*Approved: 5/7/2021 Effective: Summer 2021*

|  |  |  |
| --- | --- | --- |
| **TOPICS** | **SECTIONS FROM TEXT** | **RECOMMENDED**  **TIME LINE** |
| Applications of Definite Integrals: areas, volumes, volumes by cylindrical shells, work, average value of a function  **Math 18B Support Topics**  Riemann sums, fundamental theorem of calculus, u-substitution, similar triangles, geometry formulas, graphing horizontally-opening parabolas, and work problems. | 6.1 – 6.5 | **Math 181:**  7.5 Hours  **Math 18B:**  4 hours |
| Techniques of integration: integration by parts, partial fractions, trig integrals, trig substitution, hyperbolic trig substitutions, tables and computer algebra systems, numerical integration, improper integrals.  **Math 18B Support Topics**  U-substitution, integration by parts (circular case in particular), long division of polynomials, inverse trigonometric functions, trigonometric identities, partial fractions, completing the square, limits, and l’Hospital’s Rule. | 7.1 – 7.8 | **Math 181:**  13 Hours  **Math 18B:**  7 hours |
| Further Applications of Integration: Arc length, surface areas of revolution, fluid force, moments and centers of mass.  **Math 18B Support Topics**  Similar triangles, integration, Riemann sums, perfect square trinomials, chain rule, and review center of mass. | 8.1 – 8.3 | **Math 181:**  5 Hours  **Math 18B:**  2.5 hours |
| Differential Equations: Modeling with differential equations, separable differential equations, population growth and other applications.  **Math 18B Support Topics**  Factoring polynomials including factor by grouping, properties of exponents, exponential models, and Newton’s law of cooling. | 9.1, 9.3 | **Math 181:**  2.5 Hours  **Math 18B:**  1.125 hours |
| Parametric equations, polar coordinates, graphing in polar coordinates,  areas and lengths in polar coordinates.  **Math 18B Support Topics**  Parametric equations, polar coordinates, trigonometric identities, solving trigonometric equations, graphs of trigonometric functions, and integrals involving absolute value. | 10.1 – 10.4 | **Math 181:**  7 Hours  **Math 18B:**  3.5 hours |
| Infinite sequences and series: sequences, infinite series, integral test, comparison tests, ratio and root tests, alternating series, absolute and conditional convergence, power series, Taylor and Maclaurin series, convergence of Taylor series: error estimates, applications of power series.  **Math 18B Support Topics**  l’Hospital’s Rule, squeeze theorem, geometric series, improper integrals, interchanging infinite sum and derivative and interchanging infinite sum and integral, rational functions, binomial theorem for positive integer exponents, Taylor remainder theorem, and integration using power series representation. | 11.1 – 11.11 | **Math 181:**  17 Hours  **Math 18B:**  8 hours |
| Total Time: |  | **Math 181:**  52 hours  **Math 18B:**  26.125 hours |

**All hours listed are face-time; i.e. breaks are administered by the instructor separately**

**and are in addition to the hours listed.**

**Math 181 (4 units): 57.5 hours + 2.5-hour final exam = 60 hours (a portion of these hours is testing)**

**Math 18B (2 units): 30 hours**

### **Math 18B: The outline does not include time for exams. Exams in the support course are at the**

### **discretion of the professor.**

### **Math 18B is a 15-week course. The corequisite course does not meet during finals week.**

**NOTES:**

1. It is expected that a student leaving this course will have had experience with a computer algebra system. A

minimum of two computer assignments is needed.

1. A computer algebra system student handout is available at the Math/CS computer lab.
2. At least 25% of the grade should be based on student performance without the aid of a graphing calculator or computer.
3. Practice exams can indicate types of problems but actual problems should be substantially different.

**Submitted by:** Beydler, Griffith, Guth, Khoddam, Kojima, Nguyen, Pop, Sholars, Tamayo, Tran

Math Department Policy can be found at: <https://www.mtsac.edu/math/departmentpolicy.html>