

Math 277-O01N Calculus III (Vector Calculus) Online

Welcome Page:

<http://www.tcc.edu/faculty/webpages/JArnold/onlinelear/newpage.html>

I. Course Description:

An introduction to vector-valued functions, functions of several variables, partial differentiation, multiple integrals and vector analysis.

II. Prerequisites:

MTH 173-174 (Calculus with Analytic Geometry I-II) or equivalent.

III. Introduction:

This course is designed to introduce the student to the concepts of vector-valued functions, functions of several variables, partial derivatives, multiple integrals, and vector analysis.

IV. Instructional Materials:

- ✓ A computer preferably with broadband access to an Internet Service Provider.
- ✓ You will need Microsoft office 2003 or higher. In Microsoft word you should save files in a doc extension and not the default docx extension. For those of you with Word versions under the 2007 version, you can download the reader for the docx ext in the event you need to read such a document. The link for that is at: <http://www.microsoft.com/downloads/details.aspx?FamilyID=941b3470-3ae9-4aee-8f43-c6bb74cd1466&displaylang=en>
- ✓ This course is designed around the textbook: Calculus, Eighth Edition, by Larson, Hostetler, and Edwards; 2006; ISBN 0-618-50298-X; Houghton Mifflin Company.
- ✓ In addition you will need to download free software called Winplot. If you are using a Mac you already have a graphing program built in. Winplot will not work on Mac.
- ✓ At least a Scientific Calculator although a graphing calculator would be preferred. The TI-89 , and TI-92 are not allowed on proctored exams.

Supplementary: Study and Solutions Guide, Volumes I and II, by Bruce H. Edwards;

ISBN 0-618-52791-5 & 0-618-52792-3 (optional)

Free to use for the semester but must be returned at the end.

1. DVD lectures provided by text book found in the Norfolk Math Lab at 350 Granby St. in Norfolk
2. Limited number of A+ Calculus III by Jason Gibson DVD's located in the libraries at each TCC campus. These also can be purchased by going to <http://mathtutordvd.com/>
The A+ DVD's are not required, but Gibson does provide lots of worked out problems.

V. Course Objectives:

The student must master the following concepts:

A. Vectors and the geometry of space (Ch 11)

- 11.1* Vectors in the plane
- 11.2* Space coordinates and vectors in space
- 11.3* The dot product of two vectors
- 11.4* The cross product of two vectors in space
- 11.5 Lines and planes in space
- 11.6 Surfaces in space
- 11.7 Cylindrical and spherical coordinates

* sections should be reviewed as necessary as they were part of math 174

B. Vector-valued functions (Ch 12)

- 12.1 Vector-valued functions
- 12.2 Differentiation and integration of vector-valued functions
- 12.3 Velocity and acceleration
- 12.4 Tangent vectors and normal vectors
- 12.5 Arc length and curvature

Test 1 on 11.5 – 12.5 Online Test

C. Functions of several variables (Ch 13)

- 13.1 Introduction to functions of several variables
- 13.2 Limits and continuity
- 13.3 Partial derivatives
- 13.4 Differentials
- 13.5 Chain rules for functions of several variables
- 13.6 Directional derivatives and gradients

- 13.7 Tangent planes and normal lines
- 13.8 Extrema of functions of two variables
- 13.10 Lagrange multipliers

Test 2 on 13.1-13.10 Test to be taken in person on the Norfolk campus or at an approved proctored location.

D. Multiple integration (Ch 14)

- 14.1 Iterated integrals and area in the plane
- 14.2 Double integrals and volume
- 14.3 Change of variables: polar coordinates
- 14.5 Surface area
- 14.6 Triple integrals and applications
- 14.7 Triple integrals in cylindrical and spherical coordinates
- 14.8 Change of variables: Jacobians

Test 3 on 14.1-14.8 Online Test

E. Vector Analysis (Ch 15)

- 15.1 Vector Fields
- 15.2 Line integrals
- 15.3 Conservative vector fields and independence of path
- 15.4 Green's theorem
- 15.5 Parametric surfaces
- 15.6 Surface integrals
- 15.7 Divergence theorem
- 15.8 Stoke's theorem

Test 4 on 15.1- 15.8 On campus test or an approved proctored location

VI. ATTENDANCE

Attendance in an online class consists of the following:

- ✓ Turning in required HW assignments
- ✓ Participation in the Discussion Board on the TCC Blackboard site
- ✓ Keeping up to date with the weekly schedule
- ✓ Turning in required projects on time
- ✓ Taking the major tests on time
- ✓ **Coming to campus for two proctored tests***(See **EXCEPTIONS** below)

If you have not communicated via the avenues above and have a failing average you may be dropped from the course.

* **EXCEPTIONS:** Students who are at a great distance from campus (50+ miles) are responsible to find a proctored location where someone of authority can administer their test and give them access to a computer with an Internet connection. Possible places are other community colleges, or libraries. The

name, email address, phone number, and title of the proctor must be given to the Instructor in plenty of time for arrangements to be made with the proctor.

VII. Grading

Grades at the end of the semester will be assigned according to a scale of

90-100 = A, 80-89 = B, 70-79 = C, 60-69 = D, 0-59 = F

Grades will come from the following sources:

Graded Assigned Homework 20%

4 Tests 15% each

1 project 20% (Final Exam)

Extra Credit: Discussion Board participation (10 questions or answers to questions) 5%

VIII. WHAT TO DO IF YOU EXPERIENCE COMPUTER PROBLEM

Students are responsible for maintaining their computer equipment and if they can not do that, they are required to report it to their instructors and come to the math lab to work until their equipment is working. Please make sure your computer meets the system requirements as listed on the welcome page. If not, you may need to plan to attend the math lab in room 3205 to keep yourself up to date.

IX. DISABILITY REQUIREMENTS

Accessibility: If you need course adaptations or accommodations because of a disability or illness, please provide your instructor with the Letter of Accommodation you have received from Disability Services located on the Norfolk Campus Room 1106.