

Standard Institutionally Developed College: N/A

EDGE Compatible: Yes

Pre-requisites

MATH 1113 - Precalculus (201003)

Co-requisites

Course Description

Topics include the study of limits and continuity, derivatives, and integrals of functions of one variable. Applications are incorporated from a variety of disciplines. Algebraic, trigonometric, exponential, and logarithmic functions are studied.

Course Length

| | Minutes | Contact Unit |
|------------------------|---------|--------------|
| Lecture: | 2250 | |
| Lab 2: | 1500 | |
| Lab 3: | 0 | |
| Practicum/Internship: | 0 | |
| Clinical: | 0 | |
| Total: | 3750 | 4 |
| <hr/> | | |
| Semester Credit Hours: | | 4 |

Competencies

| Order | Description | Lecture | Lab2 | Lab3 | Practicum/Internship | Clinical | Total Minutes | Semester Credit Hrs |
|---|--|-------------|-------------|----------|----------------------|----------|---------------|---------------------|
| 1 | Derivatives and Applications | 1500 | 1000 | 0 | 0 | 0 | 2500 | 2 |
| 2 | Introduction to Integration and Applications | 750 | 500 | 0 | 0 | 0 | 1250 | 1 |
| Totals for Course MATH 1131 - Calculus I (version 201003): | | 2250 | 1500 | 0 | 0 | 0 | 3750 | 4 |

Learning Outcomes

| Derivatives and Applications | | | |
|------------------------------|--|-----------------|-------------------|
| Order | Description | Learning Domain | Level of Learning |
| 1 | Calculate limits of functions | Cognitive | Application |
| 2 | Understand the definition of continuity. | Cognitive | Comprehension |

| Order | Description | Learning Domain | Level of Learning |
|-------|---|-----------------|-------------------|
| 3 | Differentiate algebraic, trigonometric, exponential, and logarithmic functions. | Cognitive | Analysis |
| 4 | Apply the Chain Rule. | Cognitive | Application |
| 5 | Perform implicit differentiation. | Cognitive | Synthesis |
| 6 | Calculate higher derivatives. | Cognitive | Application |
| 7 | Solve related rate problems. | Cognitive | Application |
| 8 | Understand the Mean Value Theorem. | Cognitive | Comprehension |
| 9 | Apply the Mean Value Theorem. | Cognitive | Application |
| 10 | Apply the First Derivative Test. | Cognitive | Application |
| 11 | Apply the Second Derivative Test. | Cognitive | Application |
| 12 | Determine the critical numbers and points of inflection. | Cognitive | Application |
| 13 | Solve optimization problems. | Cognitive | Application |

Introduction to Integration and Applications

| Order | Description | Learning Domain | Level of Learning |
|-------|---|-----------------|-------------------|
| 1 | Find the most general antiderivative of a function. | Cognitive | Knowledge |
| 2 | Understand and use sigma notation. | Cognitive | Comprehension |
| 3 | Calculate area using the limiting value of approximating polygons. | Cognitive | Application |
| 4 | Understand the definition of definite integral. | Cognitive | Comprehension |
| 5 | Apply the properties of definite integrals. | Cognitive | Application |
| 6 | Apply both parts of the Fundamental Theorem of Calculus. | Cognitive | Application |
| 7 | Apply the Substitution Rule for integrals. | Cognitive | Application |
| 8 | Calculate the area between two given curves in a plane. | Cognitive | Application |
| 9 | Calculate volumes using the disk method and method of cylindrical shells. | Cognitive | Application |
| 10 | Calculate the average value of a function. | Cognitive | Application |
| 11 | Calculate the length of an arc. | Cognitive | Application |
| 12 | Calculate the work done by a variable force. | Cognitive | Application |
| 13 | Calculate the center of mass. | Cognitive | Application |

References

| Order | Reference Type | Description |
|-------|----------------------------|---|
| 1 | Book with Author(s) Listed | Varberg/Purcell/Rigdon. (2007). Calculus Early Transcendentals. (1st). Upper Saddle River: Pearson/Prentice Hall. |