William Rainy Harper College
COURSE SYLLABUS
Semester: Fall 2024

MATH 140-001: PRECALCULUS

General Course Information

Illinois Articulation Initiative (IAI) designation: None
Credit Hours: 5 lecture, 0 lab
Class Dates: Starts: 1/16 Ends: 5/15
Meeting Times: Mon & Wed - 8:00am – 8:50am
Tues & Thurs - 8:00am – 9:15pm
Meeting Location(s): D112
Modality: Face-to-Face, In-Person
Online Expectations: Minimal Blackboard Usage with Online Homework and Gradebook on ALEKS

Instructor Information

Instructor: Karega Cooper
Office: D233c
Phone: (847)925-6091
E-mail: kcooper@harpercollege.edu
Student Help Hours:
Monday : noon – 1pm; Wednesday : 9am-10pm
Tuesday & Thursday : 11am – Noon
Friday : (online) 8am – 10am
Also available outside these times by appointment
WebEx Meeting Room Link and QR Code:
https://harpercollege.webex.com/meet/kcooper
Preferred Method of Communication: Face-to-Face

Your **Class Code** is: **PMVNW-4XGAK**
Your **Financial Aid Access Code** is: **5BF2C-0EDC1-27E1C-08B50**

Final Exam: Wednesday, December 11, 2024, at 8am

Required Textbook: Miller, Julie and Gerken, Donna. *Precalculus*. 2nd Ed. McGraw-Hill (2023)
ISBN10: 1260260453 | ISBN13: 9781260260458

Other Course Materials: **Graphing Calculator** (recommend: TI 84+)

Course Content Description:
This course builds on MTH 103 (College Algebra) to provide the foundation for calculus and analytic geometry. Topics include but are not limited to radical and rational equations; equations quadratic in form; polynomial and rational functions; polynomial and rational inequalities; sequences and series; mathematical induction; the binomial theorem; trigonometric functions; inverse trigonometric functions; applications of trigonometric functions; polar coordinates and vectors; and the complex plane.

Prerequisites:
Prerequisite: MTH 103 (College Algebra) with a grade of C or better, or other placement options (see following link)
Math_Placement_Grid.pdf (harpercollege.edu)

The following is a brief outline of procedures that will be used in this course. Because of the nature of human learning activity, some modifications may have to be made to facilitate course procedures.

Expected Student Outcomes
Upon successful completion of this course, students should be able to:

- solve rational equations.
- solve radical equations.
- solve equations quadratic in form.
- solve polynomial inequalities algebraically and geometrically.
- solve rational inequalities algebraically and geometrically.
- solve absolute value inequalities algebraically and geometrically.
- sketch polynomial functions including end behavior, zeros and behavior near each zero.
- sketch rational functions including end behavior, zeros, behavior near each zero, vertical and non-vertical asymptotes, behavior near asymptotes.
- fine and use the general term of an arithmetic sequence to solve problems related to arithmetic sequences.
- find and use the general term of a geometric sequence to solve problems related to geometric sequences.

- find nth partial sum of an arithmetic sequence to solve problems related to arithmetic series.
- find nth partial sum of a geometric sequence to solve problems related to finite geometric series and infinite geometric series.
- use proof by mathematical induction to prove statements of natural numbers.
- use the binomial theorem to expand powers of binomials.
- convert angle measures between degrees and radians.
- evaluate trigonometric functions at multiples of 0, 30, 45, 60, and 90 degree angles.
- describe properties of the six basic trigonometric functions and their graphs.
- sketch the graphs of trigonometric functions by identifying the amplitude, period, phase shift and vertical shift.
- describe properties of inverse trigonometric functions and their graphs.
- apply basic trigonometric identities.
- prove trigonometric identities.
- find the general solution and particular solutions of trigonometric equations.
- solve triangles by applying the law of sines, the law of cosines, and/or geometric theorems.
- solve triangles in applications.
- find the area of a triangle using length of sides, and/or measures of angles.
- use properties of vector addition and scalar multiplication to solve problems related to vectors.
- convert between rectangular and polar coordinates.
- convert between rectangular and polar equations.
- graph polar equations.
- explain the relationships among trigonometric functions, polar coordinates and the complex plane.
- find the polar form of a complex number.
- write the product and quotient of two complex numbers in polar form.
- use DeMoivre's theorem to find integer powers and roots of a complex number in a polar form.

The final grade for the course will be based on:

- **Scores on chapter tests**
- **Scores on online homework**
- **Score on the comprehensive final examination**

Grading Policy:
The course grade will be determined by chapter tests and a final exam. There will be four Chapter Exams.

Exams	= 60%
Online Homework	= 15%
Final Exam	= 25%

Letter grades will be determined by the following percentages:

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Make-up exams
There are no make-up tests except in extreme circumstances. Arrangements for these extreme situations must be made prior to the test. If an extreme situation occurs on the day of the test, a message must be left on my voicemail or email the day of the test. If you miss a test, you will receive a grade of 0 (0 points).

Late Work Policy
Late Work will only be accepted with a percentage deduction agreed upon by pupil and instructor – please email me to discuss late work to avoid a percentage deduction.

Attendance Policy
~~In this class attendance is mandatory; therefore any non-excused absence beyond 3 will result in 30 points subtracted from your chapter exam point total.~~

You are responsible for everything (including quizzes/exams and announcements) that take place during all class sessions.

- **The last day to drop and receive a refund is August 26, 2024.**
- **The last day for withdrawal without academic assessment is November 18, 2024.**

Tardiness:
~~You must be in class at the assigned time. Continual tardiness will not be allowed; to this end, any tardiness beyond 3 will result in 30 points being subtracted from your chapter exam point total.~~

Cheating:
Any instance of cheating will result in a instructor and pupil discussion and could possibly lead to a zero on the assignment, referral to the Student Code of Conduct Officer or failure for the entire course.

Confidentiality:
This instructor will protect the confidentiality of all participants in this class. I will not disclose information about a student to anyone without written permission. This means that I will not share any information about your grades or performance in this class with parents, spouses or anyone else that should inquire about your progress.

Accessibility:
Harper College strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let Access and Disability Services (ADS) know immediately at 847.925.6266. ADS will privately discuss the options you have, including the accommodations they offer. You are welcome to register with Access and Disability Service by going to Access and Disability Services and filling out the application for ADS services. Once you have your accommodations approved by ADS, please make arrangements with the instructor as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

- Location: Building I, Room 103
- Phone: 847.925.6266
- Email: ads@harpercollege.edu
- To learn more visit: Access and Disability Services

Equal Opportunity Statement
Harper College does not discriminate on the basis of race, color, religion, sex, gender, national origin, ancestry, age, marital status, sexual orientation, disability or unfavorable discharge from military service. If you believe you have experienced discrimination or harassment (whether on or off campus) that affects your ability to participate in class or any of Harper College's programs, please seek assistance from any of the following resources:

- For gender-based or sexual misconduct (including sexual assault and sexual harassment) by any person, visit the Harper College Title IX resource page to learn more about your support and reporting options.
- For any other harassment/discrimination by an employee, contact the College's Chief Human Resources Officer at 847-925-6216.

Please be advised that faculty members are required to report to the College if they learn that a crime may have occurred or that harassment or discrimination may have occurred. If you are not sure if you want to formally report to the College, but you want confidential support or assistance, contact Psychological Services at 847-925-6268.

Academic Dishonesty:
Students are expected to uphold college policies related to academic dishonesty towards pursuit of their educational objectives as outlined in the Academic Honesty Policy, in the Student Handbook. The College reserves the right to set and communicate reasonable standards of behavior as needed. The following behaviors related to academic dishonesty are prohibited. Examples are provided to illustrate the specific prohibition and are not intended to be all-inclusive.

- Cheating (accessing or using unauthorized materials or information)
- Plagiarism (reproducing someone else's words or ideas without accurate acknowledgment)
- Falsifying information (providing untrue information)
- Unauthorized collaboration (getting assistance or sharing work without permission)
- Facilitating academic dishonesty (participating in an act that creates an unearned advantage for someone)

Lecture procedure:
READ YOUR BOOK! We will be using the textbook as the primary source for materials presented in this class. The topics presented will usually follow the text's presentation with slight modification. However, not all important material will be lectured. Note, that this material will be indicted when appropriate. Furthermore, the pupil is expected to read each section covered as well as some material on his or her own.

Course Topics

Chapter R **Review of Prerequisites**
- R.5 Equations with Real Solutions
- R.6 Complex Numbers and More Quadratic Equations
- R.8 Linear, Compound, and Absolute Value Inequalities
- 2.6 Polynomial and Rational Inequalities

Chapter 2 **Polynomial and Rational Functions**
- 2.1 Quadratic Functions
- 2.2 Introduction to Polynomial Functions
- 2.3 Division of Polynomials and the Remainder and Factor Theorems
- 2.4 Zeros of Polynomial Functions
- 2.5 Rational Functions

Chapter 4: **Trigonometric Functions**
- 4.1 Angles and Their Measure
- 4.3 Right Triangle Trigonometry
- 4.2 Trigonometric Functions Defined on the Unit Circle
- 4.4 Trigonometric Functions of Any Angle
- 4.5 Graphs of the Sine and Cosine Functions
- 4.6 Graphs of the Other Trigonometric Functions
- 4.7 Inverse Trigonometric Functions

Chapter 5 **Analytic Trigonometry**
- **5.1 Fundamental Trigonometric Identities**
- 5.2 Sum and Difference Formulas
- 5.3 Double-Angle, Power- Reducing, and Half-Angle and Formulas
- 5.4 Product-to-Sum and Sum-to-Product Formulas
- 5.5 Trigonometric Equations

Chapter 6 **Applications of Trigonometric Functions**
- 6.2 Law of Sines
- 6.3 Law of Cosines

Chapter 11 **Sequences, Series, Induction, and Probability**
- 11.1 Sequences and Series
- 11.2 Arithmetic Sequences and Series
- 11.3 Geometric Sequences and Series
- 11.4 Mathematical Induction
- 11.5 The Binomial Theorem

Chapter 7 **Trigonometry Applied to Polar Coordinate Systems and Vectors**
- 7.1 Polar Coordinates
- 7.2 Graphs of Polar Equations
- 7.3 Complex Numbers in Polar Form
- 7.4 Vectors
- 7.5 Dot Product

Section Schedule

WEEKS	SECTIONS COVERED
Week 1	R.5
Week 2	R.6 and R.8
Week 3	2.6 and 2.1
Week 4	2.2 and 2.3
Week 5	2.4 and 2.5
Week 6	4.1, 4.3 and 4.2
Week 7	4.4 and 4.5
Week 8	4.6 and 4.7
Week 9	5.1 and 5.2
Week 10	5.3 and 5.4
Week 11	5.5 and 6.2
Week 12	6.3 and 11.1
Week 13	11.2 and 11.3
Week 14	11.4 and 11.5
Week 15	7.1 and 7.2
Week 16	7.3, 7.4 and 7.5