

2/20/2025

DATE

☐ REQUIRED COURSE
☐ ELECTIVE COURSE

MSD DIVISION
☐ NEW COURSE
☒ REVISION

Lake Land College

Course Information Form

| | | | | | | | | | | | | | |
|--------------------------------------|--|------------------|--|------------------------|-------------------------|------|------------------------------|------|----------|--------|-----|-------|-----|
| COURSE NUMBER: | MAT-242 | | TITLE: (30 Characters Max) | | Analytical Geom-Calc II | | | | | | | | |
| SEM CR HRS: | 4 | Lecture: | 4 | | Lab: | 0 | | | ECH: | 4 | | | |
| Course Level: | <input checked="" type="checkbox"/> Gen Ed/IAI <input type="checkbox"/> Baccalaureate/Non-IAI | | <input type="checkbox"/> Career/Technical <input type="checkbox"/> Dev Ed/Not in Degree Audit | | Clinical Practicum: | 0 | Work-based Learning: | 0 | WBL ECH: | 0 | | | |
| Course PCS & CIP: | 11 - 27.0101 | | IAI Code: | | M1 900-2 and MTH 902 | | Contact Hours (Minutes/Week) | | | | | | |
| Repeatable (Y/N): | N | Pass/Fail (Y/N): | N | Variable Credit (Y/N): | N | Min: | | Max: | | 16 Wks | 200 | 8 Wks | 400 |
| Prerequisites: | MAT-241 with grade of "C" or higher | | | | | | | | | | | | |
| Corequisites: | None | | | | | | | | | | | | |
| Catalog Description: (40 Word Limit) | A continuation of Calculus I with emphasis on different methods of integration and applications, L'Hôpital's Rule, sequences, series, power series, Taylor series and Maclaurin series. A graphing calculator is required. | | | | | | | | | | | | |

| List the Major Course Segments (Units) | Contact Lecture Hours | Contact Lab Hours | Clinical Practicum | Work-based Learning |
|--|-----------------------|-------------------|--------------------|---------------------|
| Applications of integration | 12 | | | |
| Techniques of integration and L'Hôpital's Rule | 19 | | | |
| Infinite series, sequences, tests for series, Taylor polynomials, functions and Maclaurin series | 17 | | | |
| Calculus with parametric and polar equations, conic sections | 12 | | | |
| TOTAL | 60 | 0 | 0 | 0 |

EVALUATION

| | | | |
|---|---|--|---------------------------------|
| QUIZZES <input checked="" type="checkbox"/> | EXAMS <input checked="" type="checkbox"/> | ORAL PRES <input type="checkbox"/> | PAPERS <input type="checkbox"/> |
| LAB WORK <input type="checkbox"/> | PROJECTS <input type="checkbox"/> | COMP FINAL <input checked="" type="checkbox"/> | OTHER <input type="checkbox"/> |

COURSE MATERIALS

| | |
|---------------------|--|
| TITLE: | Calculus: Early Transcendental Functions |
| AUTHOR: | Ron Larson & Bruce Edwards |
| PUBLISHER: | Cengage Learning |
| VOLUME/EDITION/URL: | 7th edition |
| COPYRIGHT DATE: | 2019 |

| MAJOR COURSE SEGMENT | HOURS | LEARNING OUTCOMES |
|--|-------|---|
| | | <i>The student will be able to:</i> |
| Applications of integration | | 1. Apply different methods of integration to solve a variety of problems. 2. Apply integration to find area between two curves. 3. Apply integration to find volumes using the disc method. 4. Apply integration to find volumes using the shell method. 5. Apply integration to find the lengths of arcs. 6. Apply integration to find areas of surfaces of revolution. 7. Find amount of work of a constant force and variable force, centers of mass and moments, and fluid pressure, force. |
| Area of a region between two curves | 2 | |
| Volume: the disk method | 2 | |
| Volume: the shell method | 1 | |
| Arc length and surfaces of revolution | 2 | |
| Work | 2 | |
| Moments, center of mass, and centroids | 2 | |
| Fluid pressure and fluid force | 1 | |
| Techniques of integration and L'Hôpital's Rule | | 1. Identify and evaluate new types of integrals and apply them to various problems, emphasizing integration by parts, partial fractions, trigonometric substitutions and trigonometric integrals. 2. Apply L'Hôpital's Rule to indeterminate forms and improper integrals. |
| Basic integration rules | 2 | |
| Integration by parts | 3 | |
| Trigonometric integrals | 3 | |
| Trigonometric substitution | 3 | |
| Partial fractions | 3 | |
| Indeterminate forms and L'Hôpital's Rule | 2 | |
| Integration by tables and other integration techniques | 1 | |
| Improper integrals | 2 | |

| Infinite series, sequences, tests for series, Taylor polynomials, functions, Maclaurin series | | 1. Work with different types of sequences and series, emphasizing the integral test, p-series test, comparison tests, alternating series test and ratio and root tests. 2. Construct Taylor polynomials, power series and Taylor and Maclaurin series. |
|---|---|--|
| Sequences | 1 | |
| Series and convergence | 2 | |
| The integral test and p-series | 2 | |
| Comparisons of series | 2 | |
| Alternating series | 2 | |
| The ratio and root tests | 1 | |
| Power series | 1 | |
| Representation of functions by power series | 2 | |
| Taylor polynomials and approximations | 2 | |
| Taylor and Maclaurin series | 2 | |
| Calculus with parametric and polar equations, conic sections | | 1. Identify equations for conic sections and be able to graph them. 2. Represent and graph equations in parametric form. 3. Apply calculus to parametric equations. 4. Represent and graph equations in polar coordinates. 5. Apply calculus to polar equations. |
| Conics and calculus | 3 | |
| Plane curves and parametric equations | 2 | |
| Parametric equations and calculus | 2 | |
| Polar coordinates and graphs | 2 | |
| Area and arc length in polar coordinates | 3 | |
| | | 60 |

| Outcomes* | At the successful completion of this course, students will be able to: |
|-------------------------------------|--|
| Course Outcome 1 | Apply integration to find the area between two curves. |
| Course Outcome 2 | Apply integration to find the volume of a solid of revolution by both the disk (washer) and shell methods. |
| Course Outcome 3 | Identify the basic 18-20 integration formulas. |
| Course Outcome 4 | Apply the major integration techniques: parts, trigonometric substitution, partial fractions, L'Hôpital's Rule and improper integrals. |
| Course Outcome 5 | Determine the convergence/divergence of sequences of numbers. |
| Course Outcome 6 | Perform the major convergence/divergence tests for infinite series: Nth-term test, geometric series, integral test, p-series, alternating series, direct and limit comparison, ratio tests and root tests. |
| Course Outcome 7 | Construct Maclaurin and Taylor polynomials and series for functions. |
| Course Outcome 8 | Identify conic sections, especially ellipses and hyperbolas. |
| Course Outcome 9 | Apply parametric equations for plane curves and their calculus. |
| Course Outcome 10 | Apply polar coordinates and graphs and their calculus. |
| Primary Laker Learning Competency | Critical Thinking: Students connect knowledge from various disciplines to formulate logical conclusions. |
| Secondary Laker Learning Competency | Quantitative Literacy: Students analyze data and mathematical patterns in real-life situations. |

*Course and program outcomes will be used in the software for outcomes assessment and should include at least 1 primary and 1 secondary Laker Learning Competency. Limit to 3-5.