Departmental Syllabus for MAC 2312 - Draft
to be used starting in Spring 2021

Textbook: *Calculus, Early Transcendentals* - 3rd Edition, by Briggs, Cochran, Gillett, Schultz Publisher: Pearson. ISBN 13: 978-0-13-476364-4 , ISBN 10: 0-13-476364-5. Students may also purchase just access to MyLabMath online system and get electronic access to the textbook this way.

Prerequisite: Grade C or better in Calculus I (or equivalent).

Learning objectives: Upon completion, students should demonstrate:
(1) An understanding of how to model physical situations with definite integrals using limits of Riemann sums.
(2) The ability to use calculus to compute areas of planar regions, volumes of solids of rotation, arclength of planar curves, and the work generated by a force.
(3) The ability to compute some indefinite and improper integrals and to approximate definite integrals numerically.
(4) The ability to determine convergence of infinite series, use power series to approximate functions, and apply the technique of power series to compute integrals and solve differential equations.
(5) An understanding of parametric equations and polar coordinates to describe and work with curves in the plane.
(6) The ability to use deductive reasoning in all these tasks.

Assessments: In Fall/Spring/Summer C semesters, departmental policy recommends a minimum of 3 class exams (100 minutes) and a (mandatory, comprehensive) final exam (120 minutes). A graded homework component (online or paper-pencil) should be used and often quizzes/worksheets are recommended. In short semesters, such as Summer A or B terms, the instructor may reduce the number of class exams.

Coverage and pace: The schedule below is based on a course that meets 100 minutes twice a week for 14 weeks. It assumes about 24 class periods for lectures, with the others used for review and exams. The course includes about 35 sections of the textbook, so the pace is about 3 sections per week.

Chapter 5. Integration
Sections 5.1 - 5.3 (quick review) 1-2 lectures - Area, Definition of Integral as Limit of Riemann Sums and Fundamental Theorem of Calculus (topics assumed covered in Calculus 1)
Sections 5.4, 5.5 2 lectures - Working with Integrals, Substitution Rule.

Chapter 6: Applications of Integration – Motion, Areas, Volumes (with cross-section and cylindrical shells), Arc-length, Surface area, Mass and Work.
Sections 6.1-6.7 4-5 lectures - all sections are mandatory, but light coverage of surface area and work is acceptable in short summer semesters.

Chapter 7: Logarithmic, Exponential and Hyperbolic Functions
Only section 7.1 is mandatory (light coverage after 5.5 is recommended) 0.5-1 lecture. Section 7.2 Exponential Models is a good optional section as an introduction to differential equations (if time allows at the end of the course). A very brief exposure to hyperbolic trig. functions $\cosh x, \sinh x$ may be given in conjunction with material from section 6.5 on arc-length.

Chapter 8: Integration Techniques. Mandatory are sections 8.2, 8.3, 8.4, 8.5, 8.6, 8.8, 8.9 4-5 lectures. A light coverage of section 8.1 is also recommended. Section 8.6 Integration Strategies is new compared to our previous textbooks, but it is useful to put together all previous integration techniques (light coverage for 8.6 is recommended - just show some examples and assign some problems). Likely there will be no time for 8.7 (integration using tables).

Chapter 10: Sequences and Series
Sections 10.1-10.8 5 lectures - all sections are mandatory.
As for integration techniques, this textbook has a special section 10.8 Choosing a Convergence Test. Again, this is an useful review, so consider this section as mandatory, with light coverage.

Chapter 11: Power Series
Sections 11.1-11.4 2-3 lectures - all sections are mandatory

Chapter 12: Parametric and Polar Curves
Sections 12.1-12.3 2-3 lectures Mandatory are only the first three sections. Limit to just area in polar coordinates for section 12.3.