Metropolitan State University
College of Sciences
MATH 211-01 Discrete Mathematics

Term: Summer 2017
Meeting: Mondays 6—9:50 pm
Instructor: Dr. Pangyen (Ben) Weng, Associate Professor of Mathematics
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URL: www.drweng.net

Course Description: This is a continuation of Math 210 Calculus I and a working knowledge of that material is expected. Through a conceptual and theoretical framework this course covers the definite integral, the fundamental theorem of calculus, applications of integration, numerical methods for evaluating integrals, techniques of integration and series.

Learning Outcomes:

1. Successfully apply the methods and concepts of integral calculus to mathematically model and solve problems of current interest in the sciences, economics, and engineering.
2. Understand the basic theory of integral calculus, including sequences, series and convergence criteria.
3. Understand, and be able to calculate, integrals of polynomial, rational, trigonometric, exponential and logarithmic functions.
4. Understand, and be able to utilize, techniques of integration.

Prerequisite: C- or better in Calculus I, or placement at equivalent levels.

Calculators: Graphing calculators such as TI-83 are recommended, and may be used in quizzes or exams unless otherwise notified.

Textbook: *Thomas' Calculus: Early Transcendentals, by Weir, Hass, and Thomas, 12th edition.*

Notes and Attendance: Attendance and notes are checked at the beginning of every class: 2 points for each attendance and 1 point for each set of weekly notes. Notes need to be taken on the blank pdf presentations that accompany the video lessons.

Pre-class Check-in: These are online quizzes due before the class. No makeup is allowed.

Check-out quizzes: These will be conducted at the end of class. You may use notes. No makeup is allowed; a missing quiz receives a zero for the score. The two lowest scores will be waived.

Homework: Mathematics is not a spectator's sport. Solving problems independently and as much as possible is the only way to strengthen your math understanding and skills. Homework is an important part of your learning: expect to spend 8 to 10 hours each week on assignments. **No late homework will be accepted.** Homework problems are on www.MyMathLab.com with course ID *weng52956*.

Tests: There are four 90-minute module tests. Calculators may be used, but not tablets, cellphones or other types of electronic devices. One sheet of notes is allowed but no books or any other kind of help is allowed. The passing score of each test is 70 or above. Unless the instructor has been contacted and provided with legitimate reasons, students who are absent from an exam will receive a score of 0. Students who fail any of the first three tests must make up the test for 70% of the full credit. Students must have a passing test to be eligible for the next test.

Course Requirements and Grading Policy: Letter grades are given based on the following scale. You will receive the best grade that meets all the requirements. Students who are NOT eligible for any of the 4 grades automatically receive an F.

	I	C	B	A
Notes and attendance	≥ 70%	≥ 70%	≥ 75%	≥ 75%
Pre-class check-in	≥ 65%	≥ 65%	≥ 70%	≥ 80%
Check-out quizzes	≥ 70%	≥ 70%	≥ 80%	≥ 85%
Homework	≥ 70%	≥ 70%	≥ 80%	≥ 85%
Tests	-	≥ 70%	≥ 80%	≥ 85%

Testing Center: Phone: 651-793-1460; email: testing.center@metrostate.edu

Students with Disabilities: Special accommodations can often be made for those with learning disabilities. Students who have or may have documented learning disabilities are recommended to contact the instructor as well as the Disability Services Office at (651) 793-1540 or (651) 772-7687.

Email Communication: In accordance with University's policy, this class will use your university email address (name@metrostate.edu) to communicate with you about all course-related matters.

Policy on Academic Integrity: The Metropolitan State University Student Handbook states "*In simple terms, plagiarism is using another person's words or ideas and presenting them as your own, without acknowledging the original source. This is a serious academic offense. Academic sanctions can include receiving a failing grade for an assignment or an entire course.*"

Assignments and exams are to be completed independently unless specified otherwise. Copying and/or utilizing another person's work in order to complete your assignments or exams constitutes plagiarism. In situations where I suspect academic dishonesty, I reserve the right to either reassess your understanding of the material or assign a grade of 0 points. Repeated offenses will result in a grade of F for the entire course. For additional information on the university's policies regarding plagiarism, please refer to the student handbook found at http://www.metrostate.edu/msweb/pathway/gateway/handbook/handbook.html.

Classroom Diversity: The instructor strives to provide a welcoming learning environment to students of diverse backgrounds with diverse learning needs. Students who have questions or concerns about the course policy or how the course is conducted are encouraged to discuss them with the instructor.

Tentative Schedule:

Class	Date	Coverage	Activities and assignment	
1	5/15	**Module 1 Integration** 1.1 Antiderivatives 1.2 Area and Estimating with Finite Sums 1.3 Sigma Notation and Limits of Finite Sums 1.4 The Definite Integral	Week 1 Check-out	in class
2	5/22	1.5 The Fundamental Theorem of Calculus 1.6 The Substitution Method 1.7 Substitution and Area Between Curves	Homework 1 Week 2 Check-in Week 2 Check-out	6pm 6pm in class
-	5/29	**Memorial Day: no class**		
3	6/5	**Module 2 Applications of Definite Integrals** 2.1 Volumes Using Cross-Sections 2.2 Volumes Using Cylindrical Shells 2.3 Arc Length	**Module 1 Test** Homework 2 Week 3 Check-in Week 3 Check-out	**6—7:30pm** 6pm 6pm in class
4	6/12	2.4 Areas of Surfaces of Revolution 2.5 Work and Fluid Forces 2.6 Moments and Centers of Mass	Homework 3 Week 4 Check-in Week 4 Check-out	6pm 6pm in class
5	6/19	**Module 3 Techniques of Integration** 3.1 The Logarithm as an Integral 3.2 Integration by Parts 3.3 Trigonometric Integrals 3.4 Trigonometric Substitutions	Homework 4 Week 5 Check-in Week 5 Check-out	6pm 6pm in class
6	6/26	3.5 Integration of Rational Functions by Partial Fractions 3.6 Numerical Integration 3.7 Improper Integrals	**Module 2 Test** Homework 5 Week 6 Check-in Week 6 Check-out	**6—7:30pm** 6pm 6pm in class
7	7/3	**Mid-semester checkpoint; additional topics**	Homework 6 Week 7 Check-in Week 7 Check-out	6pm 6pm in class
8	7/10	**Module 4 Series and Sequences** 4.1 Sequences and Infinite Series 4.2 The Integral Test 4.3 Comparison Tests	Homework 7 Week 8 Check-in Week 8 Check-out	6pm 6pm in class
9	7/17	4.4 The Ratio and Root Tests 4.5 Alternating Series, Absolute and Conditional Convergence 4.6 Power Series	**Module 3 Test** Homework 8 Week 9 Check-in Week 9 Check-out	**6—7:30pm** 6pm 6pm in class
10	7/24	4.7 Taylor and Maclaurin Series 4.8 Convergence of Taylor Series 4.9 Applications of Taylor Series	Homework 9 Week 10 Check-in Week 10 Check-out	6pm 6pm in class
11	7/31	**Module 5 Parametric Equations, Polar Coordinates and Vectors** 5.1 Parametrizations of Plane Curves 5.2 Calculus with Parametric Curves 5.3 Polar Coordinates 5.4 Areas and Lengths in Polar Coordinates	Homework 10 Week 11 Check-in Week 11 Check-out	6pm 6pm in class
12	8/7	5.5 Three-Dimensional Coordinate Systems and Vectors 5.6 The Dot Product 5.7 The Cross Product 5.8 Lines and Planes in Space	**Module 4 Test** Homework 11 Week 12 Check-in Week 12 Check-out	**6—7:30pm** 6pm 6pm in class
13	8/14	**Final presentation**		

Curriculum mapping:
The following is based on *Thomas' Calculus: Early Transcendentals, by Weir, Hass, and Thomas, 12th edition.*

Topic	Textbook
Module 1 Integration	
1.1 Antiderivatives	4.8
1.2 Area and Estimating with Finite Sums	5.1
1.3 Sigma Notation and Limits of Finite Sums	5.2
1.4 The Definite Integral	5.3
1.5 The Fundamental Theorem of Calculus	5.4
1.6 The Substitution Method	5.5
1.7 Substitution and Area Between Curves	5.6
Module 2 Applications of Definite Integrals	
2.1 Volumes Using Cross-Sections	6.1
2.2 Volumes Using Cylindrical Shells	6.2
2.3 Arc Length	6.3
2.4 Areas of Surfaces of Revolution	6.4
2.5 Work and Fluid Forces	6.5
2.6 Moments and Centers of Mass	6.6
Module 3 Techniques of Integration	
3.1 The Logarithm as an Integral	7.1
3.2 Integration by Parts	8.1
3.3 Trigonometric Integrals	8.2
3.4 Trigonometric Substitutions	8.3
3.5 Integration of Rational Functions by Partial Fractions	8.4
3.6 Numerical Integration	8.6
3.7 Improper Integrals	8.7
Module 4 Series and Sequences	
4.1 Sequences and Infinite Series	10.1, 10.2
4.2 The Integral Test	10.3
4.3 Comparison Tests	10.4
4.4 The Ratio and Root Tests	10.5
4.5 Alternating Series, Absolute and Conditional Convergence	10.6
4.6 Power Series	10.7
4.7 Taylor and Maclaurin Series	10.8
4.8 Convergence of Taylor Series	10.9
4.9 Applications of Taylor Series	10.10
Module 5 Parametric Equations, Polar Coordinates and Vectors	
5.1 Parametrizations of Plane Curves	11.1
5.2 Calculus with Parametric Curves	11.2
5.3 Polar Coordinates	11.3, 11.4
5.4 Areas and Lengths in Polar Coordinates	11.5
5.5 Three-Dimensional Coordinate Systems and Vectors	12.1, 12.2
5.6 The Dot Product	12.3
5.7 The Cross Product	12.4
5.8 Lines and Planes in Space	12.5