**MA 301 CALCULUS III**

# Fall 2025

**Text: Calculus with Analytic Geometry by Larson & Hostetler**

**Instructor: Jinglong Ye**
**Class Meetings Location/Time: CRB 205/MWF (11:00-11:50 am)**
**Office Location: CRB 111 C**
**Office Hours: M/W/F: 9:00-9:50am, 2:00-2:50pm, T: 1:30-2:20 am, TR: 1:00-3:50pm**
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## COURSE DESCRIPTION

Indeterminate forms and L'Hopital's rule, improper integral, infinite series, parametric equation, polar coordinates, vectors.

## PURPOSE

To provide the necessary background in Calculus III for students of mathematics, Computer Science, and a related knowledge of disciplines. More specifically this course aims to successfully wed intuition and rigor of some of the basic limit concepts introduced in beginning Calculus. Another aim is to help produce a gradual increase in the mathematical sophistication of the student. Finally, this course aims to establish a true integration of Analytic Geometry with Calculus concepts.

## COURSE OBJECTIVES AND GOALS

The objectives and goals of this course are:

1. To provide students with adequate exposure of subject matter to prepare them for a more in-debt study of upper level mathematics courses.
2. To help students develop their critical thinking, technological and mathematical writing skills.
3. To help students develop a step-by-step procedure for solving problems.
4. To prepare students to communicate mathematically both orally and in writing.

## SSD/Special Needs Statement

Students having any special needs (handicaps, problems, or any factors that may affect their performance in class or require special instructional strategies) should make these special needs known to the instructor during the first week of the course. The instructor meets with the student to insure access of available resources in the university and make appropriate instructional modifications.

## ADA Syllabus Statement

**Mississippi Valley State University is committed to providing reasonable accommodations for students with a documented disability. If a student has a disability that qualifies under the Americans with Disability Act (ADA) and requires accommodations, he/she should contact the Services for Students with Disability Office to obtain this service. Disabilities covered by the ADA may include learning, physical, psychiatric, vision, hearing, or chronic health disorders. Students who are uncertain if their condition/disability is qualified should contact the SSD Office.**
**Mrs. Kathy Brownlow/ ADA Coordinator**

**Social Science Building Office 105**
**Phone/e-mail: 662-254-3443, kbrownlow@mvsu.edu.**

## RELATIONSHIP WITH THE HOLISTIC TRANSFORMER MODEL (HTM)

Due to the nature of this and other computer technology courses, the student is forced to use the scholarly approach to critically reflect upon their thinking to solve problems. Technology is constantly changing and students of this course are made aware of this. To keep abreast of technological advances, learning has to take place continuously. Students are shown how computers and application software are used to facilitate learning. Finally, students of computer science and mathematics have to be scholars to combat the goals and objectives set forth for this and other courses in their curriculum.

## COURSE CONTENT

**Text**: Calculus with Analytic Geometry 9th edition by R. Larson and R. Hostetler
Indeterminate forms, improper integrals, Taylor's formula, infinite series, vectors in the plane, and coordinate systems in three-dimensional space.

## COURSE OBJECTIVES

1. Use theorems and the derivative to solve complex limits
2. Be able to evaluate improper integral using the limit concept
3. Use Taylor's Polynomials to approximate complex functions.
4. Be able to visualize the graph of functions such as In, $e^x$, arc tan etc.
5. Formulate or guess a general formula for a sequence given a list of it terms.
6. Use computers and/or calculators to generate a sequence leading to a limit, and to approximate transcendental functions with polynomials.
7. Solve textbook application problems from science, engineering, and business.
8. Anticipate the limit of function before calculation by looking at the graph.
9. Estimate the sum of a geometric series and telescoping function for a specified number of terms.

## USE OF TECHNOLOGY

The students use the graphing calculators and Mathematica software to assist with many of the in-class and take home assignments. Additionally, demonstrations are often given in class with the Mathematica software, especially with the graphing capability.

## MAJOR STUDENT ACTIVITIES

1. Prove Rolle's Theorem and work at least 5 problems pertaining to this theorem.
2. Test functions to determine if they satisfy conditions for Rolle's theorem.
3. Solve problems and compare Rolle's theorem to the Mean-Value Theorem.
4. Work on group projects to find 10 examples of Cauchy's Generalized Mean-Value Theorem.
**5**. Use the Mathematica software to find limits that are of indeterminate form**.**
6. Assignments will be given from the problem sets in the text. Specific problems are not included here, these vary from semester to semester.
**7.** Internet activities.

## TEXTBOOK

**The textbook(s) for this course are available on Reserve at the Circulation Desk at the James H. White Library for a 2-hour loan period (books must stay in the Library). Please**

**take advantage of this resource, but keep in mind that copies of textbooks for each course are limited and may be in use by another student, particularly right before an assignment or reading is due, so plan your textbook use accordingly.**

## EVALUATION AND GRADING PROCEDURES

The evaluation methods, with exception to the homework and final exam, may vary with instructors. **(See Homework and Final Exam below)**

**Grading Scale**

| Score (Average) | Grade |
|---|---|
| 90-100 | A |
| 80-89 | B |
| 70-79 | C |
| 60-69 | D |
| Below 60 | F |

**Classroom Activities…….……10%**
**Homework/quizzes……...…....40%**
**Midterm, Final Exams…….50%**

***** Cheating on test will result in course failure *****

## BIBLIOGRAPHY

Schick, W., (1995), Fortran 90 and Engineering Computation. New York, John Wiley & Sons, Inc.
Bunch, B., (1982), Mathematical Fallacies and Paradoxes. Van Nostrand Reinhold.
Andrews, Larry C. (1995) Elementary Partial Differential Equations with Boundary Value Problems. Philadelphia: Saunders College Publishing.
Forsythe, G. E., and M. A. Malcoln (1977) Computer Methods for Mathematical Computation. Englewood Cliffs, N. J.: Prentice-Hall.
Hamming, R. W. (1971) Introduction to Applied Numerical Analysis. New York: McGraw Hill.