Proposed IAI Code MATH 902 M1 900-2

MATH 208

City Colleges of Chicago Course Title: Calculus and Analytic Geometry II (IAI Code: MATH 902 M1 900-2)

Length of course: 16 Weeks

Contact Hours: 5 Contact Hours

Credit Hours: 5 Credit Hours

Lecture Hours: 5 Lecture Hours

Lab Hours:

Weekly Plan: 5 Hours

Catalogue Description:

This is the second course in calculus and analytic geometry. It covers techniques and applications of integration, polar coordinates, and infinite series. Technology and writing as appropriate to the discipline will be emphasized throughout the course.

Students the Course is Expected to Serve:

This course is intended for those students who require at least two courses in calculus.

Pre-requisites:

Placement Test -- or Prerequisite -- MATH 207 with a minimum grade of 'C' or Consent of Chair --

Course Objectives:

- 1. Differentiate inverse trigonometric, exponential, and logarithmic functions.
- 2. Differentiate and integrate in polar coordinates.
- 3. Apply the concepts of integral calculus to contextual (real-world) scenarios.
- 4. Apply various convergence tests to an infinite series.
- 5. Derive and apply the Taylor series of a function.
- 6. Apply various integration techniques, calculate improper integrals and numerically estimate definite integrals.

Student Learning Outcomes:

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

- A. Apply integration techniques such as partial fractions, trigonometric substitution, or use of integration tables.
- B. Estimate definite integrals using the Midpoint Rule, Trapezoidal Rule and Simpson's Rule.
- C. Apply L'Hospital's Rule to calculate limits of functions.
- D. Evaluate improper integrals.
- E. Apply integration to computing the area between two curves and the volume of a solid.
- F. Graph a curve, including the conics, using polar coordinates.
- G. Differentiate equations in parametric and polar form.
- H. Calculate the area of regions in polar form using integrals.
- I. Determine the limit of a sequence.
- J. Calculate the sum of a geometric series.
- K. Determine the convergence or divergence of a series using the Integral Test, comparison tests, Alternate Series Test, and Ratio Test.

- L. Determine the interval of convergence for a power series.
- M. Determine the McLaurin and Taylor series representation of a function at a point.
- N. Apply Taylor series to estimate function values and definite integrals.
- O. Calculate integrals using substitution and integration by parts methods.

Topical Outline:

<u>Week</u> 1 - 2	<u>Topics</u> Indefinite & Definite Integrals
3 - 6	Substitution Area Integration by Parts
7 - 8	Trigonometric Substitutions & Partial Fractions Trapezoidal Rule & Simpson's Rule Improper Integrals.
9 - 11	Volume Polar Coordinates & Parametric Equations Area in Polar Coordinates
12 - 13	Sequences Infinite Series Convergence & Divergence
14 - 15	Power Series McLaurin Series Taylor Series
16	Final Exam

Calendar:

Methods of Evaluation:

Total Percentage: 0%

The weight given to exams, quizzes, and other instruments used for evaluation will be determined by the instructor

Methods of Assessment:

Exams, quizzes, homework, in-class activities and other assessments will be used as appropriate to assess student learning.

Methods of Instruction:

Problem-based activities, collaborative-learning techniques, and lecture will be used as appropriate.

Recommended Text:

- 1. Finney, R. L., Weir, M. D., & Giordano, F. R. *Thomas' Calculus Early Transcendentals* 11th Edition, Pearson Addison Wesley, 2003 ISBN: 0321267591
- 2. Stewart, J. *Calculus* 6th Edition, Brooks Cole, 2007 ISBN: 0495011606
- 3. Larson, R., Hostetler, R., & Edwards, B. *Calculus: Early Transcendental Functions* 4th Edition, Houghton Mifflin Company, 2006 ISBN: 0618606246