Topic
6.1	10.1	Introduction: A Model for Heat Flow
6.2	10.2	Method of Separation of Variables
6.3	10.3	Fourier Series
6.4	10.4	Fourier Cosine and Sine Series
6.5	10.5	The Heat Equation
6.6	10.6	The Wave Equation