# Shanghai Jiao Tong University

## MA081 Calculus II

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| **Instructor Information:** | Linghai Zhang<br>Home Institution: Lehigh University<br>Email: liz5@lehigh.edu<br>Office Hours: Determined by Instructor |
| **Term:** | May 25, 2020 – June 19, 2020    **Credits:**    4 units |
| **Class Hours：** | Monday through Friday, 120 minutes per teaching day |
| **Discussion Sessions:** | 2 hours each week, conducted by teaching assistant(s) |
| **Total Contact Hours:** | 66 contact hours (1 contact hour = 45 mins, 3000 mins in total) |
| **Required Texts (with ISBN):** | Calculus, by James Stewart, Eighth Edition.<br>ISBN 978-0-538-49790-9 |
| **Prerequisite:** | Calculus 1 |

**Course Overview**

Calculus Two focuses on several technical ideas for the evaluations of both definite and indefinite integrals and many applications of definite integrals, including volume of a solid obtained by rotation, arc length of a curve, area of a surface obtained by rotation, differential equations, topics related to parametric functions, topics related to polar curves, the convergence or divergence of an infinite series, radius of convergence and interval of convergence of power series.

**Course Goals**

Students are expected to be able to apply integration by parts, substitution rule, partial fraction etc., to solve many definite and indefinite integrals, including improper integrals, to be able to find the volume of solids generated by rotations about the x-axis or the y-axis, to be able to find the arc length of curves, the surface areas generated by rotations of curves, to be able to solve reasonable differential equations, to be able to judge if a series is absolutely convergent, conditional convergent or divergent.

**Grading Policy**

| Quizzes and Homework | 30% |
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| Midterm Examination | 30% |
| Final Examination | 40% |

**Grading Scale**

| Number grade | Letter grade | GPA |
|---|---|---|
| 90-100 | A | 4.0 |
| 85-89 | A- | 3.7 |
| 80-84 | B+ | 3.3 |
| 75-79 | B | 3.0 |
| 70-74 | B- | 2.7 |
| 67-69 | C+ | 2.3 |
| 65-66 | C | 2.0 |
| 62-64 | C- | 1.7 |
| 60-61 | D | 1.0 |
| ≤59 | F (Failure) | 0 |

**Class Schedule**

| Date | Lecture | Readings |
|---|---|---|
| Day 1 | Areas between curves. Volumes. Volumes by cylindrical shells | Chapter 6.1- 6.3 |
| Day 2 | Integration by parts. Trigonometric integrals | Chapter 7.1 – 7.2 |
| Day 3 | Trigonometric substitutions. Integration of rational functions by partial fraction | Chapter 7.3 – 7.4 |
| Day 4 | Strategy for integration. Integration using known integrals | Chapter 7.5 – 7.6 |
| Day 5 | Approximate integration. Improper integrals | Chapter 7.7 – 7.8 |
| Day 6 | Arc length. Area of a surface of revolution. Applications to physics and engineering | Chapter 8.1 – 8.3 |
| Day 7 | Separable equations. First order linear differential equations | Chapter 9.3, 9.5 |
| Day 8 | Review for midterm examination one | Chapters 6, 7, 8, 9 |
| Day 9 | **Midterm Examination** | Chapters 6, 7, 8, 9 |
| Day 10 | Curves defined by parametric equations. Calculus with parametric curves | Chapter 10.1 – 10.2 |
| Day 11 | Polar coordinates. Areas and arc length | Chapter 10.3 -10.4 |
| Day 12 | Areas and arc length of polar curves (continued) | Chapter 10.4 |
| Day 13 | Sequences. Series | Chapter 11.1 – 11.2 |
| Day 14 | The integral test and estimates of sums. The comparison tests | Chapter 11.3 – 11.4 |
| Day 15 | Alternating series. Absolute convergence | Chapter 11.5 – 11.6 |
| Day 16 | The ratio and root tests Strategy for testing series. C | Chapter 11.6 – 11.7 |
| Day 17 | Power series. Representations of functions as power series | Chapter 11.8 - 11.9 |
| Day 18 | Taylor series and Maclaurin series | Chapter 11.10 |
| Day 19 | Review for the final examination | Chapters 6 - 11 |
| Day 20 | **The Final Examination** | Chapters 6 - 11 |