



North Central Michigan College

Master Course Syllabus

PART 1:

Course Name: Analytic Geometry & Calculus III

Course Number: MATH 215

Credit Hrs. 4 Lecture Hrs. 4 Lab Hrs. 0 Clinical Hrs. 0 Variable Hrs. 0

Total Hours of Instruction: 4 Total Contact Hours: 70.4
(Total Contact hour's formula: (lecture hrs. + lab hrs. + clinical hrs.) x 17.6)

Course Description:

The third course in a three semester sequence of differential and integral calculus. This course introduces students to two main areas of study: multivariable calculus and vector calculus. Topics included in the first area are partial derivatives, multiple integrals, directional derivatives and gradients, maximums and minimums, cylindrical and spherical coordinates, lines, planes and quadric surfaces. Topics included in the second area are dot and cross products, vector valued functions, vector fields, line and surface integrals, curl and divergence, Green's Theorem and Stokes' Theorem. Use of graphing calculators and current technology will be emphasized.

Prerequisite (s): MATH 210 (or equivalent) with a grade of "C" or higher.

Co-requisite (s): None

Course Objectives:

Upon completion of this course, successful students will be able to:

- Analyze vector valued functions, solving problems involving topics such as motion, curvature and arc length.
- Evaluate derivatives and integrals in 3-dimensional coordinate systems.
- Solve optimization problems with more than 2 variables applying a variety of methods.
- Calculate area and volume of irregular objects in 3-dimensions.
- Apply the concepts of vector fields to solve problems of engineering and physics.

Reasonable accommodations can be provided for students with documented disabilities. Please contact Learning Support Services to arrange for these (231)348-6687 or (231)348-6817, Room 533 SCRC.



North Central Michigan College Master Course Syllabus

PART 2:

Course Objectives and Linked Lumina DQP Outcomes

See **PART 3** of this syllabus for the complete language of each Lumina DQP outcome.

*Please identify the Lumina DQP outcome(s) supported by the course objectives. List each course objectives (from **PART 1**), followed by the corresponding Lumina DQP Outcome number(s) in parentheses.*

- Analyze vector valued functions, solving problems involving topics such as motion, curvature and arc length. (DQP 2, 10, 13)
- Evaluate derivatives and integrals in 3-dimensional coordinate systems. (DQP 2, 10, 13)
- Solve optimization problems with more than 2 variables applying a variety of methods. (DQP 2, 10, 13)
- Calculate area and volume of irregular objects in 3-dimensions. (DQP 2, 10, 13)
- Apply the concepts of vector fields to solve problems of engineering and physics. (DQP 2, 10, 13)



North Central Michigan College Master Course Syllabus

Suggested Methods of Instruction:

Lecture, discussion, collaborative group work, and assignments.

Suggested Methods of Assessment and Evaluation:

Tests and Final examination – Homework and participation – Projects and collaborative classroom work.

Adopted Text at Time of Course Adoption/Revision:

Calculus: Concepts & Contexts, James Stewart 4E

Topics Covered During the Semester:

Sequence of topics and time allowance are at the discretion of the instructor

Week 1:	Vector Valued Functions & Parametric Surfaces
Week 2:	Vector Valued Functions & Parametric Surfaces
Week 3:	Vector Valued Functions & Parametric Surfaces
Week 4:	Derivatives & Applications in Multiple Dimensions
Week 5:	Derivatives & Applications in Multiple Dimensions
Week 6:	Derivatives & Applications in Multiple Dimensions
Week 7:	Derivatives & Applications in Multiple Dimensions
Week 8:	Integration & Applications in Multiple Dimensions
Week 9:	Integration & Applications in Multiple Dimensions
Week 10:	Integration & Applications in Multiple Dimensions
Week 11:	Integration & Applications in Varying Coordinate Systems
Week 12:	Integration & Applications in Varying Coordinate Systems
Week 13:	Vector Valued Functions in Higher Dimensions
Week 14:	Vector Valued Functions in Higher Dimensions
Week 15:	Vector Valued Functions in Higher Dimensions
Week 16:	Vector Valued Functions in Higher Dimensions

Part 1 & Part 2 approved by CRDAP on: 04 17 15

Part 2 approved by AD:

Date:

Part 2 approved by CRDAP Chair:

Date:

Rev02/15



North Central Michigan College

Master Course Syllabus

PART 3:

LUMINA DQP OUTCOMES – Use this reference sheet for **PART 2** of Master Course Syllabus.

Specialized Knowledge

1. Describes the scope and principal features of the field of study, citing at least some of its core theories and practices and offers a similar explication of at least one related field.
2. Illustrates contemporary terminology used in the field.
3. Generates substantially error-free products, reconstructions, data, juried exhibits or performances as appropriate to the field.

Broad Integrative Knowledge

4. Describes how existing knowledge or practice is advanced, tested and revised
5. Describes and examines a range of perspectives on key debates and their significance both within the field and in society.
6. Illustrates core concepts of the field while executing analytical, practical or creative tasks.
7. Selects and applies recognized methods of the field in interpreting characteristic discipline-based problems.
8. Assembles evidence relevant to characteristic problems in the field, describes the significance of the evidence and uses the evidence in analysis of these problems.
9. Describes the ways in which at least two disciplines define, address and interpret the importance of a contemporary challenge or problem in science, the arts, society, human services, economic life or technology.

Intellectual Skills – Analytic Inquiry

10. Identifies, categorizes and distinguishes among elements of ideas, concepts, theories and/or practical approaches to standard problems.

Intellectual Skills – Use of Information Resources

11. Identifies, categorizes, evaluates and cites multiple information resources necessary to engage in projects, papers or performance in his or her program.

Intellectual Skills – Engaging Diverse Perspectives

12. Describes how knowledge from different cultural perspectives would affect his or her interpretations of prominent problems in politics, society, the arts and/or global relations.

Intellectual Skills – Communication Fluency

13. Presents accurate calculations and symbolic operations and explains how such calculations and operations are used in either his or her specific field of study or in interpreting social and economic trends.
14. Presents substantially error-free prose in both argumentative and narrative forms to general and specialized audiences.

Applied Learning

15. Describes in writing at least one substantial case in which knowledge and skills acquired in academic settings are applied to a challenge in a non-academic setting; applies that learning to the question; and analyzes at least one significant concept or method related to his or her course of study in light of learning outside the classroom.
16. Locates, gathers and organizes evidence on an assigned research topic addressing a course-related question or a question of practice in a work or community setting; offers and examines competing hypotheses in answering the question.

Civic Learning

17. Describes his or her own civic and cultural background, including its origins and development, assumptions and predispositions.
18. Describes diverse positions, historical and contemporary, on selected democratic values or practices and presents his or her own position on a specific problem where one or more of these values or practices are involved.
19. Takes an active role in a community context (work, service, co-curricular activities, etc.) and examines the civic issues encountered and the insights gained from the community experience.

The Degree Qualifications Profile was adopted by CRDAP: April 11, 2012