LSU College Readiness Dual Enrollment Program for Math

COURSE PROFILE

7-30-2018

**COURSE NAME: Math 1552 Calculus II**

**BOARD OF REGENTS COMMON COURSE NUMBER: CMAT 2124 Calculus II**

**PRIMARY ONLINE CONTENT SOURCE: *Calculus: Early Transcendentals, 2e,* *MyMathLab*,**

**Briggs, Cochran, Gillett, Schultz**

**COURSE/UNIT CREDIT: 4 credit hours, 1 Carnegie Unit**

**GRADE(S): 11 or 12**

**PREREQUISITE(S): Credit for Math 1550 Calculus I**

**CHAPTERS**

**7 – Integration Techniques**

**10 – Parametric and Polar Curves**

**11 – Vectors**

**8 – Sequences and Infinite Series**

**9 – Power Series**

| **SECTION NAMES (NUMBER OF EXERCISES) AND LEARNING OBJECTIVES** |
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| **CHAPTER 7: Integration Techniques** |
| **7.1 Basic Approaches (17)**  Solve integrals using substitution.  Solve integrals by splitting fractions.  Solve integrals by dividing rational functions.  Solve integrals by completing the square.  Solve integrals by multiplying by 1. |
| **7.2 Integration by Parts (11)**  Evaluate indefinite integrals by applying integration by parts once.  Evaluate indefinite integrals by applying integration by parts more than once.  Evaluate definite integrals using integration by parts.  Find volumes of solids of revolution using integration by parts. |
| **7.3 Trigonometric Integrals (15)**  Evaluate integrals involving powers of sine and cosine.  Evaluate integrals involving powers of the other four trigonometric functions.  Use trigonometric integrals to find areas, volumes or arc lengths. |
| **7.4 Trigonometric Substitution (15)**  Evaluate integrals of the form .  Evaluate integrals of the form .  Evaluate integrals of the form . |
| **7.5 Partial Fractions (11)**  Evaluate integrals involving only linear factors.  Evaluate integrals involving irreducible quadratic factors.  Evaluate integrals that require a preliminary step. |
| **7.7 Numerical Integration (6)**  Find an approximation for an integral using the midpoint,  Determine the error in numerical integration.  Solve applications involving numerical integration. |
| **7.8 Improper Integrals (14)**  Evaluate improper integrals with an infinite limit of integration.  Evaluate improper integrals with an integrand that is infinite at some point.  Evaluate integrals using symmetry or integration by parts.  Find volumes using improper integrals. |
| **CHAPTER 10: Parametric and Polar Curves** |
| **10.1 Parametric Equations (10)**  Graph and analyze parametric equations.  Graph and analyze circles, arcs, and circular motions.  Find slopes of tangent lines.  Graph and analyze other parametric curves. |
| **10.x Calculus with Parametric Equations (15) {content from 10.1, 6.5, and external book}**  Find slopes of tangent lines.  Solve applications involving parametric equations.  Use technology to find arc lengths.  Find surface areas of curves revolved about the *x*-axis.  Find surface areas of curves revolved about the *y*-axis.  Find areas of surfaces of revolution for parametrized curves.  Find lengths of parametrized curves. |
| **10.2 Polar Coordinates (17)**  Graph using polar coordinates.  Convert between polar and Cartesian coordinates.  Convert between polar and Cartesian graphs. |
| **10.3 Calculus in Polar Coordinates (9)**  Find slopes and equations of tangent lines to polar curves.  Find the area of a region bounded by polar curves. |
| **CHAPTER 11: Vectors** |
| **11.1 Vectors in the Plane (17)**  Perform vector operations.  Find the magnitude of a vector.  Find position vectors.  Identify equal vectors.  Write linear combinations of vectors.  Find unit vectors. |
| **11.2 Vectors in Three Dimensions (20)**  Find and plot points in *xyz*-space.  Sketch planes.  Find equations for given three-dimensional objects.  Give a geometric description of sets of points.  Use vector operations.  Find unit vectors and magnitude. |
| **11.3 Dot Products (18)**  Compute dot products using the definition.  Compute dot products and find angles between the vectors.  Sketch and calculate orthogonal projections.  Calculate work done in given situations.  Find orthogonal vectors. |
| **11.4 Cross Products (20)**  Compute cross products and their magnitude.  Find areas of parallelograms and triangles.  Find normal vectors.  Solve applications involving cross products. |
| **11.5 Lines and Curves in Space (19)**  Find equations of lines and line segments.  Graph curves in space.  Determine if a pair of lines are parallel, intersecting, or skew.  Find points of intersection. |
| **11.6 Calculus of Vector-Valued Functions (24)**  Find first derivatives of vector-valued functions.  Find tangent vectors.  Find higher derivatives of vector-valued functions.  Compute indefinite integrals.  Find the function *r* that satisfies given conditions. |
| **11.7 Motion in Space (14)**  Find the velocity and acceleration of objects.  Solve problems involving two-dimensional motion.  Solve problems involving three-dimensional motion. |
| **\*11.8 Lengths of Curves (17) (optional)**  Find arc lengths.  Find speeds and lengths of trajectories.  Find arc lengths of polar curves.  Parameterize curves by arc length. |
| **CHAPTER 8: Sequences and Infinite Series** |
| **8.1 An Overview (19)**  Find terms of sequences.  Write recurrence relations and/or explicit formulas for the terms of sequences.  Determine limits of sequences if the sequences converge.  Determine limits of sequences of partial sums if the sequences converge. |
| **8.2 Sequences (17)**  Use properties and theorems to determine limits of sequences.  Determine the limits of geometric sequences that converge.  Use the Squeeze Theorem to determine limits of sequences that converge.  Use the growth rate of sequences to determine limits of sequences that converge. |
| **8.3 Infinite Series (16)**  Evaluate geometric sums.  Evaluate geometric series.  Evaluate telescoping series. |
| **8.4 The Divergence and Integral Tests (20)**  Apply the divergence test.  Apply the integral test.  Determine if a *p*-series converges or diverges.  Estimate the values of series.  Use properties of convergent series to evaluate series.  Determine if a series converges or diverges. |
| **8.5 The Ratio, Root, and Comparison Tests (22)**  Apply the ratio test.  Apply the root test.  Apply the comparison test or limit comparison test.  Determine if a series converges or diverges.  Determine values for which series converge. |
| **8.6 Alternating Series (24)**  Apply the alternating series test.  Determine the number of terms needed to ensure given errors for partial sums of alternating series.  Estimate the values of alternating series.  Determine if a series converges absolutely or conditionally. |
| **CHAPTER 9: Power Series** |
| **9.1 Approximating Functions with Polynomials (15)**  Use linear and quadratic polynomials to approximate functions.  Find the Taylor polynomials of functions.  Use Taylor polynomials centered at zero to approximate functions.  Use Taylor polynomials not centered at zero to approximate functions.  Find the remainder term of a Taylor approximation and use it to estimate error. |
| **9.2 Properties of Power Series (20)**  Find the interval and radius of convergence of power series.  Combine power series.  Differentiate and integrate power series.  Write a function as a power series.  Write power series in summation notation. |
| **9.3 Taylor Series (17)**  Find the Maclaurin series of a function.  Find the Taylor series of a function, not centered at 0.  Find the Binomial series of a function. |
| **9.4 Working with Taylor Series (8)**  Differentiate Taylor series.  Approximate definite integrals using Taylor series.  Approximate real numbers using Taylor series. |
| **\*SECTION 12.4: Partial Derivatives (optional)** |
| **\*12.4 Partial Derivatives (16)**  Find first partial derivatives.  Find second partial derivatives.  Find first partial derivatives of functions with more than two variables. |