

MATH R120: CALCULUS WITH ANALYTIC GEOMETRY I

Originator

bblack

College

Oxnard College

Discipline (CB01A)

MATH - Mathematics

Course Number (CB01B)

R120

Course Title (CB02)

Calculus with Analytic Geometry I

Banner/Short Title

Calculus I

Credit Type

Credit

Start Term

Fall 2021

Catalog Course Description

This is a first course in differential and integral calculus of a single variable. Topics include functions; limits and continuity; techniques and applications of differentiation and integration; and the Fundamental Theorem of Calculus. C-ID: MATH 210.

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 R115 and MATH R116 or MATH R117 or placement as determined by the college's multiple measures assessment process

Requisite Justification**Requisite Type**

Prerequisite

Requisite

MATH R115 and MATH R116 or MATH R117

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 | Differentiate elementary functions using differentiation rules. |
| 2 | Evaluate anti-derivatives and indefinite integrals |

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

- | | |
|---|---|
| 1 | Compute the limit of a function at a real number |
| 2 | Determine if a function is continuous at a real number |
| 3 | Find the derivative of a function as a limit |
| 4 | Find the equation of a tangent line to a function |
| 5 | Compute derivatives using differentiation formulas |
| 6 | Use differentiation to solve applications such as related rate problems and optimization problems |
| 7 | Use implicit differentiation |

8	Graph functions using methods of calculus
9	Evaluate a definite integral as a limit
10	Evaluate integrals using the Fundamental Theorem of Calculus
11	Apply integration to find area

Course Content

Lecture/Course Content

1. Definition and computation of limits using numerical, graphical, and algebraic approaches
2. Continuity and differentiability of functions
3. Derivative as a limit
4. Interpretation of the derivative as: slope of tangent line, a rate of change
5. Differentiation formulas: constants, power rule, product rule, quotient rule and chain rule
6. Derivatives of transcendental functions such as trigonometric, exponential or logarithmic
7. Implicit differentiation with applications, and differentiation of inverse functions
8. Higher-order derivatives
9. Graphing functions using first and second derivatives, concavity and asymptotes
10. Maximum and minimum values, and optimization
11. Mean Value Theorem
12. Antiderivatives and indefinite integrals
13. Area under a curve
14. Definite integral; Riemann sum
15. Properties of the integral
16. Fundamental Theorem of Calculus
17. Integration by substitution
18. Indeterminate forms and L'Hopital's Rule

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
 Problem-Solving Assignments
 Problem-solving exams
 Quizzes

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:

- A. Instructor-guided classroom discussion on applications of Calculus and it's relation to other fields of study, such as Physics and Business.
- B. Instructor-led problem-solving activities through group work or independent study.
- C. 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 homework solutions using correct mathematical notation on problems such as those on limits. For example: "Find the limit as x approaches 0, of $\sin(5x)$."

Critical Thinking Assignments

1. Understand mathematical computational procedures. For example: "Use implicit differentiation on the equation $\cos(xy)=10$, to find the derivative of y with respect to x ."
2. Mathematical problem solving, for example: Find the values of c guaranteed by the Mean Value Theorem for Integrals for the function $f(x) = 2x$ over the interval $[0,3]$.

Reading Assignments

Critical reading and thinking in application homework problems. For example:

"A rectangular package can have a maximum combined length and girth (perimeter of a cross section) of 108 inches. Find the dimensions of the package of maximum volume."

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 210

Status

Approved

Comparable Courses within the VCCCD

MATH M25A - Calculus with Analytic Geometry I

MATH M25AH - Honors: Calculus With Analytic Geometry I

MATH V21A - Calculus with Analytic Geometry I

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). Macmillan. N.Y., N.Y.

Resource Type

Textbook

Description

Briggs, W., Cochran, L., & Gillett, B. (2018). *Calculus: Early Transcendentals* (3rd). Pearson. N.Y., N.Y.

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 others classmate with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch recorded video lectures.
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 equations.

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 video lectures.
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 equations.

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, videos lectures.

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 equations.

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

08/30/2020

Dean

08/31/2020

Technical Review

09/09/2020

Curriculum Committee

09/09/2020

Curriculum Committee

11/25/2020

CCCCO

MM/DD/YYYY

Control Number

CCC000060753

DOE/accreditation approval date

MM/DD/YYYY