MATH A182H: CALCULUS 1 AND 2 HONORS

Item	Value
Curriculum Committee Approval Date	12/02/2020
Top Code	170100 - Mathematics, General
Units	5 Total Units
Hours	90 Total Hours (Lecture Hours 90)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Associate Arts Local General Education (GE)	• OC Comm/Analytical Thinking - AA (OA2)
Associate Science Local General Education (GE)	• OCC Comm/AnalyticalThinking-AS (OAS2) • OCC Mathematics (OMTH)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 2A Math Concepts (2A)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 2A Math Concepts (2A)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B4 Math/Quant.Reasoning (B4)

Course Description

An in-depth honors level study of elementary differential and integral calculus which includes exponential, logarithmic, and trigonometric functions, techniques of integrations, sequences and series, and applications. Combines content of MATH A180 and MATH A185 with emphasis on theory and challenging problems in a fast-paced course for well-prepared students with previous calculus experience. PREREQUISITE: MATH A140, MATH A180, MATH A180H or AP Calculus AB score of 3 or higher. Transfer Credit: CSU; UC: Credit Limitation: MATH A140, MATH A180, MATH A180H and MATH A182H combined: maximum credit, 1 course; MATH A182H and MATH A185, MATH A185H combined: maximum credit, 1 course.

Course Level Student Learning Outcome(s)

1. Use the least upper bound property of the real numbers in order to prove limit, continuity, and sequence and series theorems.
2. Discuss the uses of Simpson's rule, Taylor's theorems, first order differential equations and techniques of integration.
3. Prove derivatives and integral theorems.

Course Objectives

- 1. Use the least upper bound properties of the reals during proofs.
- 2. Use and prove limit and continuity theorems.
- 3. Prove derivative theorems.
- 4. Calculate definite and indefinite integrals and improper integrals, and prove related basic theorems.
- 5. Use standard techniques of integration.
- 6. Use Simpsons rule.
- 7. Prove sequence theorems.
- 8. Discuss the tests for convergence or divergence of series.
- 9. Apply the Taylor theorem.
- 10. Solve first order linear differential equations.

Lecture Content

1. Least Upper Bounds a. properties of reals b. induction 2. Limit and Continuity Theory a. limit proofs b. continuity proofs 3. Derivative Theory a. definition b. proofs of differentiation rules c. mean value and Cauchy mean value theorems 4. Integration a. upper and lower sums b. definition of integration c. proofs of basic properties d. proofs of the fundamental theorems of calculus 5. Techniques of Integration a. inverse chain rule b. parts c. trigonometric substitutions d. partial fractions 6. Simpsons Rule a. derivation b. use 7. Sequences a. definition of convergence b. Cauchy sequences and completeness 8. Series a. polynomial approximations b. Taylors theorem c. uniform convergence 9. Elementary Differential Equations a. separating variables b. first order linear

Method(s) of Instruction

- Lecture (02)

Instructional Techniques

Lecture, written homework, discussion

Reading Assignments

As assigned from text.

Writing Assignments

Written assignments, written exams, comprehensive final compared to minimum standard

Out-of-class Assignments

Written homework as assigned by instructor.

Demonstration of Critical Thinking

Tests include definitions and making comparisons. Creating proofs is a high level critical thinking process.

Required Writing, Problem Solving, Skills Demonstration

Written assignments, written exams, comprehensive final compared to minimum standard. Tests include definitions and making comparisons.

Textbooks Resources

1. Required Thomas, G. B.. University Calculus, ed. . Chicago: Addison-Wesley, 2007 Rationale: .

Other Resources

1. Spivak, Michael. Calculus.Houston: Publish or Perish, Inc., latest.