Modesto Junior College

Course Outline of Record Report

01/25/2021

MATH181 : Problem Solving for Calculus 1

General Information

Faculty Author:	• Tina Akers Porter
Attachments:	MATH 171-193 Batch DE Addendum Fall 2020 Newest.pdf Math 171-193 Batch DE Addendum FA 2020. .pdf ASSIST Maintenance Reports2.pdf ASSIST Maintenance Reports3.pdf ASSIST Maintenance Reports1.pdf ASSIST Maintenance Reports.pdf MATH-181_SP17.pdf ASSIST CAS MATH 181.pdf ApprovalLetter_MATH 181_CCC000573991.pdf Download
Course Code (CB01) :	MATH181
Course Title (CB02) :	Problem Solving for Calculus 1
Department:	Mathematics
Proposal Start Date:	No value
TOP Code (CB03) :	(1702.00) Mathematics Skills
CIP Code:	(27.0199) Mathematics, Other
SAM Priority Code (CB09) :	Non-Occupational
Distance Education Approved:	No
Course Control Number (CB00) :	CCC000573991
Curriculum Committee Approval Date:	04/12/2016
Board of Trustees Approval Date:	05/11/2016
External Review Approval Date:	09/01/2013
Course Description:	Designed to supplement Math 171 with additional assistance in developing problem-solving skills necessary for success.
Proposal Type:	No value
Faculty Author:	No value

Discipline(s)

Master Discipline Preferred:	• Mathematics

Bachelors or Associates Discipline Preferred:	No value

Course Coding

Course Basic Skill Status (CB08)

Course is not a basic skills course.

Course Special Class Status (CB13)

Course is not a special class.

Grading

- P/NP Only

☐ Allow Students to Gain Credit by Exam/Challenge

Repeatability

0

Course Prior to College Level (CB21)

Not applicable.

Rationale For Credit By Exam/Challenge

No value

Type of Repeat

No value

☐ Allow Students To Audit Course

Course Support Course Status (CB26)

Course is not a support course

Associated Programs

☐ Course is part of a program (CB24)

Associated Program	Award Type	Active
No value	No value	

Transferability & Gen. Ed. Options

Course General Education Status

(CB25)

Y

Transferability	Transferability Status
Transferable to both UC and CSU	Approved

Units and Hours

Summary

Minimum Credit Units (CB07)	1	**Total Course In-Class (Contact) Hours**	18	**Total Student Learning Hours**	54
Maximum Credit Units (CB06)	1	**Total Course Out-of-Class Hours**	36		

Credit / Non-Credit Options

Course Credit Status (CB04)

Credit - Degree Applicable

Course Non-Credit Category (CB22)

Credit Course.

Non-Credit Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Classs
Lecture Hours	1	2
Laboratory Hours	-	-
Activity Hours	-	-

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	52.5
Course In-Class (Contact) Hours	
Lecture	18
Laboratory	-
Activity	-
Total	18
Course Out-of-Class Hours	
Lecture	36
Laboratory	-
Activity	-
Total	36

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Prerequisites, Corequisites, and Advisories

Co-Requisite

MATH171 - Calculus: First Course

Requisite Skills

Requisite Skills	Content Review
Evaluate a limit.	• MATH 171 - state the definition of the limit of a function and apply the definition to calculate limits of specific functions.
Determine a derivative.	• MATH 171 - state the definition of the derivative of a function, use the definition to calculate derivatives, and use the derivative to find the equation of a tangent line to a function. • MATH 171 - calculate derivatives using the power, sum, difference, product, quotient, and chain rules. • MATH 171 - state and correctly use the derivatives of trigonometric, inverse trigonometric, exponential, logarithmic, and hyperbolic functions. • MATH 171 - calculate derivatives of implicitly-defined functions. • MATH 171 - calculate higher-order derivatives.
Work with integrals.	• MATH 171 - define the integral both as an antiderivative and as a limit of sums. • MATH 171 - state the Fundamental Theorem of Calculus and use it to evaluate integrals. • MATH 171 - use the substitution rule to evaluate integrals.

Specifications

Methods of Instruction

Methods of Instruction (Typical)	INSTRUCTIONAL METHODS

MOI

1. Lecture
2. Guided discussion
3. Instructor-led activities
4. Demonstration of mathematical techniques
5. Interactive question and answer

Assignments (Typical)

Evidence of Workload for Course Units (Quantity)

1. Weekly homework
2. Collaborative projects several times during the semester

Evidence of Critical Thinking (Quality)

Group and individual assignments of a level of rigor like the following examples:

1. Work with your group to write a report answering the following questions. Be sure to include in your report any graphs that you used to justify your conclusions. Round all answers to the nearest tenth of an inch.
    1. Assuming there is no waste of raw materials, and joining costs are negligible, what dimensions will yield the cheapest possible cylindrical can that holds 12 fluid ounces?
    2. Assuming the circular tops and bottoms of those cans must be cut from a flat sheet of metal (producing significant waste), what are the dimensions of the cheapest possible cylindrical can that holds 12 fluid ounces?
    3. Measure a real 12 fluid ounce can (such as a soda) and decide if the manufacturer has some additional costs you have not accounted for.
    4. Speculate what those additional costs might be, what circumstances might make them important, and how you might account for them.
2. Given the velocity function of a particle moving along a line, find the displacement and the total distance traveled during a given time interval.

Methods of Evaluation (Typical)	Methods of Evaluation Rationale
FORMATIVE EVALUATION	1. Homework 2. Worksheets 3. Collaborative projects 4. Class participation
SUMMATIVE EVALUATION	1. Workbook of all assignments

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
James Stewart	Calculus: Early Transcendentals (8th Ed.)	Brooks Cole	2016	0538497904

Other Instructional Materials

No Value

Learning Outcomes and Objectives

Course Objectives

Apply problem-solving techniques to situations involving limits.

Apply problem-solving techniques to derivatives and applications of derivatives.

Apply problem-solving techniques to evaluating integrals and applications involving integrals.

CSLOs

Analyze and solve level appropriate problems including calculating limits, derivatives, integration, and applications. Expected SLO Performance: 0.0

ISLOs Core ISLOs	Students will develop critical and analytical thinking abilities, cultivate creative faculties that lead to innovative ideas, and employ pragmatic problem-solving skills. Students will be able to: Analyze differences and make connections among intellectual ideas, academic bodies of knowledge and disciplinary fields of study. Develop and expand upon innovative ideas by analyzing current evidence and praxis, employing historical and cultural knowledge, engaging in theoretical inquiry, and utilizing methods of rational inference. Utilize the scientific method and solve problems using qualitative and quantitative data. Demonstrate the ability to make well-considered aesthetic judgments.
	Students will develop skills to effectively search for, critically evaluate, and utilize relevant information while demonstrating technological literacy. Students will be able to: Effectively access information and critically evaluate sources of information. Analyze, synthesize and apply information practically and ethically within personal, professional and academic contexts. Identify, utilize and evaluate the value of a variety of technologies relevant to academic and workplace settings.
ISLOs GELO	Demonstrate proficiency in LANGUAGE AND RATIONALITY by doing the following: Demonstrating awareness of the interactive nature of communication involving effective listening, reading, writing, and speaking; demonstrating critical thinking in the analysis and production of communication; and demonstrating the ability to find, evaluate, and use information in a variety of formats.

Effectively communicate, using appropriate mathematical notation, processes and strategies in solving level appropriate problems including calculating limits, derivatives, integration, and applications. Expected SLO Performance: 0.0

Content

Course Content

Problems solving techniques important for:

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 the slope of a tangent line and as a rate of change
5. Differentiation formulas
6. Derivatives of transcendental functions
7. Implicit differentiation

8. The Mean Value theorem
9. Graphing functions using first and second derivatives
10. Optimization problems
11. Antiderivatives and indefinite integrals
12. The definite integral and Riemann sums
13. Areas under curves
14. Integral properties
15. The Fundamental Theorem of Calculus
16. Integration by substitution
17. Indeterminate forms and L'Hopital's rule