MATH-121: CALCULUS II

Effective Term
Fall 2024

CC Approval
10/06/2023

AS Approval
10/10/2023

BOT Approval
10/19/2023

SECTION A - Course Data Elements

CB04 Credit Status
Credit - Degree Applicable

Discipline

Minimum Qualifications	And/Or
Mathematics (Master's Degree)	

Subject Code
MATH - Mathematics
Course Number
121

Department
Mathematics (MATH)

Division
Mathematics (MATH)

Full Course Title
Calculus II

Short Title
Calculus II

CB03 TOP Code
1701.00 - Mathematics, General

CB08 Basic Skills Status
NBS - Not Basic Skills

CB09 SAM Code
E - Non-Occupational

Rationale
Standard Course Updates including updating book and SLOs.

SECTION B - Course Description

Catalog Course Description
The second semester of a three-course sequence in differential and integral calculus. Topics include integration, techniques of integration, infinite sequences and series, polar and parametric equations, and applications of integration. Primarily for majors of mathematics, engineering, and sciences.

SECTION C - Conditions on Enrollment

Open Entry/Open Exit
No

Repeatability
Not Repeatable

Grading Options
Letter Grade Only

Allow Audit
Yes

Requisites

Prerequisite(s)
Completion of MATH-120 with a minimum grade of C.

Requisite Justification

Requisite Description
Course in a Sequence

Subject
MATH
Course #
120

Level of Scrutiny
Required by 4-Year Institution

Explanation
Math 121 is the 2nd semester of calculus. The CID for this class is Math 220 and lists "Required Prerequisites or Co-Requisites

Prerequisite: Single Variable Calculus I Early Transcendentals (Math 210, CAN 18)," which is our Math 120.

SECTION D - Course Standards

Is this course variable unit?
No

Units
5.00000

Lecture Hours
90.00

Outside of Class Hours
180

Total Contact Hours
90

Total Student Hours
270

Distance Education Approval

Is this course offered through Distance Education?
Yes

Online Delivery Methods

DE Modalities	Permanent or Emergency Only?
Entirely Online	Permanent
Hybrid	Permanent
Online with Proctored Exams	Permanent

SECTION E - Course Content

Student Learning Outcomes

	Upon satisfactory completion of the course, students will be able to:
1.	Evaluate integrals using a variety of methods.
2.	Solve applications involving integrals.
3.	Apply convergence tests and represent functions as power series.
4.	Write mathematical proofs.

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

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;

Methods of Instruction

Methods of Instruction

Types	Examples of learning activities
Lecture	In class lecture
Discussion	Discussion of class topics
Other	Practice problems

Instructor-Initiated Online Contact Types

Announcements/Bulletin Boards
Discussion Boards
E-mail Communication

Video or Teleconferencing

Student-Initiated Online Contact Types
Discussions
Group Work

Course design is accessible
Yes

Methods of Evaluation

Methods of Evaluation

Types	Examples of classroom assessments
Exams/Tests	Traditional exams including a final exam. Exams could include methods of integration (integration by parts, trigonometric integrals, trigonometric substitution, partial fraction decomposition). Exams could include determining convergence of infinite series (geometric, divergence, p-series, integral, comparison, limit comparison, ratio, root, alternating series).
Quizzes	Quizzes on class material
Projects	Individual or group projects
Homework	Homework problems from book
Other	Additional assessment information: The Mathematics Department maintains a commitment to diverse teaching methods in courses emphasizing vital quantitative skills and qualitative reasoning ability. To that end, it is expected that sufficient formative assessments will be given to students that in frequency, length and rigor adequately assess both quantitative skills and qualitative reasoning.

Assignments

Reading Assignments
Read sections from the textbook, for example: 1. Read section on arc length 2. Read section on improper integrals

Writing Assignments
Daily homework exercises from the text, for example:
1. Find the work required to pump all the water out of a cylindrical tank with height = 5 feet, radius = 2 feet.
2. Find the Maclaurin series for f(x) = sin(2x)

Other Assignments
Other assignments such as research into applications or group projects assigned at instructors' discretion.

SECTION F - Textbooks and Instructional Materials

Material Type
Textbook

Author
Stewart

Title
Calculus: Early Transcendentals

Edition/Version
9th

Publisher
Cengage

Year
2021

ISBN #
9780357537299

Proposed General Education/Transfer Agreement

Do you wish to propose this course for a Local General Education Area?
Yes

Proposed Local General Education Area

Local GE Area	Proposed To
Local GE Area D2: Mathematics	Add

Do you wish to propose this course for a CSU General Education Area?
Yes

Proposed CSU General Education Area

CSU GE Area	Proposed To
CSU GE Area B4: Mathematics/Quantitative Reasoning	Add

Do you wish to propose this course for a UC Transferable Course Agreement (UC-TCA)?
Yes

Do you wish to propose this course for an IGETC General Education Area?
Yes

Proposed IGETC General Education Area

IGETC Area	Proposed To
IGETC Area 2: Mathematical Concepts and Quantitative Reasoning	Add

Course Codes (Admin Only)

CB00 State ID
CCC000522977

CB10 Cooperative Work Experience Status
N - Is Not Part of a Cooperative Work Experience Education Program

CB11 Course Classification Status
Y - Credit Course

CB13 Special Class Status
N - The Course is Not an Approved Special Class

CB23 Funding Agency Category
Y - Not Applicable (Funding Not Used)

CB24 Program Course Status
Program Applicable

Allow Pass/No Pass
No

Only Pass/No Pass
No