**The College of New Jersey**
**Mathematics and Statistics Department**

# Program Cover Document - MAT 095: Intermediate Algebra

## I. Basic Course Information

MAT 095: Intermediate Algebra is a **0.5 unit course (additive credit – does not count towards graduation)** that has two 80-minute meeting times each week. The purpose of the course is to prepare students for success in MAT 119: Intro to Functions or MAT 120: Precalculus

*Course Prerequisite*: Placement into MAT 095.

*Course Description (for Bulletin)*: This course is designed for students majoring in a field where at least one of the courses, Introduction to Functions (MAT 119), Pre-Calculus (MAT 120), Calculus A (MAT 127), or Calculus for Business and the Social Sciences (MAT 125) is required. Conceptual understanding and skill development of traditional algebraic topics such as: linear equations and inequalities, exponents and polynomials, rational expressions, quadratic equations, and systems of linear equations are included. **[MAT 095 does not count toward graduation but is considered credit-bearing for financial aid, tuition, and full-time status.]**

## II. Learning Goals

Students should acquire the ability to:

a. Perform fundamental operations on algebraic expressions and simplify the results using properties of real numbers.
b. Factor polynomial expressions.
c. Sketch graphs of equations of two variables by plotting sets of points.
d. Solve equations, including linear, quadratic, polynomial, rational, radical, and absolute value equations.
e. Find x-intercepts and y-intercepts of graphs.
f. Solve systems of linear equations in two variables.
g. Solve linear and absolute value inequalities.
h. Create basic models and solve "verbal" problems relating to applications.

The course will cover the following concepts. The specific list of topics and sections to be covered is appended to this document.

1. Integer and rational exponents, radicals, and their properties.

2. Fundamental operations on algebraic expressions.

3. Solving equations, including linear, power (for example (x+1)^3 = 8), quadratic, polynomial, rational, radical, and absolute value equations using a variety of methods including by factoring.
4. The coordinate plane including distance, midpoint, graphing equations of two variables by plotting points, x-intercepts and y-intercepts; graphs and equations of lines.
5. Linear and absolute value inequalities.
6. Applications of intermediate algebra

**III. Learning Activities**

Learning activities may consist of a combination of lectures and group work. The specific choice will depend on the individual instructor. Outside of class, students are expected to do a significant amount of individual and group homework to achieve the learning goals.

**a.** An attempt will be made to use problems that motivate the theoretical aspects of the course.

**b.** Introduction and formal presentation of basic concepts by the instructor and/or capable students.

**c.** The course meets TCNJ's standard of a "fourth hour" through a) the assignment of a significant amount of out-of-class work expected; and b) extensive support for students through tutoring and office hours.

**IV. Student Assessment**

a. Students will be assessed by their class participation, homework and/or quizzes, and written examinations.

b. Instructors will provide regular feedback to students through homework, quizzes, and tests to enable students to improve their understanding.

c. There will be a common set of homework assignments. Instructors are welcome to assign additional homework assignments.

**V. Course Evaluation**

The course will be assessed for its effectiveness in the following ways:

**Students**

1. Student evaluations.

2. Student performance in the following course (MAT 119 or MAT 120).

3. Student performance on the final.

**Colleagues**

a. Departmental and Calculus committee discussions
b. Consultation with other departments the course serves

**VI. Bibliography**

J. Stewart, L. Redlin, S. Watson, *College Algebra (7th Edition),* Cengage Learning.

**Intermediate Algebra Topics List**

Topics in **bold** should be emphasized.

1) Exponents and Algebraic Expressions
    a. **Real numbers, rational numbers, integers, absolute value**
    b. **Integer Exponents**
    c. **Rational Exponents and Radicals**
    d. Algebraic Expressions
    e. **Factoring Polynomials**
    f. Rational Expressions
2) Solving Equations
    a. Linear Equations
    b. Power Equations
    c. **Quadratic Equations (includes factoring, completing the square, and quadratic formula)**
    d. **Polynomial Equations**
    e. Rational Equations
    f. Radical Equations
    g. Absolute Value Equations
    h. Systems of Linear Equations, 2 variables
    i. Applications of Solving Equations
3) Inequalities
    a. **Linear Inequalities**
    b. Absolute Value Inequalities
4) Equations in 2 variables
    a. Coordinate plane
    b. Graphing by plotting points
    c. **x-intercepts and y-intercepts**
    d. **Lines, including parallel and perpendicular lines**
5) Modeling
    a. Using models
    b. Making models
    c. Applications involving (for example) area, length, distance/rate/time, time to do a job, mixtures, interest
6) Functions (time permitting)
    Definition of a Function

# MAT 095: Intermediate Algebra – Section 01

Dr. Susan Schmoyer

Spring 2023


| | |
|---|---|
| Phone: | (609) 771-3042 (leave a message) |
| Office: | SC-P202 A |
| Email: | **schmoyes@tcnj.edu**<br>• e-mail is the BEST way to contact me outside of class; I check it often.<br>• I will reply within 1 business day. |
| Help Hours: | Drop in to say hi or ask questions!<br>See Canvas for schedule.<br>Also by appointment. |
| Class times: | Section 01: MoTh 2:00 – 3:20PM Forcina 222 |
| Fourth Hour: | Plan to spend 1 hour per week **outside of class** working math exercises, meeting with math tutors, and/or attending Help Hours with me. |

**Note on e-mail**:

- I am teaching THREE different classes this semester! Please include in each e-mail which course and which section you are in, or which time our class meets.
- Please use your TCNJ e-mail account for class related conversations.
- CHECK YOUR E-MAIL often, at least once a day. It will be an important way to communicate outside of class.

# Contents

# 1 Please read this!

Of course you should always read the syllabus carefully. I'm not sure I always read them for my classes. This document contains a lot of important information. Print a copy, if possible, keep it with your course notes, refer back to it when you have questions about how the course is run.

# 2 Masking and Attendance

- Face masks are optional in this course. This policy is subject to change during the semester. Any changes will be communicated to you.
- This is an in-person class. Attendance is expected and required. **Your participation in this course matters and is valued.**

# 3 Resources

## 3.1 Canvas

I will post assignments, review materials, our daily schedule, and more on Canvas. Most content, including assignments, will appear in the Modules, so be sure to check often for new Modules.

Please check Canvas often for updates.

## 3.2 Text Book and WebAssign

- REQUIRED: WebAssign with Corequisite Support for Stewart/Redlin/Watson's Precalculus, 7th Edition. Note that WebAssign has an online ebook built into it and WebAssign is required.

  In WebAssign you will actually have access to TWO books — Precalculus, which can be used without extra cost next semester in MAT 119 or MAT 120, and Beginning and Intermediate Algebra.
- See Canvas for more information about what to buy.
- WebAssign/Cengage should be accessed through Canvas the first time.
- THERE IS NO CLASS KEY because WebAssign has been integrated into Canvas. In Canvas look for the Cengage link in the left side menu.
- Be careful to NOT pay twice for your book and/or WebAssign — **if you have a Cengage Unlimited subscription, it is part of the Cengage Unlimited subscription**.

### 3.2.1 WebAssign

WebAssign is an online homework system that is linked to the text book and it is a required part of the course. **More information is provided on Canvas** and in the Grading section below.

## 3.3 Getting Help

### 3.3.1 Drop-in Office Hours/Student Help Hours

I will schedule 3 hours per week for drop-in questions. Come say hi, get to know me, ask questions. It's ok to just come to Help Hours to listen. By-appointment help may be scheduled in person or by Zoom as time permits.

#### 3.3.2 FREE Tutoring!

Tutoring for this course is provided for **FREE** by the TCNJ Math Department and by the TCNJ Tutoring Center. For more information, see:
TCNJ Tutoring Center: `https://tutoringcenter.tcnj.edu/math-science/`
TCNJ Math Department Tutoring: `https://mathstat.tcnj.edu/resources/tutoring/`

#### 3.3.3 Sign up EARLY for tutoring!

SIGN UP EARLY if you know you want a private tutor. Drop-in tutoring will be available in the Math Department **on the second floor of the Math and Physics building**.

# 4 Course Description and Learning Goals

## 4.1 Prerequisites

Placement into MAT 095.

## 4.2 About Intermediate Algebra

This course is designed to prepare you for either:

- MAT 119 Introduction to Functions, followed by MAT 125 Calculus for Business and the Social Sciences; or
- MAT 120 Precalculus, followed by MAT 127 Calculus A.

You will develop your logic and problem solving skills and you will improve your mathematical reading, writing, and speaking abilities. You will prepare for classes by watching carefully selected videos and we will do in-class examples, group work, weekly homework and quizzes that will give you the opportunity to develop your knowledge and demonstrate what you are learning.

## 4.3 Learning Goals

The goals of the course are to prepare you for success in MAT 119 Intro to Functions or MAT 120 Precalculus. We focus on conceptual understanding and skill development in algebraic topics including linear equations and inequalities, integer and rational exponents, polynomials and rational expressions, how to solve different kinds of equations, how to solve and interpret systems of linear equations, and applications of these topics.

## 4.4 Math is NOT a Spectator Sport!

Hard work is the key to success.

Every time you learn something new, you make mistakes. We all do. Mathematics, like juggling or cooking, is a skill and **the only way to *really* learn mathematics is by *doing* it**. As such, you will be expected to work on problem sets every week. You will also need to read selections from the text in preparation for doing these problems.

This university (and really, just about every university) measures college credit based on the Carnegie Unit. In this system:

> One lecture (taught) or seminar (discussion) credit hour represents 1 hour per week of scheduled class/seminar time **and 2 hours of student preparation time**. [1]

[1] See `www2.ed.gov/about/offices/list/ous/international/usnei/us/credits.doc`

Intermediate Algebra is worth 0.5 units (additive credit – does not count towards graduation) and the course has two 80-minute meeting times each week. To be successful in this course AND the next, you will need to put time and effort into developing the algebra skills that are covered this semester. A typical student needs to spend 3 hours of class time and **6 hours of preparation and practice PER WEEK**. This general rule is especially true for math classes. These 6 hours per week will be spent reading the book and practicing problems *in addition to* doing homework.

Note: This course is the foundation of your future math courses; success in future math classes depends heavily on your success in Intermediate Algebra.

# 5 A Typical Class

A typical class meeting will look something like this.

- This is an in-person class. Attendance is expected and required. **Your participation in this course matters and is valued.**
- Classes will meet during our scheduled times (according to PAWS). See page 1 of the syllabus for meeting times.
- Before class every day you will complete a "Video Prep" assignment. These assignments will be posted on Canvas. You will watch a selection of videos on the day's topic, takes notes and/or answer simple questions about the videos, scan and upload your work to Canvas for grading. These assignments should be easy are are designed to prepare us to work lots of examples during class time.
- Class time will be spent on short lectures and as many examples as we have time for. Some class time will be spent on group activities and problem solving. I will prepare and post pdf "notes" with lots of blank spaces for your own notes and solutions to example exercises.
- You will turn in homework assignments and/or take a quiz about once a week. Most assignments will be turned in on paper.

## 5.1 Assignments and Grading

Your final letter grade will be based on Quizzes and Handwritten Homework, WebAssign Online Homework, two (2) In-Class Exams, and a Final Exam as follows:

| | | |
|---|---|---|
| Video Prep Assignments and Patricipation | = | 5% |
| Quizzes and/or Handwritten Homework | = | 20% |
| WebAssign Online Homework | = | 10% |
| In-class Exams (3) | = | 40% total |
| Final Examination | = | 25% |
| | | |
| Total | = | 100% |

- **Video Prep Assignments,Discussion, and Participation (5% of your overall grade):** Do you ever wish your teacher would do more examples? By moving some "lecture" outside of class, we can! You will prepare for every class by watching videos about the day's topics. I try to keep most of the videos relatively short. You'll answer straightforward questions about the videos and turn in your answers before class. Discussion questions may be assigned on Canvas.
- **Quizzes and Handwritten Homework (20% of your overall grade):** Every week you will turn in written homework, take a quiz, or sometimes do both. Homework sets will often be exercises from the textbook or questions similar to book exercises. All assignments will be posted on the course web page or Canvas, so be sure to check often. Homework will **not** be accepted after the majority of papers have been graded. Quizzes will be based on WebAssign and recommended book exercises. They will

focus on new material but may incorporate material from any prior text section. There will be NO make-up quizzes. The lowest ONE quiz or homework will be dropped, so you can miss one with no penalty. Homework and quizzes are announced about 1 week before the due date, but I reserve the right to give unannounced quizzes.

- **WebAssign Online Homework (10% of your overall grade):** WebAssign is an online homework system that is linked to the text book and it is a required part of the course. The exercises you do on WebAssign will prepare you for quizzes, written homework, and exams and they will help you gauge how well you are doing in the course on a day-to-day basis. I HIGHLY recommend you keep a special WebAssign notebook – online homework still requires you to do handwritten solutions before you enter your answers on the computer. A well-organized WebAssign notebook will also help us both when you ask questions during office hours.

- **In-Class Exams (3 exams worth 40% TOTAL):** Exams are cumulative and will test both basic Calculus skills and deeper understanding of the material. Questions will often be similar in nature to examples from the book, examples from class, and assigned homework (both written and WebAssign).

  **The lowest in-class exam score will be worth 10% of your final grade and the best two in-class exams will each be worth 15%.**

  Exams will have a time limit and be held in person in class. It is expected that in the case of emergency forcing you to miss the exam, you will contact the instructor as soon as possible prior to the exam. Documentation of the emergency must be provided at the make-up exam. There will be *no* curving of the exam grades during the semester.

- **Final Exam (25% of your overall grade):** A cumulative final exam will be given (date and time TBD by TCNJ). DO NOT make travel plans until AFTER the exam date has been set! The final exam will be based upon homework and WebAssign exercises, previous exam materials, and examples from the book. Expect a blend of computational questions, problem solving questions, and questions involving a deep understanding of the course material.

### 5.2 Final letter grades

My expectation is that on the basis of your semester average, a letter grade will be given using the following scale.

90 - 100 is an A or A- (outstanding)
80 - 89 is a B or B± (good)
70 - 79 is a C or C± (average)
60 - 69 is a D or D+ (below average)
0 - 59 is an E (poor)

## 6 Required and Recommended Supplies

### 6.1 Technology Needs

You will need

- a scanner app for taking pictures of written work so you can upload that work to Canvas or another tool. Past students have used FastScanner and CamScanner but you are welcome to use any scanner tool that works for you. I will ask that all scans be black and white, high contrast pdf files to keep file sizes manageable and easy for me to view.

- **Your participation in this course matters and is valued.** The Accessibility Resource Center (ARC) is available to help facilitate the removal of barriers and to ensure reasonable accommodations if needed. For more information about ARC, please visit: `https://arc.tcnj.edu/`.

- Need help with technology? Contact the TCNJ Help Desk: `https://it.tcnj.edu/`

### 6.2 Recommended Supplies

I recommend the following supplies for success in Intermediate Algebra.

- A 3-ring binder, a quality 3-hole paper punch, and loose note paper. This will make it easier to organize your fill-in-the-blanks notes, other handouts, homework exercises, syllabus, schedule, exams, etc.

## 7 Course Policies

### 7.1 Attendance

Attendance is necessary to do well in any class and I will expect students to attend every class meeting. Attendance will be taken. Poor attendance almost always results in a poor grade.

### 7.2 Collaboration, Cheating, and Academic Dishonesty:

I encourage you to work together. You will practice communicating mathematical IDEAS and you will solidify your understanding by discussing those ideas with others. Math is rarely a solitary activity.

However, **your homework write-ups MUST be in your own words and they must represent your own understanding of the material. Copying another person's work is never acceptable.** When you are working with others, I expect that you are talking things out and perhaps writing stuff on a blackboard or scrap piece of paper, but you are not copying another person's work.

Needless to say, there will be a **no tolerance** policy towards cheating. **I ask you to be above suspicion.** This includes plagiarism. You are required to cite any outside source used to complete each assignment. Engaging in academic dishonesty will handled through TCNJ's Academic Integrity Policy and may result in an F grade for the assignment, exam, and/or the course. See `http://academicintegrity.tcnj.edu/` for more details.

### 7.3 Warning about Technology Dependence

You're here to develop your algebra skills to prepare for future math, science, and engineering classes. **Avoid using math apps.** Make mistakes and learn from them. The more you let computers and apps do the work for you, the less prepared you will be for quizzes, exams, and future classes. There are lots of powerful tools out there — be sure to use them responsibly to support your learning, not to replace your learning.

### 7.4 Netiquette

In the words of Bill and Ted, "Be excellent to each other." Whenever you communicate via text, chat, discussion boards, etc. imagine that you are actually talking face-to-face.

### 7.5 Accessibility

Students who experience barriers in this course are encouraged to contact the instructor as early in the semester as possible. The Accessibility Resource Center (ARC) is available to facilitate the removal of barriers and to ensure reasonable accommodations. For more information about ARC, please visit: `https://arc.tcnj.edu/`.

## 8 Notes to Students

- Would you run a marathon if your longest practice run had been 5 miles? Would you give a driver's license to someone who has only practiced driving for a day? Do you ever make mistakes when you learn a new skill or video game?

Learning mathematics is no different than learning these other skills. Learning anything new requires **lots of practice, lots of time, and consistent effort**. Regular class attendance, completing each assignment, and reading class notes and the textbook are **essential** for success in this course for all students. Extra help is provided during office hours. Use this opportunity!

- *Good communication is essential in all subjects*, including (and maybe especially) in mathematics. As such, your quiz and exam grades depend more on your methods and communication of the problem solving process than on the final answer.

# 9 Changes to the Syllabus

I reserve the right to make changes to the syllabus, schedule, and grading plan as necessary during the semester. You will be kept informed of all changes in-class, or on Canvas.

# 10 Additional TCNJ Policies

For more information about TCNJ policies including, but not limited to, Student Support Resources, Attendance, Academic Integrity, and Final Assessment Policies, see the TCNJ Syllabus Resources Page: `https://academicaffairs.tcnj.edu/tcnj-syllabus-resources/`

Intermediate Algebra, Tentative Schedule
Spring 2023

| Day | Date | Important | Topic | Beginning and Intermediate Algebra | Precalculus |
|---|---|---|---|---|---|
| Mo | 01/23/23 | | Syllabus and Review | Chapter 1 | 1.1 |
| We | 01/25/23 | | | | |
| Th | 01/26/23 | | 1.1 Intro to Modeling and Real Numbers | Chapter 1 | 1.1 |
| Mo | 01/30/23 | | 1.1 Real Numbers | Chapter 1 | 1.1 |
| We | 02/01/23 | | | | |
| Th | 02/02/23 | | 1.2 Integer Exponents | | 1.2 |
| Mo | 02/06/23 | | 1.2 Rational Exponents, Radicals | 9.1—9.5 | 1.2 |
| We | 02/08/23 | | | | |
| Th | 02/09/23 | | 1.2 Rational Exponents, Radicals | 9.1—9.5 | 1.2 |
| Mo | 02/13/23 | | 1.3 Algebraic Expressions | 4.4—4.6 | 1.3 |
| We | 02/15/23 | | | | |
| Th | 02/16/23 | NO CLASS | Teaching and Learning Summit --- NO DAY CLASSES | | |
| Mo | 02/20/23 | | 1.3 Factoring Polynomials | Chapter 5 | 1.3 |
| We | 02/22/23 | | | | |
| Th | 02/23/23 | | 1.3 Factoring Polynomials | Chapter 5 | 1.3 |
| Mo | 02/27/23 | | Catch up and Review for Exam 1 | | |
| We | 03/01/23 | | | | |
| Th | 03/02/23 | | **Exam 1, Covers P.1 – P.6** | | |
| Mo | 03/06/23 | | 1.4 Rational Expressions | 4.6—4.7, Chapter 6 | 1.4 |
| We | 03/08/23 | | | | |
| Th | 03/09/23 | | 1.5 Solving Basic Equations | 2.1—2.5 | 1.5 |
| Mo | 03/13/23 | NO CLASS | Spring Break | | |
| We | 03/15/23 | NO CLASS | Spring Break | | |
| Th | 03/16/23 | NO CLASS | Spring Break | | |
| Mo | 03/20/23 | | 1.7 Modeling with Equations | 1.6 | various sections |
| We | 03/22/23 | | | | |
| Th | 03/23/23 | | 1.9 Coordinate Plane and Graphs | 3.1—3.2 | 1.9 |
| Mo | 03/27/23 | Last day W | Catch up and Review for Exam 2 | | |
| We | 03/29/23 | | | | |
| Th | 03/30/23 | | **Exam 2, Covers P.1, P.6—P.9, 1.1—1.3, 5.1** | | |
| Mo | 04/03/23 | | 1.10 Lines | 3.2—3.5 | 1.1 |
| We | 04/05/23 | | | | |
| Th | 04/06/23 | | 10.1 Systems of Linear Equations | 8.1—8.3 | 10.1 |
| Mo | 04/10/23 | | 1.5 Quadratic Equations | 5.7, 10.1—10.2 | 1.5 |
| We | 04/12/23 | | | | |
| Th | 04/13/23 | | 1.5 Quadratic Equations and 1.5 Other Equations | 5.7, 6.5, 7.5 | 1.5 |
| Mo | 04/17/23 | | 1.5 Other Equations, 1.5 Absolute Value Equations | X | 1.5 |
| We | 04/19/23 | | | | |
| Th | 04/20/23 | | Review for Exam 3 | | |
| Mo | 04/24/23 | | **Exam 3, Covers 1.4, 1.6—1.8, 3.3** | | |
| Tu | 04/25/23 | NO CLASS | COSA --- No classes | | |
| We | 04/26/23 | | | | |
| Th | 04/27/23 | | 1.8 Linear Inequalities, 1.8 Absolute Value Inequalities | 2.7, 3.7, 8.7 | 1.8 |
| Mo | 05/01/23 | | Catch up or Review (time permitting) | | |
| We | 05/03/23 | | | | |
| Th | 05/04/23 | | OUR Last Day; Review for Final exam | | |
| Fr | 05/05/23 | | Last Day of Classes | | |
| **Mo, Tu** | **5/8-5/9** | | Reading Days, exams begin Tuesday evening | | |
| | **5/9—5/15** | | Exam Period --- DO NOT make travel plans until you know your exam schedule. | | |
| **Mo** | **05/22/23** | | Spring grades are due | | |

This schedule is tentative and may need to be adjusted during the semester.
Use it as a guide and check Canvas for updates.

Class does not meet on Wednesdays, but to be successful you should be attending office hours AND tutoring on Wednday afternoons.