Math 104 - PreCalculus
Fall 2022 Syllabus

Contents

1 Course Coordinator's Information

Coordinator	Coordinator's Email	Office	Office hours	zoom ID	Zoom Passcode
Niknejad, Jila	jila at ku.edu	651 Snow C	MWF 3-3:50PM	983 9865 9842	104127

2 Instructors' Information

Instructor	Email/Zoom ID	Office	Section	Time	Classroom
Kathryn Cole	kathryncole@ku.edu	MW 9-10 AM Snow	14420	MTuWThF 08:00 - 08:50 AM	Learned 1131
Enrique Salcido	esalcido@ku.edu	Th 1-2PM Snow 624	14071	MTuWThF 09:00 - 09:50 AM	Learned 1131
Xinyun(Melody) Yu	melodyyu1029@ku.edu	Th 12- 1 PM Snow 625	11402	MTuWThF 10:00 - 10:50 AM	Learned 1131
Ryan Hunter	rehunter@ku.edu	TuTh 2:30-3:30 Snow 451 A	13419	MTuWThF 11:00 - 11:50 AM	Learned 1131
Ray Zhang	rayzhang@ku.edu 5504431223 code:496038	M 3-4pm Snow 555	11403	MTuWThF 12:00 - 12:50 PM	Learned 1131
Chen Ma	c175m266@ku.edu	Tu 2:10-3:10 PM Snow 620	11404	MTuWThF 01:00 - 01:50 PM	Learned 1131
Trevor Arrigoni	tarrigoni@ku.edu	W 3-4 Snow 553	11405	MTuWThF 02:00 - 02:50 PM	Learned 1131
Debjit Basu	debjitbasu@ku.edu 94521751963 code : 2022	F 11am - noon Snow 560	13779	MTuWThF 03:00 - 03:50 PM	Learned 1131

3 Disclaimers

This syllabus contains the basic information for MATH 104. Students should regularly visit the course Canvas page to find their exam scores, assignment scores, course announcements, assignments, detailed course schedule, and links to course materials.

Students must **regularly check both their KU email and the course Canvas page** .

The **"Total" column of Canvas grade book is not accurate** and we will post an excel sheet, called **grade-calculator** , for you to compute your grade after each exam.

4   Textbook

Textbook: Precalculus, OpenStax, Abramson, Precalculus 1e (The electronic version of this textbook is **free** and can be obtained at https://openstax.org/details/books/precalculus. (Physical copies are also available at KU bookstore.)

Other Material Needed:

You will have access to WebAssign, and Ebook through "Auto access" on Canvas.

Zoom App: The classes and help room are in-person but some of the instructors may hold office hours on zoom.

Calculators for Midterms/Final Exams: **Only basic or scientific calculators** will be permitted while taking exams. Calculators must not have $\int$, $\frac{d}{dx}$, or lim keys. (TI 30 is recommended.)

5   Course Goals and Topics

The course is an introduction to the elementary functions (polynomial, rational, exponential, logarithmic, and trigonometric) and their properties. The objective of the course is to acquire mastery of the material covered in the course in the following senses:

Analysis and Graphing of Functions

- Analyzing/ evaluating a function using a rule of the function, a table of values or a graph; using function notation; finding the domain and range of a function; writing the rule of a function; analyzing functions in applications; finding average rate of change; relating average the rate of change to the net change in piecewise defined and linear functions; recognizing extrema in graphs or in quadratic models.

- Using concepts of symmetry; intercepts, left and righthand behavior, asymptotes, and transformations; to sketch the graph of various types of functions (constant, linear, quadratic, absolute value, piecewisedefined, square root, cubic, polynomial, rational, exponential, and logarithmic).

- Writing equations of circle, ellipse, hyperbola given their descriptions.

- Performing $+, -, \times$, division, composition and inverse operations on functions; analyzing real-life application of these operations.

Solutions of Equations and Inequalities

- Solving linear, quadratic or cubic equations in one variable involving one or multiple parameter(s); solving equations involving radicals, rational expressions or absolute values; solving exponential and logarithmic equations.

- Solving systems of linear equations; understanding the geometry of the solution(s); inconsistent, distinct point or infinite. Performing Gaussian reduction; $+, -, \times$ matrix operations. Knowing examples of non-commutative matrix products. Recognizing a vector as a matrix. Solving systems of non-linear equations.

- Solving linear, polynomial, rational or absolute value inequalities; by graphing.

Trigonometry

- Converting between radian measurement and degree measurement; understanding the relationship between radian and arc length of a circle; understanding angular velocity.

- knowing six trigonometric values of all angles; whose reference angles are special angles $0, \pi/6, \pi/4, \pi/3$, and $\pi/2$.

- Solving for an unknown sides/angles within right triangles.

- Graphing the six basic trigonometric functions and their arithmetic combinations; understanding the concepts of period, phase shift, amplitude, and vertical displacement.

- Deriving/verifying trigonometric identities, including but not limited to double angle, half angle, angle sum, and angle difference identities.

- Defining, graphing, and applying inverse trigonometric functions.

- Solving trigonometric equations; recognizing the difference between an identity and a trigonometric equation.

- Finding solutions of oblique triangles using the Law of Cosines and/or Law of Sines.

- Deriving the trigonometric form of complex numbers and perform calculations with them including products and quotients.

- Converting between rectangular and polar coordinates; graphing within the polar coordinate systems.

- Understanding basic parameterized curves; the conversion between parameterized curves and a function rule; understanding parameterized form of a circle, ellipse and hyperbola.

- Application of trigonometric functions including optimization; shadowing relating rates when one of the functions are linear.

5.1   Learning Objective and Course Content

Chapter 1 : **Functions**

- Section 1.1: Functions and Function Notation
- Section 1.2: Domain and Range
- Section 1.3: Rate of Change and Behavior of Graphs
- Section 1.4: Composition of Functions
- Section 1.5: Transformation of Functions
- Section 1.6: Absolute Value Functions
- Section 1.7: Inverse Functions

Chapter 2 : **Linear Functions**

- Section 2.1/ 2.2: Linear Functions/ Graphs of Linear Functions
- Sections 2.3: Modeling with linear Functions

Chapter 3 : **Polynomial and Rational** Functions

- Section 3.1: Complex Numbers
- Section 3.2: Quadratic Functions
- Section 3.3: Power Functions and Polynomial Functions
- Section 3.4: Graphs of Polynomial Functions
- Section 3.5: Dividing Polynomials
- Section 3.6: Zeros of Polynomial functions
- Section 3.7: Rational Functions
- Section 3.8: Inverse and Radical Functions

Chapter 4 : **Exponential and Logarithmic Functions**

- Section 4.1: Exponential Functions
- Section 4.2: Graphs of Exponential Functions
- Section 4.3: Logarithmic Functions
- Section 4.4: Graphs of Logarithmic Functions
- Section 4.5: Logarithmic Properties
- Section 4.6: Exponential and Logarithmic Equations
- Section 4.7: Exponential and Logarithmic Models

Chapter 5 : **Trigonometric Functions**

- Section 5.1: Angles

- Section 5.2: Unit Circle: Sine and Cosine Functions
- Section 5.3: The Other Trigonometric Functions
- Section 5.4: Right Triangle Trigonometry

Chapter 6 : **Periodic Functions**

- Section 6.1: Graphs of Sine and Cosine
- Section 6.2: Graphs of Other Trigonometric Functions
- Section 6.3: Inverse Trigonometric Functions

Chapter 7 : **Trigonometric Identities and Equations**

- Section 7.1: Solving Trigonometric Equations with Identities
- Section 7.2: Sum and Difference Identities
- Section 7.3: Double-Angle, Half-Angle, and Reduction Formula
- Section 7.4: Sum-to-Product and Product-to-Sum Formula
- Section 7.5: Solving Trigonometric Equations

Chapter 8 : **Further Applications of Trigonometric Functions**

- Section 8.1: Non-right Triangles: Law of Sines
- Section 8.2: Non-right Triangles: Law of Cosine
- Section 8.3: Polar Coordinates
- Section 8.4: Polar Coordinates: Graphs
- Section 8.5: Polar Form of Complex Numbers
- Section 8.6: Parametric Equations
- Section 8.7: Parametric Equations: Graphs

Chapter 9 : **Systems of Equations and Matrices**

- Section 9.1: Systems of Linear Equations: Two variable
- Section 9.2: Systems of Linear Equations: Three Variables
- Section 9.3: Systems of Nonlinear Equations and Inequalities
- Section 9.5: Matrices and Matrix Operations
- Section 9.6: Solving Systems with Gaussian Elimination

Chapter10 : **Analytic Geometry**

- Sections 10.1: The Ellipse, 10.2: The hyperbola and 10.3: The Parabola

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5.2　Prerequisite

MATH 002, or two years of high school algebra and a score of 22 or higher on ACT mathematics, or a qualifying score on the mathematics placement test. Open for only two hours credit for students with credit in MATH 101. Not open to students with credit in MATH 103.

6　Grading System

A	B	C	D
$\geq 88\%$	$\geq 76\%$	$\geq 64\%$	$\geq 50\%$

Note that there are no plus/minus grades in the precalculus/calculus sequence. The letter grade cut-offs will not change at the end of the semester and there will not be a curve.

Most assignments and assessments will have extra credit opportunities. The following is a breakdown for MATH 104 showing the components of the course and how much each component is worth.

Final Exam	25%
Midterm 1	20%
Midterm 2	20%
Gateway Exam	10%
WebAssign Homework	10%
Individual Work Upload and In-class Group Work	6%
Participation	4%
In-class Quizzes	5%
Practice Quizzes (Extra Credit)	2%
Various Surveys (Extra Credit)	1%

Total= $25 + 20 + 20 + 10 + 10 + 6 + 4 + 5 = 100$ and Extra credit: $2 + 1$

7　Important Dates and Exams

7.1　Paper Gateway, Midterm and Final Exams

Paper Gateway exams and Midterm exams are graded by MATH 104 instructors. All questions in paper gateway exam is posted. Midterm Exams from previous semester(s) will be posted on Canvas 10 days before the exam dates.

Exam	Day	Date	Time	Room	Content
Paper Gateway	Wednesday	October 12th	During Class	In class	Function Operations, Expression Simplification and Solving Equations
Midterm 1	Tuesday	September 27th	5:50-7:50 PM	Tentatively Budig 110	Chapters 1,2,3, and Sections 4.1-4.2
Midterm 2	Tuesday	November 1st	5:50-7:50 PM	Tentatively Budig 110	Chapters 4, 5, 6 and 7
Final Exam	Wednesday	December 14th	4:30-7 PM	(TBA)	Accumulative

7.2 The Gateway Exams

Students can earn a score of 0 or 10 on the Gateway. Students earn full credit by passing either the paper (written) Gateway Exam or the computerized in-lab Gateway Exam retakes. Information about the WebAssign Gateway Exams, including deadlines and location is given below; we will confirm the information on the course's Canvas page closer to those dates.

Exam	Date(s)	Place		
Paper Gateway Wednesday	October 12th	In Recitation	Click for Questions	Click to Watch the prep-videos.
Computerize Retake	Weeks 9-10 (10/17 -10/28)	Snow 159	MTuWThF	Tentatively 1-5PM

A paper (written) Gateway Exam will be administered in laboratory (recitation) sections during the 1st recitation session of Week 8. Students who correctly answer 7, 8, 9, or 10 out of the 10 questions earn full credit and **do not** need to retake the In-Lab Gateway Exam.

7.3 Withdrawal Dates

Day	Date	Type	
Monday	September 12th, 2022	Last day to withdraw/drop without a "W"	
Wednesday	November 16th, 2022	Last day to withdraw from a class or the University	

8 The Structure of the Class

Your class meets five times per week, at the same time of the day. Your instructor will go briefly over the material for a few minutes; you work in groups for the rest of the time; your instructor will visit each group or make quick instructions when you are working in groups. The first five chapters of the book is an extensive review of algebra; the next five sections cover trigonometry, systems of equations, parametric curves, and conical cross sections. Print the worksheets before the class if possible; or write the questions in your notebook. Having a computer in class helps a lot.

8.1 Summary of the Structure of Assignments and Assessments

Participation	For every class, there is a lecture note or a worksheet. There are are questions in these notes and worksheet to e done in class. If you are contributing to the group work, you will earn 100% of that day. If you are late or not participating, you may earn 50% or 0% of that day's attendance and will be marked "late" or "absent".
Gateway Exam	Each exam contains 10 questions on Function Operation, Expression Simplification and Solving Equations. Pass score is 70% or higher and full points will be awarded. Any score below 70% is awarded zero points. A paper Gateway exam will be given in the 1$^{\text{st}}$ recitation session of Week 8. If you didn't pass the paper gateway, multiple computerized retakes will be available in Weeks 9-10 (10/17 -10/28) in Snow 159.
In-class Quizzes	They are low stake assessments that **may** help in reducing the testing anxiety for other assessments by giving you practice. Each covers 2-3 learning objectives. Five of these quizzes are in preparation for Gateway exams; no partial credit will be awarded on any individual questions.
Practice Quizzes	Some of the quizzes come with a practice quiz to prepare you; to prepare you for that quiz. (Extra Credit.) You can find them on the weekly modules.
Midterm & Final Exams	They are administered in the evening. They come with review sessions and practice exams
WebAssign Homework	Find a link on the week's Canvas module. WebAssign Homework gives you instant feedback. You have multiple attempts for each assignment. If you complete a week in advance, small extra credit will be awarded. You can request automatic extension on WebAssign a week past the due dates; to use extension, avoid the viewing of the solutions.
Worksheets: Group work & Individual Work	There are twelve Worksheets during the semester. Each of these worksheet have a section for notes, a few questions to do in groups and individual work questions. Sometimes the worksheets are combined with lecture notes; they can look like any lecture notes but they are marked as worksheet. Read the worksheets before the class; come in prepared and work on group work in your groups. Each member of groups should write a problem so make sure that you do your work. Ask questions from your instructor. You may work on the individual part of the worksheet together but write your own work and upload to Canvas or submit in class before due date. Up to 2 points of group work will be awarded in class and the individual work will be graded for correctness out of 8 points; total of 10 points.

8.2 The Participation

(A) If you have an school sanctioned reason that will cause you to miss class for more than 5 consecutive working days or more than 10 non-consecutive working days; have the appropriate office contact us; if the reason you are missing class is personal or chronic illness, please contact https://access.ku.edu/ to document your illness. They will communicate with us.

(B) If you have an excused absence and your total absence does not fall in the first category, described in Part (A); notice that Part (C) is explaining that you can miss class up to 7 days a semester and

get 100% attendance points. If you still wish to make up the points; please email us a documents such as a doctor's note; a COVID positive test, a court hearing letter, an accident police report and etc; we will contact you with attendance make up instructions.

(C) You can earn participation points following these instructions.

   – By attending each class and working on each worksheets in your groups; you will earn 100% participation for that day.

   – If you are late for the class, not attending or not participating, you may earn 50% or 0% participation for that day; it that case, you will be marked late or absent.

   – 90% and more attendance points is considered full participation. For < 90% attendance, we divide by 0.9.

(D) Note that when the number of absence in class increases, students become overwhelmed with material; their chances of success decreases. Please come to class; bring your positive attitude; interact with your instructor and other students. Make sure your instructor knows who you are; they can help you when you need it. Come to class to make friends in your major; positive human interaction helps you with math and life in general; contributing to your success in both is on our agenda.

9   Keys to Success in Math 104

- Come to class prepared to learn and engage with the material! Watch the videos if you need help.

- After each class, review the material and do the assigned work ahead of their due dates.

- Prepare for the next class meeting:

   – Visit Canvas to check the schedule and announcements.

   – Read the upcoming section in the textbook.

   – Find help! Take advantage of both your lecturer and your laboratory leaders office hours. Visit the Calculus Help Room! The help room schedule can be found in the course Canvas.

- Study! Gather a group of friends and regularly work and study together using the Help room (Snow 651).

9.1   General Comments on Study Habits

Regular class attendance is important for success in this course. Even if youve taken a previous Calculus course, this course is likely to be taught from a more sophisticated perspective, and if you think this class will be review, you are probably mistaken. You should expect to spend **at least two hours** studying outside of class **for every hour** spent in class. In contrast to most high school math classes, if you dont understand the topics being covered, you should NOT assume that your instructor will repeat material until you understand or master it. Ideally, you should ask questions at the time in class. Of course, you will also probably need to spend time thinking things through on your own, but if youve tried that and are still confused, make use of the Calculus Help Room and instructor office hours. Dont wait! Mathematics is cumulative, so anything you dont understand now is likely to keep giving you trouble as the semester goes on.

9.2 Math Help

Every instructor and graduate teaching assistant is available for help outside the classroom, see individual instructor information to find times and locations. The Mathematics Help Room is in Snow 651 and is staffed by helpful and competent mathematics graduate teaching assistants. Before searching for a private tutor, be sure to visit either your instructor or the Mathematics Help Room as they are free for KU students. The schedule of Help Room will be posted on Canvas on the second week of classes. Group tutoring and individual tutoring are also available through KU Learning center: https://learning.ku.edu/tutoring.

9.3 Supplemental Instruction (SI)

Supplemental Instruction, or SI, is available for this class. SI Leaders are students who have taken the class and now, as SI Leaders, they attend the class lectures and lead engaging and activity-based sessions to review course material outside of the classroom. The sessions are free, voluntary, and provide an opportunity for students to meet other students in class, discuss important concepts, and develop effective study strategies. Data has shown that students who regularly attend and actively participate in SI Sessions have the potential to do well on exams and receive strong grades in their course. Specific information about SI for this course including the days, times, campus locations, and Zoom URLs (and passcodes) of SI Sessions and Office Hours will be announced the second week of classes. For more information about SI, visit the Academic Learning Center website at http://learning.ku.edu and click on Supplemental Instruction from the main menu. The SI Leaders for MATH 104 this semester are Michael and Evans.

9.4 Jayhawk GPS

This course utilizes Jayhawk GPS, a student success technology that is designed to inform your academic success at the University of Kansas. As your instructor, I may communicate your course performance to you and your assigned academic advisor through Jayhawk GPS if I believe you might benefit from additional resources or support at KU. This notification will prompt an email to your student account and a Student Navigator, your advisor or another member of your Student Success Team may reach out to you through email, phone or text as well. Please be sure your contact information is accurate in Enroll & Pay so that they may reach you. Texting has an opt out option by replying "STOP" to any incoming messages. You can access your Jayhawk GPS / Navigate login using this link https://jayhawkgps.ku.edu/navigate-student-app to schedule appointments online with your assigned academic advisor and other resource staff across the KU campus.

10 Commercial Note Taking

Pursuant to the University of Kansas Policy on Commercial Note-Taking Ventures, commercial note-taking is not permitted in Math 104. Lecture notes and course materials may be taken for personal use, for the purpose of mastering the course material, and may not be sold to any person or entity in any form. Any student engaged in or contributing to the commercial exchange of notes or course materials will be subject to discipline, including academic misconduct charges, in accordance with University policy. Please note: note-taking provided by a student volunteer for a student with a disability, as a reasonable accommodation under the ADA, is not the same as commercial note-taking and is not covered under this policy.

11   Diversity and Inclusion

All students are welcome in this course, regardless of age, ability, background, belief, ethnicity, gender, gender identity, gender expression, religious affiliation, sexual orientation, and socioeconomic status. Instructors and students are both expected to contribute positively to an environment that respects the identities of others and welcomes diversity. If you are experiencing discrimination and/or harassment, please consider reaching out to any of your specific instructors or to the course coordinator (jila@ku.edu). If your instructor or coordinator is causing you harm and you do not feel comfortable approaching the individual, there are additional resources on campus to support you, such as:

- Office of Diversity, Equity, Inclusion, and Belonging

- Center for Sexuality and Gender Diversity

- Office of Civil Rights and Title IX

12   Excused Absence and Making Up Missed Work

Exams and Laboratory Section: Students with a conflict with another course or verifiable excuse, temporary orders necessitating the absence of those in the US Armed Forces, sanctioned university activities, or a medical crisis of themselves, a relative, or friend and living in a different time zone may be excused from being present. It is the responsibility of the student to initiate discussion with their instructor or graduate teaching assistant prior to the absence examination/test if possible. Students can formally request their exam to be rescheduled due to a conflict by completing an Exam Conflict form which will be forwarded 10 days before the exam is scheduled.

13   Grade Disputes

All graded material will be become available on Canvas. You can view the feedback by clicking on the grades. The instructors of MATH 104 will check the grading of any assignment if the assignment was graded within the past two weeks; after two weeks, the instructors are not obligated to check the grading of an assignment.

14   Group Work and Tutors

Students may discuss homework/Worksheet problems in groups, but each student is responsible for doing their own work and for turning in individual solutions. When a student works with a tutor, it is the responsibility of both the student and the tutor to ensure that it is the student who works to arrive at the solution of the problems. Tutors should not do student homework or provide solutions for assignments. Members of the class are encouraged to study together, but EACH must write out their own solutions to the assigned problems. Copying of another person's homework is not allowed. HOMEWORK IS A MAJOR PART OF THE LEARNING PROCESS IN MATHEMATICS. It is essential that you work on problems on your own and do the homework on a regular basis.

15   Intellectual Property

- Course materials prepared by the instructor, together with the content of all lectures and review sessions presented by the instructor are the property of the instructor.

- Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited.

- Permission to make such recordings may be granted by the instructor on a case-by-case basis, on the condition that the individual making the recording uses these recordings only as a study aid.

- Unless explicit permission is obtained from the instructor, recordings of lectures and review sessions and course content may not be modified and must not be transferred or transmitted to any other person, whether or not that individual is enrolled in the course.

16 KU Firearm Policy

Individuals who choose to carry concealed handguns are solely responsible to do so in a safe and secure manner in strict conformity with state and federal laws and KU weapons policy. Safety measures outlined in the KU weapons policy specify that a concealed handgun:

- Must be under the constant control of the carrier.

- Must be out of view, concealed either on the body of the carrier, or backpack, purse, or bag that remains under the carriers custody and control.

- Must be in a holster that covers the trigger area and secures any external hammer in an un-cocked position

- Must have the safety on, and have no round in the chamber.

17 Late Policy for Assignments

WebAssign Homework can be completed after the deadline; assignments can be extended automatically through WebAssign. All WebAssign Homework assignments close permanently at 11:59pm on Thursday, Dec. 8th. No late worksheets please! The solutions to worksheets will be posted on Canvas within a week from the due date. No late worksheet please.

18 Policy on Academic Misconduct

You are required to abide by all KU policies on academic integrity. Cheating, plagiarism or other academic misconduct will result in a failing grade on the assignment in question, notification of the students dean, and usually further disciplinary sanctions, possibly including a failing grade in the course. You are encouraged to collaborate with other students on the homework assignments. However, each student must write up his or her own solutions and acknowledge all collaborators. Copying someone elses homework, or allowing someone else to copy yours, is considered to be a form of cheating. For more information, see KUs official policies on academic misconduct at http://policy.ku.edu/governance/USRR#art2sect6.

19 Policy on Masks

We follow the guideline in University policy.

20 Policy on Students with Special Needs

The KU Office of Student Access Services (SAC) coordinates accommodations and services for all eligible students with disabilities. If you have a disability and wish to request accommodations, you should contacted SAC as soon as possible (22 Strong Hall; 785-864-4064 (V/TTY); http://access.ku.edu/). We also recommend that you contact your instructor and graduate teaching assistant privately in regard to your needs in this course.

21 Religious Holidays

Any student in this course who plans to observe a religious holiday which conflicts in any way with the course schedule or requirements should contact your instructor before the end of the third week of classes to discuss alternative accommodations.