Syllabus for Precalculus ALGEBRA, MATH 118

Fall 2019 at UWSP at Wausau, 9:00-9:50 Mon., Tue., Thur., Fri. in room 192

**Instructor**

 Paul Martin, Office 087-B, Ph 715-261-6272, email pmartin@uwsp.edu

**Office Hours**

10:00 MWF and at 12:00 on MWF. I am also willing to help when on campus and not teaching or in meetings. Virtual Office Visits can also be made by appointment through a virtual classroom. Contact me if you want to chat and I will send a link.

**Text:** Algebra and Trigonometry 4th ed. By Stewart, Redlin, and Watson. ISBN 978-1-305-07174-2

**Course Catalog Description:**
Topics include concepts, graphs, and properties of functions, inverse and algebraic functions, techniques of graphing, conic sections, linear and nonlinear systems, arithmetic and geometric series, mathematical induction and the binomial theorem.

In this course we will study the function concept. In so doing we hope to:

* Refresh and hone algebraic manipulative skills.
* Develop function concepts in terms of graphs, tables, and formulas for polynomial, exponential, logarithmic, and rational functions.
* Identify transformations of basic function types from their graphs and their formulas.
* Develop the concept and properties of inverse function relations.
* Study polynomial functions, their zeros, and factorization.
* Study rational functions and their graphs and the relationship between their graphs and the zeros of the denominator and numerator polynomials.
* Solve polynomial, logarithmic, exponential and radical equations as well as systems of equations using Gaussian Elimination and also Augmented Matrices and Reduced Row-Echelon Form.
* Study arithmetic and geometric (Linear and Exponential) sequences and series.
* Develop the method of proof by mathematical induction.

A detailed schedule of topic coverage is provided on the back of the syllabus.

**Homework:** For each topic we cover, I will hand out a skeleton of the notes for the day which will include a list of problems from the text to work out. You should attempt all of these and others as necessary to achieve understanding of concepts and techniques. You should be spending about ~2 hours studying the material and working problems and after each class meeting. Any problems or concepts that you don't understand should be brought up at the start of the class for discussion and resolution. During each non-exam week, I will provide you a handout with the problems from that week that I will collect on Friday. The hand-in collected problems will mostly be very similar to some of those assigned from the textbook. These will account for 100 points towards the course total of 550 points.

**Exams:** There will be an in-class test about once every four weeks or so according to the schedule opposite. The tests will be on material covered since the previous exam. About 30-40% of these exams will be take-home and assigned about a week before the in-class component. You are encouraged to use the textbook and to consult as needed on the take-home parts of these exams, but must hand in your own write-up of the problems. There will also be a comprehensive final exam on **Dec. 17 from 10:15 -12:15 in room 192.**

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| **Grades:** The three hour-exams will count for a total of 300 points. In addition to the in-class tests there will be a Final Exam worth 150 points. The cut-off scores for A,B,C,D,F-grades will be very close to 90, 80, 70, and 60%.  |

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| Homework  | 100 |
| In-class Tests | 300 |
| Final Exam | 150 |
| Total | 550 |

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The final exam score will normally count as 150 points out of 550. However, if the % score on the final is higher than either the homework total or of any single hour exam, the final exam % will replace the lowest 100 point input to the course grade. Homework/exams missed for less than adequate reason will count as zero.

Tentative Schedule for the Semester

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|  Week  |  Sections |  Content  |
| Sept 3 | P.3-P.5 | Exponent Rules, Radicals, Polynomials,  |
| Sept 9 | P.6-P.8 | Factoring algebraic expressions, Working with Rational Expressions and Solving basic Equations.  |
| Sept 16 | 1.2, 1.3 2.1, 2.2 | Equations of Circles and Lines, e.g. Functions and graphs of functions. |
| Sept 23 | 2.3-2.5 | Reading information and describing a function in terms of its graph. Average rate of change of a function and linear functions and modeling with linear functions. |
| Sept 30 | 2.6  | Transformations (shifts and stretches and reflections) of functions.**Exam I** |
| Oct 7 | 2.7-2.8 | Combining functions through arithmetic and composition and finding formulas for going in the reverse direction of a function (Finding **Inverse Function Formulas**). |
| Oct 14 | 3.1-3.3 | Quadratic and polynomial functions and their graphs. Especially end-behavior and relation between factored form and shape of graphs near -intercepts. |
| Oct 21 | **3.4, 3.5** | Finding real and complex zeros and factorization of polynomials. Fundamental Theorem of Algebra. (Factor Theorem!) |
| Oct 28 | 3.6-3.7  | Rational functions and nonlinear inequalities and the relation between their formulas and graphs and solutions. **Exam II** |
| Nov 4 | 4.1-4.3 | Exponential and Logarithmic Functions including and .  |
| Nov 11 | 4.4-4.6 | Properties of Logarithms and solving exponential and logarithmic equations. Exponential growth and decay models. |
| Nov 18 |  10.311.1, 11.3 | Partial Fractions to decompose Rational functions.Augmented Matrices and Reduced Row Echelon Form, Determinants and Kramer’s Rule |
| Nov 25 | 12.1 | Thanksgiving Break is on Nov 28 & 29 (no classes)**Exam III.** Review parabolas and find foci. |
| Dec 2 | 12.2-12.3 | Ellipses and Hyperbolas and shifted Conic Sections. |
| Dec 9 | 12.1-12.3 | Sequences and Series especially Arithmetic (linear) and Geometric (exponential) types |
|   |  |  **Final exam is on Dec. 17 from 10:15 -12:15 in room 192.**  |