Northern Virginia Community College

MTH 163-003A (19894) **Precalculus I (3 CR.)** **Fall 2017**

Syllabus

Instructor: Dr. Alexander Krantsberg
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Office: Bisdorf, Room AA 352

Class Time: Mondays and Wednesdays 2:00 PM - 3:15 PM.
Classroom: Bisdorf / AA 354

Office hours: Monday 1:00 PM-2:00 PM, 6:00 PM-7:00 PM
Tuesday 3:00 PM-5:00 PM, 7:30 PM-8:30 PM
Wednesday 1:00 PM-2:00 PM, 6:00 PM-7:00 PM
Thursday 3:00 PM-5:00 PM, 7:30 PM-8:30 PM

Important Dates

Classes begin	**August 21**
Drop a class on NOVAConnect with tuition refund	August 21-September 7
Labor Day holiday. College closed.	September 4
Last day to drop a class with a tuition refund or change to audit	September 7
Professional development days for faculty. No classes for students.	October 9-10
Last day to withdraw without grade penalty	October 31
No classes. College offices close at noon	November 22
Thanksgiving holiday. College closed.	November 23-24
No classes. College offices closed.	November 25-26
Final exam week	December 11-17
Final Exam	December 11
Final exams end	December 14

Course Content

(visit http://www.nvcc.edu/academic/coursecont/summaries/MTH163.pdf for details)

Course Description

MTH 163 – Precalculus I presents college algebra, matrices, and algebraic, exponential and logarithmic functions. Lecture 3 hours per week.

Course Purpose

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The general purpose of this one-semester course is to prepare students for a course in applied or business-oriented calculus sequence by providing them with the necessary competencies in algebra, functions (including polynomial, rational, exponential, and logarithmic), and matrices, as well as competence in using a graphing utility. At NVCC, this course will prepare the student for the applied calculus sequence, MTH 271-272, "Applied Calculus I-II". MTH 163 can also be used in conjunction with MATH 164, "Precalculus II" in preparation for a course in calculus with analytic geometry. At NVCC, MTH 163-164 prepares students for MTH 173-174, "Calculus with Analytic Geometry I-II."

Prerequisites

Competency in Math Essentials Units MTE 1-9 as demonstrated through the placement and diagnostics tests or completion through Unit 9 in an MTT course.

Course Objectives

After completion this course, you should be able to:

- Solve problems involving equations, inequalities, and systems of equations
- Operate on functions (addition, multiplication, composition, and inverses)
- Graph linear, quadratic, rational, exponential, and logarithmic functions
- Factor polynomials and find zeros of polynomials
- Use matrices to solve systems of linear equations
- Use a graphing utility as an aid to problem solving

Major Topics

Review of Algebra

Polynomials

Factoring

Rational Expressions

Rules of Exponents for positive integer exponents

Solution of linear equations

Quadratic Formula and Quadratic-type equations

Use of theorem: Solutions of $p=q$ are a subset of the solutions of $p^2 = q^2$

A. Exponents and radicals

1. Definitions
    a. the zero exponent
    b. negative integer exponents
    c. rational exponents
2. Rules for rational exponents
    a. simplifying radicals
    b. rationalizing numerator and denominator

B. Inequalities and Absolute Value

1. Inequalities
    a. definition
    b. interval notation
    c. graphing on the number line
    d. solution of linear, quadratic, and rational inequalities
2. Absolute Value
    a. definition
    b. solution of equations and inequalities containing absolute values

C. Complex Numbers

1. Definition
2. Arithmetic operations

D. Linear equations in two variables

1. Slope
2. Intercepts
3. Parallel and perpendicular lines
4. Graphs
5. Equation of a line

E. Functions

1. Definitions, including domain and range
2. Operations
    a. arithmetic
    b. composition
3. Inverses with respect to composition
4. Difference quotient
5. Average rate of change of nonlinear functions

F. Polynomial Functions

1. Definition
2. Graphs, including transformations and symmetry
3. Remainder Theorem and Factor Theorem
4. Division of Polynomials
5. Fundamental Theorem of Algebra
6. Finding zeros of polynomial functions with integral coefficients

G. Rational functions

. Definitions
2. Graphs (including asymptotes)

H. Exponential and Logarithmic Functions

1. Definitions
. Graphs
3. Finding common and natural logarithms and antilogarithms
4. Solution of equations involving exponentials and/or logarithms
. Growth and Decay Problems and other applications

I. Matrices

1. Definition
2. Multiplicative Inverse
3. Add, subtract, scalar multiplication, matrix multiplication

J. Solving systems of linear equations

1. Algebraically or graphically
2. Using one or more matrix methods below
    a. Cramer's Rule
    b. Row reduction of augmented matrices
    c. Using the multiplicative inverse

Extra Topics

A. Sequences and series

1. Σ (sigma) notation
2. Arithmetic
3. Geometric

B. Determinant of a matrix

C. Regression using a graphing utility

Textbook and other Resources

Textbook

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Precalculus, 5th Edition, by Robert Blitzer.

Textbook ISBN-10: 1323227342

Textbook ISBN-13: 9781323227343

MyMathLab

MyMathLab is a valuable tool for study and review, and it is recommended. There will be an extra credit of 10% for homework if it is completed online by using MyMathLab.

If you purchased access to MyMathLab, the course ID is **krantsberg50544**

(You can find MyMathLab Quick Start Guide for Students at http://help.pearsoncmg.com/xl/get_started/student/mmnd/mml/get_started_stu_mmnd_mml.pdf)

Alternative Textbook

A free online Precalculus textbook by Jay Abramson et. al

https://openstax.org/details/books/precalculus

I highly recommend to use this textbook in conjunction with WebAssign**.**

WebAssign

WebAssign is a valuable tool for study and review. There will be an extra credit of 10% for each homework assignment if you do it by using WebAssign.

If you want to purchase access to WebAssign, you need the Class Key: (I will provide it.)

The price of WebAssign instant Access for OpenStax Calculus for one semester is $37.95

Calculator

This course requires a graphing device TI-83 or better. If you plan to take calculus courses, TI-89 (+) would be the best option.

Grading Policy

Grading Categories

- Homework and Class Assignments - 10%
- Quizzes - 15%
- Exams - 45 %
- Final Exam - 30 %

Course Grade

The course grade will be a letter grade:

A - 90%-100%
B - 80%-89.9%
C - 70%-79.9%
D - 60%-69.9%
F - below 60%

No audits are given in this class. **The last day to withdraw with refund is September 7, 2017**. **The last day to withdraw without grade penalty is October 31, 2017**. You are responsible for doing all paperwork before these last dates.

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Attendance:
It is very important to attend this class. If you miss no more than two classes, your lowest grade on homework, quizzes, or exams will be dropped. My experience shows that regular attendance and active class participation, in most cases, results in a passing grade.

Grading Assignments

Homework:
If you do your homework online using MyMathLab, all homework assignments are already there. Up to 10% increase of your grade for homework is given for doing homework online.
If you do your homework on paper, follow the assignments in the syllabus or in lesson plans.
Note: *If your average grade on the tests is more than 70%, you will get a 5% extra credit for your homework.*
Quizzes: We will have quizzes on most class days when there is no test. You can make up one quizz.

Tests:
There will be four tests, one hour each. The tentative schedule for the tests is this.

Test 1	**September 11**
Test 2	**October 11**
Test 3	**November 1**
Test 4	**November 29**

Please let me know in advance if you are not able to attend the class on any of these days. You may make up a test within two weeks after the test. It is your responsibility to schedule the make-up test with me.

Final Exam
The final exam is scheduled for **Monday, December 11, 2017 from 3:30PM to 5:10PM**. The exam will be comprehensive and cover all course material.
All Students are expected to attend the final exam. There is no make-up for the final.

Exam and Test Policy
You may not share calculators during exams or quizzes. You may not use cell phones as calculators during exams and quizzes.
Cheating – receiving or giving unauthorized help- will result in a score of 0 on that exam.

Classroom Behavior
You should silence cellular phones. No texting during class time.

Inclement Weather or Other Emergency Events
If the college is closed, a text alert will be sent to cell phones registered on NOVA Alert, a notice will be posted on the College's website www.nvcc.edu/emergency. You can also call the College Call Center at 703.323.3000.

Special Needs and Accommodations
Please address with me any special problems or needs at the beginning of the semester. If you are seeking accommodations based on a disability, you must provide a disability data sheet, which can be obtained from the counselor for special needs, who is located in Bisdorf (AA) 229, phone (703) 933-1840. More

information may be found at the following website: http://www.nvcc.edu/current-students/disability-services/index.html

Note: The syllabus is subject to change.

Course Outline
(Subject to change at any time)

Week	Date	Section	**Assignment** (due the following week)
1	08/21	P.1 Algebraic Expressions P.2 Exponents and Scientific Notation	pp.16-19: 4, 9, 18, 23,27,33,37,47,55,65,73,77,81,87,93,97,107,120,122,127, 131,134, pp.30-31:1,3,5,15,25,35,39,57,61,63,69,79,85,95,108,119,
1	08/23	P.3 Radicals and Rational Exponents	pp.45-47:3,5,8,10,15,21,29,41,47,49,53,61,65,69,71,75,83,87,91,107
2	08/28	P.4 Polynomials P.5 Factoring Polynomials	pp.55-57:1,2,3,11,14,17,27,35,47,65,77,93, 107 pp.68-69: 1,3,7,11,15,21,27,37,43,47,55,69,77,83,91,95,97,117
2	08/30	P.6 Rational Expressions	pp.83-85:1,5,11,19,23,39,33,37,41,52,59,66,70,75,77,92
3	**09/04**	**No Classes**	**Labor Day holiday. College closed.**
3	09/06	P7. Equations *P.8 Modeling with Equations	pp.102-105:1,9,15,19,25,28,35,43,49,51,57,61,65,69,81,83,87,93,111,116,123
4	**09/11**	**Test 1**	
4	09/13	P.9 Linear Inequalities	pp.131-133:5,15,21,27,31,39,43,49,55,59,53,71,75,89
5	09/11	1.1 Graphs 1.2 Basics of Functions	pp.150-153:11,13,19, pp.168-171:1,3,13,17,23,31,33,37,
5	09/18	1.3 More on Functions 1.4 Linear Functions and Slope	pp.182-185:1,7,11,15,17,25,27,29,31,33,37,41,45,55,99 pp.199-201:5,7,9,11,17,33,43,47,51,53,59,69
6	09/20	1.5 More on Slope	pp.211-213:1,3,9,11,15,17,27,31
6	09/25	1.6 Transformations of Functions	pp.227-230:1,3,5,7,9,11,13,15,21,31,47,55,59,59,73,87,93,103,127
7	09/27	1.6 Transformations of Functions (horizontal stretching)	
7	10/02	1.7 Combinations of Functions	pp.242-245:1,3,7,13,17,29,35,41,47,51,55,65,73,77,83,99,109
8	10/04	1.8 Inverse Functions	pp.254-256:3,7,15,19,29,31,35,39,49
8	**10/09**	**Professional Development for Faculty**	**Non Instructional Day. No Classes for Students. College offices open.**
9	**10/11**	**Test 2**	
9	10/16	1.9 Distance and Midpoint Formulas; Circles *1.10 Modeling	P264-266:1,15,19,27,37,43,51,55,61,71,83
10	10/18	2.1 Complex Numbers 2.2 Quadratic Functions	pp.298-299:1,3,7,9,11,15,21,25,29,33,37,41,45,49,61,63 pp.313-315:3,7,11,17,31,41,59,65
10	10/23	2.3 Polynomial Functions 2.4 Dividing Polynomials	Pp330-332:3,5,11,13,15,19,21,23,25,27,29,39,45,73 pp.343-345:1,5,15,19,23,33,43
11	10/25	2.5 Zeros of Polynomials	pp.356-358:1,3,7,15,21,27,61
11	10/30	2.6 Rational Functions	pp.377-379:1,5,9,11,13,15,19,21,25,33,39,43,57,69,79,99
12	**11/01**	**Test 3**	
12	11/06	2.7 Polynomial and Rational	pp.391-393:1,7,11,29,35,43,53,55,71,79

		Inequalities	
13	11/08	3.1 Exponential Functions	pp.423-426:1,5,7,11,17,19,21,23,29,45,51,65
13	11/13	3.2 Logarithmic Functions	pp.437-439:1,3,5,7,9,11,13,19,21,25,29,35,37,41,49,55,59,65,75,79,81,85,95,117
14	11/15	3.3 Properties of Logarithms	pp.449-449: 3.3.CV-1, CV-2 , CV-3, CV-4, 3,23,25,33,29,45,49,57,65,69,71,77,87,103
14	11/20	3.4 Exponential and Logarithmic Equations 3.5 Exponential Growth and Decay	pp.461-463:3,9,19,27,29,41,43,55,61,71,75,89,91,105,107 pp.477-481:5,15,27,37,49,71
15	**11/22**	**No Classes**	**Non Instructional Day. College offices close at noon.**
15	11/27	7.1, 7.2 Systems of Linear Equations 8.1Matrix Solutions to Linear Systems 8.3, 8.4 Matrix Operations	pp. 786-788: 1,3, 9, 29; pp.797-799: 1, 5 pp.859-860: 1,9,15,23 pp.884-885: 1,9,21,27; pp.898-899:3, 19
16	**11/29**	**Test 4**	
16	12/04	**Review**	
17	12/06	**Review**	
17	**12/11**	**Final Exam**	**3:30PM – 5:10PM**