

# MATH R121: CALCULUS WITH ANALYTIC GEOMETRY II

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**Originator**

hfahs

**College**

Oxnard College

**Discipline (CB01A)**

MATH - Mathematics

**Course Number (CB01B)**

R121

**Course Title (CB02)**

Calculus with Analytic Geometry II

**Banner/Short Title**

Calculus II

**Credit Type**

Credit

**Start Term**

Fall 2021

**Catalog Course Description**

This is the second course in the differential and integral calculus of a single variable series. Topics include integration; techniques of integration; infinite sequences and series; polar and parametric equations; and applications of integration. C-ID: MATH 220.

**Taxonomy of Programs (TOP) Code (CB03)**

1701.00 - Mathematics, General

**Course Credit Status (CB04)**

D (Credit - Degree Applicable)

**Course Transfer Status (CB05) (select one only)**

A (Transferable to both UC and CSU)

**Course Basic Skills Status (CB08)**

N - The Course is Not a Basic Skills Course

**SAM Priority Code (CB09)**

E - Non-Occupational

**Course Cooperative Work Experience Education Status (CB10)**

N - Is Not Part of a Cooperative Work Experience Education Program

**Course Classification Status (CB11)**

Y - Credit Course

**Educational Assistance Class Instruction (Approved Special Class) (CB13)**

N - The Course is Not an Approved Special Class

**Course Prior to Transfer Level (CB21)**

Y - Not Applicable

**Course Noncredit Category (CB22)**

Y - Credit Course

**Funding Agency Category (CB23)**

Y - Not Applicable (Funding Not Used)

**Course Program Status (CB24)**

1 - Program Applicable

**General Education Status (CB25)**

B - Satisfies Math/Quantitative Reasoning req (CSUGE-B B4, IGETC 2, or 4-yr)

**Support Course Status (CB26)**

N - Course is not a support course

**Field trips**

Will not be required

**Grading method**

Letter Graded

**Does this course require an instructional materials fee?**

No

**Repeatable for Credit**

No

**Is this course part of a family?**

No

**Units and Hours**

**Carnegie Unit Override**

No

**In-Class**

**Lecture**

**Minimum Contact/In-Class Lecture Hours**

87.5

**Maximum Contact/In-Class Lecture Hours**

87.5

**Activity**

**Laboratory**

**Total in-Class**

**Total in-Class**

**Total Minimum Contact/In-Class Hours**

87.5

**Total Maximum Contact/In-Class Hours**

87.5

**Outside-of-Class**

**Internship/Cooperative Work Experience**

**Paid****Unpaid****Total Outside-of-Class****Total Outside-of-Class****Minimum Outside-of-Class Hours**

175

**Maximum Outside-of-Class Hours**

175

**Total Student Learning****Total Student Learning****Total Minimum Student Learning Hours**

262.5

**Total Maximum Student Learning Hours**

262.5

**Minimum Units (CB07)**

5

**Maximum Units (CB06)**

5

**Prerequisites**

MATH R120 or placement as determined by the college's multiple measures assessment process

**Entrance Skills****Entrance Skills**

Algebra, trigonometry and calculus.

**Requisite Justification****Requisite Type**

Prerequisite

**Requisite**

Math R120

**Requisite Description**

Course in a sequence

**Level of Scrutiny/Justification**

Required by 4 year institution

**Student Learning Outcomes (CSLOs)****Upon satisfactory completion of the course, students will be able to:**

- |   |   |
|---|---|
| 1 | Apply various tests to determine convergence or divergence of infinite series |
| 2 | Solve application problems involving integration                              |

**Course Objectives**

Upon satisfactory completion of the course, students will be able to:

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
6	Graph, differentiate and integrate functions in polar and parametric form

**Course Content****Lecture/Course Content**

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
14. Polar curves and calculus in polar coordinates

**Laboratory or Activity Content**

None

**Methods of Evaluation**

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises  
 Skills demonstrations  
 Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Computational homework  
 Objective exams  
 Other (specify)  
 Problem-Solving Assignments  
 Problem-solving exams  
 Quizzes

**Other**

Problem-solving assignments

**Instructional Methodology**

Specify the methods of instruction that may be employed in this course

Computer-aided presentations  
 Collaborative group work  
 Class activities  
 Class discussions  
 Distance Education  
 Instructor-guided interpretation and analysis

Instructor-guided use of technology

Lecture

Small group activities

**Describe specific examples of the methods the instructor will use:**

1. Instructor-guided classroom discussion on applications of Calculus and its relation to other fields of study, such as Physics and Business.
2. Instructor-led problem-solving activities through group work or independent study.
3. Instructor-guided use of technology to display concepts of limits, differentiation, and integration.

## Representative Course Assignments

### Writing Assignments

The course is primarily computational, but students must present written worked out solutions using correct mathematical notation on homework problems such as those on limits, for example:

"Use integration by parts to find the integral of:  $(3x+5)\sin(x)$ ."

### Critical Thinking Assignments

Classroom activities demonstrating the application of theorems and the use of concepts of Calculus, such as determining the convergence or divergence of infinite series.

### Reading Assignments

Critical reading and thinking skills in application homework problems such as arc length, for example:

"A fleeing object leaves the origin and moves up the y-axis. At the same time, a pursuer leaves the point (1,0) and always moves towards the fleeing object. The pursuer's speed is twice that of the fleeing object. Given the equation that models the path, how far has the fleeing object traveled when it is caught?"

### Other assignments (if applicable)

Understanding mathematical computational procedures on homework, for example:

"Determine the convergence or divergence of the given sequence. If the sequence converges, find its limit."

## Outside Assignments

### Representative Outside Assignments

1. Homework skill building exercises.
2. Preparation for exams, including review of notes, watching video, practice exams.

## Articulation

### C-ID Descriptor Number

MATH 220

### Status

Approved

### Comparable Courses within the VCCCD

MATH M25B - Calculus with Analytic Geometry II

MATH V21B - Calculus with Analytic Geometry II

## District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

## CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

## CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

### IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

## Textbooks and Lab Manuals

### Resource Type

Textbook

### Description

Sullivan, M., Miranda, K. (2018). *Calculus: Early Transcendentals* (2nd). New York, Macmillan.

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### Resource Type

Textbook

### Description

Briggs, W., Cochran, L., Gillett, B. (2018). *Calculus: Early Transcendentals* (3rd). New York, Pearson.

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## Distance Education Addendum

### Definitions

#### Distance Education Modalities

Hybrid (51%–99% online)  
 Hybrid (1%–50% online)  
 100% online

### Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

### Regular Effective/Substantive Contact

#### Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to other classmates with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch recorded, video lectures.
E-mail	Responses to specific email questions.
Video Conferencing	Video tools such as ConferZoom may be used to provide live synchronous or asynchronous sessions with students. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Student-to-student group meetings will also be encouraged.

#### Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch recorded, lecture videos.
Video Conferencing	Video tools such as ConferZoom may be used to provide live synchronous or asynchronous sessions with students. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Student-to-student group meetings will also be encouraged.
E-mail	Responses to specific email questions.

#### 100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on the process of finding the maximum height of a projectile, and they will respond to others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch recorded, video lecture videos.

Video Conferencing

Video tools such as ConferZoom may be used to provide live synchronous or asynchronous sessions with students. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Student-to-student group meetings will also be encouraged.

E-mail

Responses to specific email questions.

**Examinations**

**Hybrid (1%–50% online) Modality**

Online  
On campus

**Hybrid (51%–99% online) Modality**

Online  
On campus

**Primary Minimum Qualification**

MATHEMATICS

**Review and Approval Dates**

**Department Chair**

09/01/2020

**Dean**

09/01/2020

**Technical Review**

09/09/2020

**Curriculum Committee**

09/09/2020

**Curriculum Committee**

11/25/2020

**CCCCO**

MM/DD/YYYY

**Control Number**

CCC000291195

**DOE/accreditation approval date**

MM/DD/YYYY