EL CAMINO COLLEGE
COURSE OUTLINE OF RECORD

I. COURSE DESCRIPTION

Course Title and Number: Mathematics 191

Descriptive Title: Single Variable Calculus and Analytic Geometry II

Discipline: Mathematics

Division: Mathematical Sciences

Course Length: ☒Full Term ☐Other (specify):

Hours Lecture: 5 Hours Laboratory: Course Units: 5

Grading Method: ☒Letter ☐Credit/No Credit ☐Both ☐No Grade

Course Type: ☒Credit, Degree Applicable ☐Credit, Not Degree Applicable ☐Non-Credit

Transfer CSU: ☒Yes Effective Date Prior to July, 1992 ☐No

Transfer UC: ☒Yes Approval Date Prior to July, 1992 ☐Pending ☐No

Conditions of Enrollment:
Specify Prerequisite Corequisite, Recommended Preparation, Enrollment Limitation or None.

Prerequisite: Mathematics 190 with a minimum grade of C.

Catalog Description:

This course includes methods of integration; applications of integration; improper integrals; numerical integration; infinite sequences, series and power series; parametric equations; polar coordinates; as well as conic sections.

II. COURSE OBJECTIVES

List the major objectives of the course. These must be stated in behaviorally measurable terms.

1. Use integration to solve application problems involving: areas between curves; volumes by washers and cylindrical shells; arc length and areas of surfaces of revolution.
2. Evaluate integrals using integration techniques including: integration by parts; trigonometric substitutions; partial fraction decomposition and tables of integrals.
3. Use numerical techniques (both with and without technology) to approximate the values of integrals.
4. Determine the convergence or divergence of sequences, series and power series.
5. Solve problems using Taylor series, including differentiation and integration of power series.
6. Solve problems involving parametric equations, polar coordinates and conic sections. Examples include the graphing of parametric and polar curves and the calculation of the arc

length of curves so defined. Additional problems involve the calculation of the area bounded by such curves.

III. OUTLINE OF SUBJECT MATTER

The topics should be detailed enough to enable an instructor to determine the major areas that should be covered and so that the course may have consistency from instructor to instructor and semester to semester.

Approximate Time in Hours	Major Topics
16	Applications of Integration 1. Areas between curves 2. Volumes by washers 3. Volumes by cylindrical shells 4. Average value of a function 5. Arc length 6. Surface area of a surface of revolution
16	Techniques of Integration 1. Integration by parts 2. Trigonometric integrals and trigonometric substitution 3. Integration of rational functions using the partial fractions technique 4. Numerical integration techniques, such as midpoint rule, trapezoid rule and Simpson's rule 5. Improper Integrals
42	Infinite Sequences and Series 1. Sequences and definition of convergent sequence 2. Series and definition of convergent series 3. Alternating Series and the definition of absolutely convergent series 4. Tests for convergence of infinite series, including the integral, comparison, limit comparison, ratio and root tests 5. Power series and representations of functions as power series, including Maclaurin and Taylor series 6. Binomial series 7. Applications of power series
16	Parametric Equations and Polar Coordinates 1. Curves defined by parametric equations, their graphs and tangent lines 2. Areas, arc lengths and surface areas involving parametric equations 3. Polar coordinates, polar equations, their graphs and tangent lines 4. Areas and arc lengths in polar coordinates 5. Conic sections using parametric equations and polar coodinates

Total: 90 hours

IV . METHODS OF EVALUATION

A. CREDIT, DEGREE APPLICABLE AND CREDIT, NOT DEGREE APPLICABLE COURSES

Check the PRIMARY method of evaluation for this course.

- ☐ Substantial writing assignments
- ☒ Problem solving demonstrations (computational or non-computational)
- ☐ Skills demonstrations

A minimum of one response in the categories 1, 2, or 3 below, as applicable, is required. However, you may check all that apply.

1. Indicate the types of writing assignments used as primary or secondary methods of evaluation for this course.
   - ☐ Essay exams
   - ☐ Written homework
   - ☐ Term or other papers
   - ☐ Reading reports
   - ☐ Laboratory reports
   - ☐ Other (specify)

2. Indicate the types of problem-solving demonstrations used as primary or secondary methods of evaluation for this course.
   - ☒ Exams
   - ☐ Laboratory reports
   - ☒ Quizzes
   - ☒ Homework problems
   - ☐ Fieldwork
   - ☐ Other (specify)

3. Indicate the types of skill demonstrations used as primary or secondary methods of evaluation for this course.
   - ☐ Class performance
   - ☐ Performance exams
   - ☐ Fieldwork
   - ☐ Other (specify)

4. If objective exams are also used, check all that apply.
   - ☐ Multiple choice
   - ☐ Completion
   - ☐ Matching items
   - ☐ True/false
   - ☐ Other (specify)

B. NON-CREDIT COURSE

Indicate the methods of evaluation that will be used to determine that stated objectives have been met.

V. COURSEWORK

A. TYPICAL ASSIGNMENT

Provide an example of a typical assignment. This assignment must correspond to the PRIMARY method of evaluation indicated in Section IV, Methods of Evaluation. That is, it must be a writing assignment or, if more appropriate, an assignment involving problem solving or skill demonstration.

Read the section of the text corresponding to “Volumes by Cylindrical Shells”, then complete the exercises for that section listed in the syllabus. The following is a sample exercise:

Use the method of Cylindrical Shells to calculate the volume generated by rotating the region bounded by the following curves about the y – axis:

$$f(x) = x^2 - 6x + 1 \text{ and } g(x) = -x^2 + 6x - 6$$

B. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS

Cite two specific assignments that demonstrate college-level critical thinking. (Required for degree applicable courses only.)

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1) Determine the radius and interval of convergence for the power series

$$\sum_{n=0}^{\infty} \frac{2^n (x-3)^n}{n+3}$$

2) Calculate the slope of the tangent line to the given polar curve at the point specified by the value of theta:

$$r = \cos\theta + \sin\theta, \quad \theta = \frac{\pi}{4}$$

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C. WORK OUTSIDE OF CLASS

Two hours work outside of class are required for each hour of lecture or equivalent. Each student in this course will be required to participate in the following work outside of class time. Check all that apply.

- ☒ Study
- ☐ Answer questions
- ☐ Skill practice
- ☒ Required reading
- ☒ Problem solving activity
- ☐ Written work (such as essay/composition/report/analysis/research)
- ☐ Journal (done on a continuing basis throughout the semester)
- ☐ Observation of or participation in an activity related to course content (such as theatre event, museum, concert, debate, meeting)
- ☐ Course is lab only - minimum required hours satisfied by scheduled lab time
- ☐ Other (specify)

VI. INSTRUCTIONAL METHODOLOGY

A. Check all planned instructional activities that apply:

☒ Lecture	☐ Group Activities
☐ Lab	☐ Role play/simulation
☒ Discussion	☐ Guest Speakers
☐ Multimedia presentations	☐ Field trips
☒ Demonstration	☐ Other (specify)

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instructional delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VII. TEXTS AND MATERIALS

If multiple selection is offered, only representative texts need be listed. An up-to-date list of required and recommended materials is maintained in the division office.

A. REQUIRED TEXTS (title, author, publisher, year)

Calculus, Early Transcendentals, 6th Edition, James Stewart, Brooks/Cole, 2008

B. REQUIRED SUPPLEMENTARY READINGS

C. OTHER REQUIRED MATERIALS

Graphing Calculator

VIII. CONDITIONS OF ENROLLMENT

If this course has a Prerequisite or Corequisite, complete section A. If this course has an Enrollment Limitation complete section B.

A. PREREQUISITE AND/OR COREQUISITE

1. Indicate if this course has a prerequisite or corequisite or both.
   ☒Prerequisite ☐Corequisite ☐Both

2. Indicate Type. Check all that apply.

   ☒Sequential ☐Computational/Communication Skills
   ☐Health and Safety ☐Non-Course
   ☐Standard (If this is a Standard prerequisite or corequisite, attach CCC Form D.)

3. Entrance Skills/Knowledge
   List the required skills and/or knowledge without which a student would be highly unlikely to receive a grade of A, B, C, or Credit (or for Health and Safety, would endanger self or others) in this course.

   1. Differentiate algebraic, trigonometric, exponential and logarithmic functions using all available rules of differentiation.
   2. Determine tangent lines to the graphs of algebraic, trigonometric, exponential and logarithmic functions at specified points.
   3. Solve application problems using differential calculus.
   4. Antidifferentiate polynomials and other functions using substitution.

B. ENROLLMENT LIMITATION

1. Indicate the category which describes the Enrollment Limitation for this course.
   - ☐ Band/Orchestra
   - ☐ Theater
   - ☐ Speech
   - ☐ Chorus
   - ☐ Journalism
   - ☐ Dance
   - ☐ Intercollegiate Athletics
   - ☐ Honors Course
   - ☐ Blocks of Courses
   - ☐ Other (specify)

2. List Degree and/or Certificate requirements that are met by this course.

3. List all El Camino College courses that also satisfy the requirements listed above in Section B.2.

Originator: V. Skinner Submittal Date: February, 1967

BOARD APPROVAL DATE: _____

Reviewed and/or Revised by:

D. Veroda and J. Vedder Date: February, 1989

Milan Georgevich Date: February, 2000

J. Cohen, G. Fry, A. Sampson, A. Seyedin and L. Wapner Date: September, 2008

_____ Date: _____

REQUIRED SIGNATURES FOR NON-CREDIT COURSE

College Curriculum Committee Chair

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Vice-President - Academic Affairs

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