

MATH 0031 - ANALYTICAL GEOMETRY AND CALCULUS II

SECTION A

- 1. **Division:** Sciences & Mathematics
- 2. **Subject Code:** MATH
- 3. **Course Number:** 0031
- 4. **Course Title:** ANALYTICAL GEOMETRY AND CALCULUS II
- 5. **Semester of First Offering:** FALL 2015

SECTION B General Course Information

- 1. **Units:** 4.0 **Variable Units:** N/A
- 2. **This Course is:** Degree-Applicable Credit - Transferable
- 3A. **Cross-List:** **3B. Formerly:**

Course Format and Duration

4. Standard Term Hours per Week		5. Standard Term Total Semester Hours	
Lecture/Discussion:	4	Lecture/Discussion:	72
Lab:		Lab:	
Activity:		Activity:	
By Arrangement:		By Arrangement:	
Total Hours per Week:	4	Total Hours :	72

6. **Minimum hours per week of independent work done outside the class:** 8

Course Preparation - (Supplemental form B required)

7a. **Prerequisite(s):** (Course and/or other preparation/experience that is **REQUIRED** to be completed previous to enrollment in this course.)

Completion of MATH 30 with grade of "C" or better

7b. **Co-requisite(s):** (Courses and/or other preparation that is **REQUIRED** to be taken concurrently with this course.)

7c. **Advisory:** (**MINIMUM** preparation **RECOMMENDED** in order to be succesful in this course. Also known as "Course Advisory".)

Catalog Description And Other Catalog Information:

8. Repeatability: Not Repeatable

Please note: Repeatability does not refer to repeating courses because of substandard grades or a lapse of time since the student took the course. A course may be repeated only if the course content differs each time it is offered and the student who repeats it is gaining an expanded educational experience as stipulated in Title V.

- Skills or proficiencies are enhanced by supervised repetition and practice within class periods.
- Active participatory experience in individual study or group assignments is the basic means by which learning objectives are attained.
- Course content differs each time it is offered.

Explanation for above repeatability selection:

9a. Grading Option: Standard Grade

9b. Catalog Description:

Continuation of MATH 30. Content includes techniques of integration, improper integrals, applications of integration, infinite series, parametric equations and polar coordinates.

Course Outline Information

10. Student Performance Objectives: (Performance objectives for all credit courses must indicate that students will learn critical thinking and will be able to apply concepts at college level. Performance objectives must be related to items listed in Section 11.)

1. Evaluate definite and indefinite integrals using a variety of integration formulas and techniques;
2. Apply integration to areas and volumes, and other applications such as work or length of a curve;
3. Evaluate improper integrals;
4. Apply convergence tests to sequences and series;
5. Represent functions as power series; and
6. Graph, differentiate and integrate functions in polar and parametric form.

11. Course Content Outline: (Provides a comprehensive, sequential outline of the course content, including all major subject matter and the specific body of knowledge covered.)

1. Areas between curves;
2. Volume, volume of a solid of revolution;
3. Additional techniques of integration including integration by parts and trigonometric substitution;
4. Numerical integration; trapezoidal and Simpson's rule;
5. Improper integrals;
6. Applications of integration to areas and volumes;
7. Additional applications such as work, arc length, area of a surface of revolution, moments and centers of mass, separable differential equations, growth and decay;
8. Introduction to sequences and series;
9. Multiple tests for convergence of sequences and series;
10. Power series, radius of convergence, interval of convergence;
11. Differentiation and integration of power series;
12. Taylor series expansion of functions;
13. Parametric equations and calculus with parametric curves; and
14. Polar curves and calculus in polar coordinates.

12. Typical Out-of-Class Assignments: (Credit courses **require** two hours of independent work outside of class for each lecture hour, less lab/activity classes. List type of assignments including library assignments.)

a. Reading Assignments: (Submit at least 2 examples.)

Example 1: Read in your textbook about 2 methods for calculating the volume of a solid of revolution.

Example 2: Research online the history of Newton's discovery of the Binomial Series.

b. Writing, Problem Solving or Performance: (Submit at least 2 examples)

1. Students will write a 3 - 5 paragraph report on Newton's discovery of the binomial series.
2. Calculate areas bounded by polar graphs. Example: Find the area enclosed inside the cardioid $r = 5\cos(t)$ and outside the rose $r = 2\sin(3t)$.

c. Other (Term projects, research papers, portfolios, etc.)

13. Required Materials:

a. All textbooks, resources and other materials used in this course are college level?

- Yes
 No

b. Representative college-level textbooks (for degree applicable courses) or other print materials:

Book 1:

Author: William Briggs and Lyle Cochran
Title: Calculus for Scientists and Engineers: Early Transcendentals
Publisher: Addison-Wesley
Date of Publication: 2014
Edition: 2nd

c. Other materials and/or supplies required of students:

14. Check all instructional methods used to present course content:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Lecture | <input type="checkbox"/> Activity |
| <input type="checkbox"/> Discussion Seminar | <input type="checkbox"/> Distance Education (requires supplemental form) |
| <input type="checkbox"/> Lab | <input type="checkbox"/> Work Experience |
| <input type="checkbox"/> Directed Study | <input type="checkbox"/> Tutoring |

Other:

Give detailed examples of teaching methodology that relate to the course performance objectives:

Example 1- Interactive lecture format to develop the concept of finding a power series representation of a variety of functions. For each type of function, the instructor will incorporate algebraic derivation and visual analysis through graphing. Students will participate verbally and will work several examples.

Example 2: In class, small group collaborative learning activities will focus on determining which methods of integration to use for a variety of problems. Students will practice recognizing which method to try, testing their conjectures, and developing solutions with peers.

15. Methods of Assessing Student Learning

15a. Methods of Evaluation:

- | | |
|--|--|
| <input type="checkbox"/> Essay Exam | <input type="checkbox"/> Reports |
| <input type="checkbox"/> Objective Exam | <input checked="" type="checkbox"/> Problem Solving Exam |
| <input checked="" type="checkbox"/> Projects | <input type="checkbox"/> Skill Demonstration |
| <input checked="" type="checkbox"/> Class Discussion | <input type="checkbox"/> Other |

15b. (All courses must provide for measurement of student performance in terms of stated student performance objectives, Area 10, and culminate in a formal recorded grade based on uniform standards. Submit at least 2 examples.)

1. Find the volume generated when the region bounded by the curves $y = \cos x$ and $y = (\cos x)^2$ for values of x between $x = 0$ and $x = \pi$, is revolved about the y axis. This problem is graded for correct method and accuracy.
2. Use Taylor's Inequality to determine the number of terms of the Maclaurin series for e^x that should be used to estimate $e^{0.1}$ to within 0.00001. This problem is graded for method and accuracy.

SECTION C

1. Program Information:

- In an approved program
- Part of a new program
- Not part of an approved program

2. TOP Code Information

Program Title: Mathematics, General 170100

3. Course SAM Code:

- A - Apprenticeship Course
- B - Advanced Occupational
- C - Clearly Occupational
- D - Possibly Occupational
- E - Non-Occupational

4. Faculty Minimum Qualifications/Degrees:

Mathematics

Comments:

SECTION D**General Education Information:****1. College Associate Degree GE Applicability:**

Communication & Analytic Thinking

2. CSU GE Applicability:

B-4 Mathematics/Quantitative Reasoning

3. IGETC Applicability:

2: Mathematical Concepts & Quantitative Reasoning

4. CAN : MATH 220 Single Variable Calculus II Early Transcendentals; and, with MATH 30, MATH 900S**5. LDTP:** Single Variable Calculus Sequence**SECTION E****1. Articulation Information:** (Required for Transferable Courses Only)

- CSU Transferable
- UC Transferable
- CSU/UC Major Requirement.

If CSU/UC major requirement, list campus and major. (Note: Must be lower division)

2. List at least one community college and its comparable course. If requesting CSU and/or UC transferability also list a CSU/UC campus and comparable lower division course

American River College: MATH 401 Calculus II

CSU Sacramento: MATH 31 Calculus II

UC Davis: MATH 21B Calculus

SECTION F

Planning and Resources: Please address the areas below:

1. Evidence of Need or Potential: recommendations of advisory committee, connection to existing or planned degrees/certificates, or regional/national developments, transfer university requirements.

Required for all math, physics, and engineering majors.

Transfer-level math class.

Meets GE applicability for Math Competency and Communication and Analytical Thinking. Course includes all four math program SLO's. (Equations and Expressions, Visual Models, Applied Problems, Communication)

2. Appropriateness to Mission: connection to basic skills, transfer, career technical education, or lifelong learning; relations

3. Place in Program/Department: relationship to student learning outcomes identified by program, connection to general education, or articulation with other institutions.

4. Availability of Faculty and Facilities: minimum qualifications to teach course, special training for instructors, or long-term physical impact of course.

All math faculty members meet the minimum qualifications to teach this course. No special training would be required.

No additional resources are needed since we have the classroom space and technology already available.

5. Potential Impact on Resources: impact on library, computer support, transportation, equipment, or other needs

SECTION G

1. Maximum Class Size (recommended): 35

2. If recommended class size is not standard, then provide rationale: