

**Syllabus****Instructor:** Dr. Alexander Krantsberg**Email:** [akrantsberg@nvcc.edu](mailto:akrantsberg@nvcc.edu)**Phone:** 703-845-6548**Office:** Bisdorf, Room AA 352**Class Time:** Mondays and Wednesdays 12:30PM - 1:45 PM.**Classroom:** Bisdorf / AA 354**Office hours:** Monday 11:00 AM-12:00 PM, 3:00 PM-5:00 PM

Tuesday 11:00 AM-12:00 PM, 2:00 PM-3:00 PM (MML)

Wednesday 11:00 AM-12:00 PM, 3:00 PM-5:00 PM

Thursday 11:00 AM-12:00 PM, 2:00 PM-3:00 PM (MML)

**Important Dates**

<b>Classes begin</b>	<b>January 10</b>
Drop a class on NOVAConnect with tuition refund	January 10 – January 29
Martin Luther King, Jr. Holiday. College offices closed.	January 15
Last day to drop a class with a tuition refund or change to audit	January 29
Spring Break	March 12-18
Last day to withdraw without grade penalty	March 22
Final exam week	May 2-8
Final Exam	May 2
Final exams end	May 8

**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**

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.”

## Syllabus

### 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

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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

1. Definitions
2. Graphs (including asymptotes)

### H. Exponential and Logarithmic Functions

1. Definitions
2. Graphs
3. Finding common and natural logarithms and antilogarithms
4. Solution of equations involving exponentials and/or logarithms
5. 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.  $\Sigma$  (sigma) notation
  2. Arithmetic
  3. Geometric
- B. Determinant of a matrix
- C. Regression using a graphing utility

## Textbook and other Resources

### Textbook

Precalculus, 5<sup>th</sup> Edition, by Robert Blitzer.

Textbook ISBN-10: 1323227342

Textbook ISBN-13: 9781323227343

### MyMathLab

## Syllabus

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 **krantsberg37171**

(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](http://help.pearsoncmg.com/xl/get_started/student/mmnd/mml/get_started_stu_mmnd_mml.pdf) )

### 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 January 29, 2018.** **The last day to withdraw without grade penalty is March 22, 2018.** You are responsible for doing all paperwork before these last dates.

#### 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 quiz.

##### Tests:

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

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- Test 1**    **February 7**
- Test 2**    **March 5**
- Test 3**    **April 2**
- Test 4**    **April 25**

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, May 2, 2018 from 1:30PM to 3:10PM**. 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.

### Course Policies

- **Classroom Behavior**  
You should silence cellular phones. No texting during class time is allowed.
- **Late Assignment Policy**  
Penalty of 20 % is imposed for every two weeks after the assignment due date.
- **Exams and Make-Up Exams**  
You may make up a test within two weeks after the test. It is your responsibility to schedule the make-up test with me.
- **Cellphones, Smartphones, Laptops and Other Electronic Devices**  
You should silence all electronic devices. No texting during class time. You are not allowed to use any electronic device, except a graphing calculator during in-class assessments.
- **Student Professionalism**  
All students are considered adults and will conduct themselves in a professional manner at all times. Please read the section titled Student Conduct, Rights, and Responsibilities: B. Student Conduct in the [Student Handbook](#).

### Student Support Resources

- **IT Helpdesk The IT**  
Help Desk provides first-level technical support to all faculty, staff and students of Northern Virginia Community College. Additional details and resources are located at <http://www.nvcc.edu/ithd/>.  
HOURS OF OPERATION

The Help Desk offers assistance 24 hours a day, 7 days a week.  
Service is available nights, weekends and holidays.

**Phone:** 703.426.4141

**Alexandria IT** 703.845.6226

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Email: [ithelpdesk@nvcc.edu](mailto:ithelpdesk@nvcc.edu)

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- **Disability Services for Students:**

The College is committed to the goal of providing each qualified student an equal opportunity to pursue a college education regardless of disability. Efforts will be made toward meeting reasonable requests for services to students with disabilities eligible under Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA).

Please read the section titled Disability Services for Students in the Student Handbook.

Students requiring special needs in accordance with the American's With Disabilities Act must provide to the professor the NOVA Accommodation Form. Every effort will be made to meet student's special needs when the student makes those needs known appropriately. It is the student's responsibility, not a counselor's, to present the NOVA Accommodation Form to the professor. Accommodations will begin as soon as the form is received and are not retroactive. Please visit the Disability Support Service (DSS), Disability Documentation Guidelines, and Disability Services Intake Packet NOVA website pages for additional details and list of Disability Counselors by Campus.

Northern Virginia Community College, Disability Services <http://www.nvcc.edu/current-students/disabilityservices/>

- **Tutoring**

Tutoring is available in my office during my office hours or by appointment.

- **Emergencies**

Anyone observing an emergency situation should contact the Campus Police Office or the dean of students.

**Alexandria Police Office**

Bisdorf Building, Room 240 Phone: 703.764.5000 Email: [PoliceDispatch@nvcc.edu](mailto:PoliceDispatch@nvcc.edu)

Hours: 24 hours a day, 7 days a week

**Dean of Students**

Bisdorf Building, Room 195 Phone: 703.845.6219 Email: [vdiaz@nvcc.edu](mailto:vdiaz@nvcc.edu)

- **Classroom Emergency Response Procedures**

All classrooms have an evacuation plan and directions (showing the route to the nearest building exit) posted next to the light switch by the doorway of each room. When the fire alarm sounds, immediately leave the classroom or lab with all of your belongings in accordance with the Evacuation Plan. Do not take the elevator. Do not activate cell phones or radios and please help assist the disabled.

- **Inclement Weather Policy**

If the college is closed, a text alert will be sent to cell phones registered on NOVA Alert and a notice will be posted on the College's website [www.nvcc.edu/emergency](http://www.nvcc.edu/emergency). You may find out whether the college is closed by checking the web site, the TV or radio news, or by signing up for text message announcements. Please visit <http://www.nvcc> for detailed information.

Individuals may also call the College Call Center at 703-323-3000 or NOVAConnect Phone at 703-323-3770. Do not call individual offices.

If weather conditions cause the College to close, all NOVA campuses and off-campus locations are closed.

**Syllabus**

In all cases of delayed openings, classes that would have started prior to an opening time and continued at least 45 minutes after the opening time will go on at the opening time. For example, in the case of a two-hour delay, a two-hour class that normally begins at 9:00 a.m. and continues to 11:00 a.m. would start at 10 a.m. and continue as usual until 12:00 p.m.

- **Emergency Procedures for Class Continuance**

In the event of a College-wide emergency, course requirements, classes, deadlines, and grading schemes are subject to changes that may include alternate delivery methods, alternate methods of interaction with the instructor, class materials, and/or classmates, a revised attendance policy, and a revised semester calendar and/or grading scheme. In case of a College-wide emergency, please refer to the following about changes in this course:

Website: Blackboard (through learn.vccs.edu or MyNOVA) For general information about an emergency situation, please refer to: <http://www.nvcc.edu> or 703-450-2540 Nova Emergency Alert Registration: <https://alert.nvcc.edu> In event of an emergency just regarding this class, check Blackboard for announcements regarding course progress/assignments.

**Note: The syllabus is subject to change.**

**Course Outline**

(Subject to change at any time)

Week	Date	Section	Assignment (due the following week)
1	01/10	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,
2	01/15	<b>No Classes</b>	<b>Martin Luther King Jr. Holiday</b>
2	01/17	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
3	01/22	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
3	01/24	P.6 Rational Expressions P7. Equations	pp.83-85:1,5,11,19,23,39,33,37,41,52,59,66,70,75,77,92 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		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,
4	02/05	1.3 More on Functions	pp.182-185:1,7,11,15,17,25,27,29,31,33,37,41,45,55,99
5	02/07	<b>Test 1</b>	
5	02/12	1.4 Linear Functions and Slope	pp.199-201:5,7,9,11,17,33,43,47,51,53,59,69
6	<b>02/14</b>	1.5 More on Slope	pp.211-213:1,3,9,11,15,17,27,31
6	<b>02/19</b>	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	02/21	1.6 Transformations of Functions (horizontal stretching)	
7	02/26	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	02/28	1.8 Inverse Functions	pp.254-256:3,7,15,19,29,31,35,39,49

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8	03/05	<b>Test 2</b>	
9	03/07	*1.9 Distance and Midpoint Formulas; Circles *1.10 Modeling	P264-266:1,15,19,27,37,43,51,55,61,71,83
9	<b>03/12</b>		<b>Spring Break</b>
10	<b>03/14</b>		<b>Spring Break</b>
10	<b>03/19</b>	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
11	03/21	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	03/26	2.5 Zeros of Polynomials	pp.356-358:1,3,7,15,21,27,61
12	03/28	2.6 Rational Functions	pp.377-379:1,5,9,11,13,15,19,21,25,33,39,43,57,69,79,99
12	<b>04/02</b>	<b>Test 3</b>	
13	04/04	2.7 Polynomial and Rational Inequalities	pp.391-393:1,7,11,29,35,43,53,55,71,79
13	04/09	3.1 Exponential Functions	pp.423-426:1,5,7,11,17,19,21,23,29,45,51,65
14	04/11	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	04/16	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
15	04/18	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	04/23	7.1, 7.2 Systems of Linear Equations 8.1 Matrix 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	04/25	<b>Test 4</b>	
16	<b>04/30</b>	<b>Review</b>	
17	<b>05/02</b>	<b>Final Exam</b>	<b>1:30PM – 3:10PM</b>
17			