MATH 022

College Algebra II and Analytic Geometry

Sample Syllabus

Description

College Algebra II represents a significant opportunity for students to discover the beauty and practical power of mathematics. Concepts and skills are taught while at the same time a sense of algebra's utility in the real world is imparted. This course provides indepth coverage of college algebra topics that students continuing in mathematics will require. This is the kind of mathematics that students will use the rest of their lives in many fields. MATH 022 is a preparatory course intended to provide mathematical background in algebra with a function/graph emphasis required in calculus courses. Linear, polynomial, rational, exponential and logarithmic functions and their graphs provide necessary models for mathematical applications.

Objectives

Upon successful completion fo the course, students should be able to:

- Solve various types of basic equations.
- Solve linear, absolute value, non-linear and rational inequalities.
- Identify functions from algebraic, graphical, tabular and verbal representations.
- Use function notation when evaluating functions.
- Identify domain and range of functions.
- Graph a piece-wise defined function.
- Identify properties of graphs such as relative and global extrema, symmetry, increasing, decreasing, even, and odd.
- Identify graphs of Basic Functions and their properties.
- Transform the graph of a function.
- Translate the graph of a circle in standard or general form.
- Write the equation of a line.
- Write equations of parallel and perpendicular lines to a given line.
- Extract information from linear and quadratic models.
- Translate applications into algebraic models and solve.

- Perform operations on functions, including composition of functions.
- Identify one-to-one functions.
- Identify, analyze and graph the inverse of a function. Find the inverse of a given function.
- Analyze and graph polynomials functions.
- Divide a polynomial function by another polynomial function.
- Apply the Remainder Theorem and Factor Theorem.
- Graph rational functions.
- Analyze and graph exponential and logarithmic functions.
- Solve exponential equations.
- Solve logarithmic equations.
- Explain what a logarithm is.
- Use logarithm properties to simplify an expression.
- Set up and solve exponential and logarithmic application problems.

Textbook

College Algebra, 2nd Edition by John W. Coburn (McGraw-Hill, 2010) pre-packaged with one-semester access to ALEKS

Course Schedule

Unit	Topic(s)
1	Extensive review of intermediate algebra topics. The review will include: solving linear equations and inequalities, fundamental concepts associated with quadratic equations, solving equations and inequalities with absolute values and other miscellaneous equations involving rational expressions and radical expressions. An introduction to complex number arithmetic is also included.
2	General concepts associated with relations and functions. Topics such as the algebra of functions, function composition and range and domain are studied. The graphical representation of linear and quadratic functions are also presented. The algebraic and graphical representation of circles will also be studied as it pertains to terminology associated with relations in general. Basic graphical transformations are introduced.
3	Polynomial and rational functions are studied in detail. In particular, ideas associated with zeros of polynomials, end-behavior, and graph sketching are

	discussed. The unit includes synthetic division, the remainder theorem, the conjugate root theorem, horizontal and slant (oblique) asymptotes, and vertical asymptotes.
4	Exponential and logarithmic functions are studied in detail. Specific skills entail working with the rules of exponents and logarithms and solving exponential and logarithmic equations. Concepts associated with one-to-one functions and the existence of inverses are also studied. Sketching and recognizing the graphical representation of exponential and log functions is included.

Algebraic Skills

Algebraic skills will be primarily developed through work on ALEKS. ALEKS is a web-based tutorial system which provides students with ongoing skills based assessments and tracks progress. The midterm and final exams will also entail skills based problems.

As necessary, lectures will be done via BlackBoard Collaborate. The midterm and final exams will administered via Canvas.

Conceptual Skills

Conceptual Skills will be incorporated in lectures, reading, and activities. Lectures and activities will be conducted approximately every other week. A typical lecture and/or activity will tie skill based ideas together to provide a larger overview of the topics. Lectures will be done via Elluminate and activities will be based upon discussion board prompts and/or assigned tasks from the text. The final exam will also incorporate questions which relate to the conceptual tasks.

ALEKS

Essentially all of the skills based work will be conducted through ALEKS. The ALEKS system will do ongoing assessments of skills based problems and track student progress. ALEKS is a major component of the course and a typical college algebra student will need to plan on 4-6 hours of online work each week (50-60 hours for the course). Skills based points will be earned by measuring mastered objective milestones and skills based ALEKS quizzes.

Readings / Problems

he text will be primarily used to tie ideas to concepts and skills together. This will be done through assigned readings and suggested problems. Occasionally, a problem may be selected to emphasize a specific skill that ALEKS did not adequately incorporate. Some of the activities will stem from the text. Finally, the text will support the ALEKS work in that explanations within ALEKS will reference specific areas from the text for further reading.

Lecture Attendance

Elluminate is the web-conference utility where the virtual classroom resides. This may also be used for more "face-to-face" group correspondence with students.

Grading

The total number of points for the course will be 1000 points. Students will have an opportunity to earn 200 points in each of the following three areas: 1) Basic Skills (ALEKS work), 2) Conceptual Understanding (Activities and quizzes), and 3) the Final Exam (incorporates both basic skills and conceptual understanding). The final grade will be determined by the sum of these three areas. The minimum of the three area scores and the maximum of the three area scores will be incorporated twice and thus each of these two areas will will contribute to 40% of your overall grade as each will be worth 400 points. This rubric emphasizes that all three areas are of utmost importance.

Conceptual Assessment	Basic Skills	Final Exam	Minimum 3 Areas	Maximum 3 areas
4 Activities (5 pts / each)	4 ALEKS Units (40 pts / each)	1 Proctored Exam (200 pts)		
4 Quizzes (20 pts / each)	Final Set (40 pts)			

2 Midterm Exams (50 pts / each)				
200 pts	200 pts	200 pts	200 pts	200 pts

Grading Scale

Letter Grade	% Score	Total Points
A	90-100	896-1000
B	80-89	796 -895
C	70-79	696-795
D	60-69	596-695
F	0-59	50-595

Arranging a Proctor

You will need to secure a proctor in order to take exams in this course. A proctor will not automatically be assigned to you; rather, you must make the necessary contacts to secure a professional who will serve in this capacity.

- Contact a person who meets the qualifications and ask him or her to proctor your exam.
- Student Services must approve your proctor before any exams can be taken. Please see instructions for securing a suitable proctor . While many proctors will serve on a voluntary basis, you are responsible for paying any expenses incurred in retaining a proctor.
- You must complete a Proctor Information Form and submit the completed form with the proctor verification documentation. Note: If your proctor has been previously approved by the World Campus during a prior course within two years, you do not need to obtain verification. World Campus retains proctor information on file for two years.
- If your proctor does not meet the required specifications, Student Services will notify you within 5 to 7 business days.

- You will need to complete an Exam Request Form for each exam. Contact your proctor to confirm the date, time, and location of your exam(s). Complete the form 3 weeks prior to your scheduled exam to allow for processing the request and mailing exams to proctors. If you are located outside the United States, in order to allow adequate time for mailing, please plan to request your exam earlier than 3 weeks prior to the exam week.
- Contact Student Services if you cannot take a scheduled exam.

Academic Integrity

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Accommodating Disabilities

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The Student Disability Resources (SDR) website provides contact information for every Penn State campus . For further information, please visit Student Disability Resources website.

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines . If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an

accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

Counseling and Psychological Services

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

- Counseling and Psychological Services at University Park (CAPS): 814-863-0395
- Counseling and Psychological Services at Commonwealth Campuses
- Penn State Crisis Line (Available 24 hrs, 7 days a week): 877-229-6400
- Crisis Text Line (Available 24 hrs, 7 days a week): Text LIONS to 741741

Educational Equity / Report Bias

Penn State takes great pride to foster a diverse and inclusive environment for students, faculty, and staff. Acts of intolerance, discrimination, or harassment due to age, ancestry, color, disability, gender, gender identity, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity via the Report Bias website.