

**NEOSHO COUNTY COMMUNITY COLLEGE  
MASTER COURSE SYLLABUS**

**COURSE IDENTIFICATION**

Course Code/Number: MATH 253

Course Title: Analytic Geometry and Calculus III

KRSN: N/A  
(Kansas Regents Shared Number)

Division:  Applied Science (AS)  Liberal Arts (LA)  Workforce Development (WD)  
 Health Care (HC)  Lifetime Learning (LL)  Nursing  Developmental

Credit Hour(s): Three (3)

Effective Date: Summer 2016

Assessment Goal Per Outcome: 80%

**COURSE DESCRIPTION**

A study is made of three-dimensional vectors and three-dimensional analytic geometry. Multivariate functions which include partial derivatives and multiple integrals are also investigated.

**MINIMUM REQUIREMENTS/PREREQUISITES AND/OR COREQUISITES**

MATH 155 Analytic Geometry and Calculus II or permission of the instructor.

**TEXTS**

The official list of textbooks and materials for this course is found on [myNeosho](http://www.neosho.edu/ProspectiveStudents/Registration/CourseSyllabi.aspx).

<http://www.neosho.edu/ProspectiveStudents/Registration/CourseSyllabi.aspx>

**GENERAL EDUCATION OUTCOMES**

1. Practice Responsible Citizenship through:
  - identifying rights and responsibilities of citizenship,
  - identifying how human values and perceptions affect and are affected by social diversity,

- identifying and interpreting artistic expression.
2. Live a healthy lifestyle (physical, intellectual, social) through:
    - listing factors associated with a healthy lifestyle and lifetime fitness,
    - identifying the importance of lifetime learning,
    - demonstrating self-discipline, respect for others, and the ability to work collaboratively as a team.
  3. Communicate effectively through:
    - developing effective written communication skills,
    - developing effective oral communication and listening skills.
  4. Think analytically through:
    - utilizing quantitative information in problem solving,
    - utilizing the principles of systematic inquiry,
    - utilizing various information resources including technology for research and data collection.

### **COURSE OUTCOMES/COMPETENCIES** (as Required)

The student will strive to achieve, and be able to demonstrate an understanding of, the following competencies:

1. Interpret vectors and their operations within the two and three dimensional coordinate system
2. Utilize the calculus of vector valued functions for various applications including projectile motion, arc length, curvature, components of velocity and acceleration (in Cartesian, polar, and cylindrical coordinates)
3. Graph within the three dimensional coordinate system including vectors, lines, planes, space curves, quadric surfaces, and functions of two variables.
4. Analyze the process of the differentiation within the three dimensional coordinate system including partial derivatives, directional derivatives and gradient vectors, tangent planes and differentials, extreme values and saddle points.
5. Perform multiple integrals and their applications including area, volume, moments, and center of mass.

### **MINIMUM COURSE CONTENT**

The following topics must be included in this course. Additional topics may also be included.

#### ***Unit I Vectors in the Plane and Three-dimensional Analytic Geometry***

- A. Vectors in the plane
- B. Rectangular coordinates in space
- C. Three-dimensional vectors
- D. Dot products and cross products
- E. Lines and planes in space
- F. Surfaces in space
- G. Cylindrical and spherical coordinates

## ***Unit II Vector-Valued Functions and Functions of Several Variables***

- A. Vector-valued functions
  - 1. Differentiation
  - 2. Integration
- B. Velocity and acceleration
- C. Tangent and normal vectors
- D. Arc length and curvature
- E. Definition of functions of two or more variables
- F. Limits and continuity
- G. Partial derivatives

## ***Unit III Applications of Partial Derivatives***

- A. Differentials
- B. The chain rule
- C. Directional derivatives and gradients
- D. Tangent planes and normal lines
- E. Extrema and applications of functions of two variables
- F. Using Lagrange multipliers

## ***Unit IV Multiple Integrals***

- A. Iterated integrals
- B. The double integral
  - 1. Area and volume
  - 2. Polar coordinate form
- C. Applications of double integrals
- D. Surface area
- E. The triple integral
  - 1. Rectangular coordinates
  - 2. Cylindrical coordinates
  - 3. Spherical coordinates
- F. Line integrals (optional)

## **STUDENT REQUIREMENTS AND METHOD OF EVALUATION**

### **INSTRUCTIONAL METHODS**

Students will be expected to have and use a graphing calculator in class, on homework assignments, and on tests. An informal lecture/discussion presentation of textbook material will be used. The text will serve as a guideline for the course. Presentations will be supported by blackboard, overhead projector, and TI-83 or 92 graphing calculator demonstrations. These topics will be presented in a lecture manner but will always be handled on a question-and-answer basis. Students may be required to make at least one presentation during a class session. This may utilize written problems, written or oral reports, graphing calculator illustration, or blackboard

demonstrations during any class session. The student will be responsible for assigned reading in the textbook and for learning various calculator techniques. Students may work in groups on some assignments.

Questions concerning the material from the previous class session or questions that pertain to the problem assignments will be discussed during the first part of the next class session. The session that immediately precedes any examination will be at least partially devoted to a review of the material. The student is always welcome to visit with the instructor for individual help after class.

### STUDENT REQUIREMENTS

Evaluation will be based on performance on unit examinations and a comprehensive exam. Specific problem assignments will be required also with appropriate point values.

Makeup of a missed exam must be accomplished within two weeks of the date that the exam was originally administered. Problem assignments that are submitted late may be subject to a 10% late penalty. Problem assignments that are more than two weeks late will be subject to a 15% penalty and will consist of a different set of problems than the original.

### GRADING SCALE

The grade at any time, including the final course grade, will be based on the accumulated point totals of unit tests, problem assignments, and the final exam. Grades will be assigned by straight percentage of the accumulated point totals relative to points available as in the following scale:

A:	90% and above
B:	80 to 89.9%
C:	70 to 79.9%
D:	60 to 69.9%
F:	below 60%

### **ASSESSMENT OF STUDENT GAIN**

The purpose of assessing student learning at Neosho County Community College is to ensure the educational purposes of the institution are met and appropriate changes are made in program development and classroom instruction to allow for student success. The instructor(s) of this course will determine the methods of assessment most appropriate and complete an assessment report at the end of the course.

### Attendance Policy

1. NCCC values interactive learning which promotes student engagement in the learning process. To be actively engaged, the student must be present in the learning environment.
2. Unless students are participating in a school activity or are excused by the instructor, they are expected to attend class. If a student's absences exceed one-eighth of the total course duration, (which equates to one hundred (100) minutes per credit hour in a face-to-face class) the instructor

has the right, but is not required, to withdraw a student from the course. Once the student has been dropped for excessive absences, the registrar's office will send a letter to the student, stating that he or she has been dropped. A student may petition the chief academic officer for reinstatement by submitting a letter stating valid reasons for the absences within one week of the registrar's notification. If the student is reinstated into the class, the instructor and the registrar will be notified. Please refer to the Student Handbook/Academic Policies for more information

3. Absences that occur due to students participating in official college activities are excused except in those cases where outside bodies, such as the State Board of Nursing, have requirements for minimum class minutes for each student. Students who are excused will be given reasonable opportunity to make up any missed work or receive substitute assignments from the instructor and should not be penalized for the absence. Proper procedure should be followed in notifying faculty in advance of the student's planned participation in the event. Ultimately it is the student's responsibility to notify the instructor in advance of the planned absence.

## **ACADEMIC INTEGRITY**

NCCC expects every student to demonstrate ethical behavior with regard to academic pursuits. Academic integrity in coursework is a specific requirement. Definitions, examples, and possible consequences for violations of Academic Integrity, as well as the appeals process, can be found in the College Catalog, Student Handbook, and/or Code of Student Conduct and Discipline.

## **ELECTRONIC DEVICE POLICY**

Student cell phones and other personal electronic devices not being used for class activities must not be accessed during class times unless the instructor chooses to waive this policy.

## **NOTE**

Information and statements in this document are subject to change at the discretion of NCCC. Students will be notified of changes and where to find the most current approved documents.

## **ACCOMMODATIONS**

If you are a student with a disability who may need accommodation(s), in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, please notify the Dean of Student Services in the Student Services Office, Sanders Hall, 620-432-0304, on the Chanute Campus, or the Dean for the Ottawa and Online Campuses, 785-248-2798, on the Ottawa Campus as soon as possible. You will need to bring your documentation for review in order to determine reasonable accommodations, and then we can assist you in arranging any necessary accommodations.

## **NON-DISCRIMINATION POLICY**

The following link provides information related to the non-discrimination policy of NCCC, including persons with disabilities. Students are urged to review this policy.

<http://www.neosho.edu/Departments/NonDiscrimination.aspx>

## **SEXUAL MISCONDUCT POLICY (TITLE IX)**

At NCCC, it is the responsibility of an instructor to help create a safe learning environment in the classroom, including both physical and virtual classrooms. All instructors are considered mandatory reporters at NCCC, therefore any information regarding sexual misconduct that is shared by a student in one-on-one meetings with the instructor must be reported to appropriate personnel at the College. Instructors will keep the information private to the greatest extent possible, but it is not confidential. Generally, climate surveys, classroom writing assignments or discussions, human subjects research, or events such as Take Back the Night events do not provide notice that must be reported to the Coordinator by employees, unless the reporting party clearly indicates that they wish a report to be made.

The following link provides information related to the sexual misconduct policy of NCCC, including resources, reporting options, and student rights. Students are urged to review this policy.

<http://www.neosho.edu/TitleIX.aspx>

## **COURSE NOTES**

### CLASSROOM ENVIRONMENT

Students are encouraged to participate freely in classroom discussions, including offering personal insights and asking questions relevant to the subject at hand. However, intentionally non-relevant comments and questions, and personal conversations are disruptive and are not appropriate in coursework while class is in session. These behaviors interfere with the learning process and therefore will not be tolerated. You are expected to conduct yourselves at all times as mature adults actively engaged in the pursuit of higher learning.