

Discovery Precalculus

M305G, Preparation for Calculus

Course Syllabus: 2020-2021

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1. COURSE DESCRIPTION

Using a creative and connected approach, students deepen and extend their knowledge of functions, graphs, and equations from their high school algebra and geometry courses so they can successfully work with the concepts in a rigorous university-level calculus course. This course is designed to push students well beyond “drill and kill” exercises, emphasizing conceptual understanding of mathematical definitions and developing logical arguments with their peers.

This course may be used to fulfill the mathematics component of the university core curriculum and addresses the following three core objectives established by the Texas Higher Education Coordinating Board: communication skills, critical thinking skills, and empirical and quantitative skills.

Mathematics (Texas core curriculum code 020)

A. Course Pre-requisites

- Successful completion of High School Algebra I, Algebra II, and Geometry

B. Course Learning Outcomes

By the end of this course, you will have a deeper and more connected understanding of the following units:

- Functions, Rates, and Patterns
 - Definition of a function, function identification, types of functions, composition of functions, inverse of a function, rates of change, function patterns, piecewise functions
- Algebra and Geometry

- Transformations of functions, complex roots and polynomials, conic sections, using matrices to model functions and relations, statistical regression
- c. Exponential and Logarithmic Functions
 - Exponent and logarithm properties, natural logarithms, applications of logarithms and exponents, including logistic growth models
- d. Trigonometry
 - Trigonometric foundations, Unit Circle, trigonometric identities, trigonometric functions with transformations, modeling using sinusoidal functions, inverse trig functions, Law of Sines and Cosines, double angle and sum and difference identities
- e. Limits and Rate of Change of Functions
 - Rational functions, limits, average rates and instantaneous rates, derivatives and the Power Rule
- f. Exploring Other Coordinate Systems
 - Parametric equations with applications, using vector operations, Polar coordinate system with graphing
- g. Sequences and Series
 - Arithmetic and geometric sequences, convergent sequences, series and partial sums, convergent series with applications, mathematical induction, combinatorics, binomial theorem

C. Course Format and Procedures

This course uses Inquiry-Based Learning (IBL), a pedagogy designed to engage students in the educational process. Inquiry-Based Learning is a student-centered methodology, which emphasizes the importance of the active construction of learning. Therefore, students are expected to pose questions, make decisions, design plans and experiments, discuss, collaborate, communicate results, and provide justified answers and explanations when engaged in the inquiry process.

Characteristics of an IBL classroom:

- Students work together in groups to explore various mathematics concept.
- Instructor listens to student conversation to monitor creation of mathematical ideas.
- Students present work on the document camera. This helps facilitate classroom discussion, closure to a problem, and allows for the Instructor to pose extension questions to the class.
- If a misconception occurs across the classroom the Instructor may choose to bring the class back together and pose leading questions to guide the discussions in the correct direction.

Overall Goals:

- The overall goal is to have students “do” mathematics - that is, to have students engage in thinking about the connectedness that exists between various basic areas of mathematics.
- Students should work to provide rigorous arguments at different levels that support the development of these connections.
- The hope is that students will more deeply understand the discipline of mathematics and the fact that if one does not ask “why” when engaging in “doing” mathematics - then the processes experienced are strictly mechanical.

D. University Course Staff

- UT Austin Faculty Lead* – A UT Austin faculty member who designs and oversees delivery of the OnRamps college distance course and ensures its alignment to the course as it is delivered at the residential university campus.
- OnRamps Course Staff* – A UT Austin staff member and designee of the UT Austin Faculty Lead who serves as a primary subject-matter expert in the academic discipline of the OnRamps course and provides yearlong support to high school Instructors to ensure the course is delivered with fidelity. As a designee of the UT Austin Faculty Lead, the Course staff assist with academic integrity investigations, sends official University communication to students, and ensures students have access to all course resources and policies.
- UT Austin Instructor of Record* – A UT Austin-appointed staff member who grades or oversees grading of college course work and determines student eligibility and credit award. The UT Austin Instructor of Record also investigates and resolves suspected incidents of academic integrity violations in the distance college course. The UT Austin Faculty Lead, Course Coordinator/Manager, or other UT Austin-appointed staff member may also serve as the UT Austin Instructor of Record.

E. Course Outline

Unit & Topic
Unit 0: Thinking Like a Mathematician
Unit 1: Functions, Rates, and Patterns
Unit 2: Algebra and Geometry
Unit 3: Exponentials and Logarithms
Unit 4A: Trigonometry 4.0 – 4.3.2

Unit 4B: Trigonometry 4.3.3 – 4.6

Unit 5: Limits and Rate of Change of Functions

Unit 6: Other Coordinate Systems

Unit 7: Sequences and Series (not tested for the college course)

2. COURSE REQUIREMENTS

- A. **Required Materials and Devices** All students will require the use of a computer throughout this course to access course content, quizzes, exams, and other assignments.
- a. **Canvas Learning Management System.** OnRamps provides an online learning environment in Canvas Learning Management System (LMS) for all students in this class. You will have access to two (2) Canvas courses for the purpose of the dual-enrollment experience: the OnRamps high school course and the OnRamps college course. You are expected to access Canvas weekly for assignments, quizzes, and exams. You will get many of your assignments and turn in your college work in Canvas. You are responsible for reading course information, including assignment instructions and due dates, that is posted in Canvas. You are also responsible for frequently checking your Canvas Inbox and viewing course announcements.
 - i. URL: <https://onramps.instructure.com>
 - b. **OnRamps Portal.** You will access the OnRamps Portal throughout the term to view information about your current OnRamps distance college course enrollment(s), including whether you are eligible for the opportunity to earn college credit. request accommodations for your distance college course, and make decisions such as whether you wish to accept or decline college credit, if earned, at the end of the course.
 - i. URL: <https://utdirect.utexas.edu/apps/ce/osis/>
 - c. **Email.** Email is an official means of communication at UT Austin. OnRamps staff will use email to communicate course, enrollment, and credit information to you. It is your responsibility to keep your email address updated in Canvas and the OnRamps Student Portal at all times. You are expected to check email frequently in order to stay current with OnRamps-related communications, recognizing that certain communications may be time-critical. Failure to check email is not an acceptable reason for missed communication or missed deadlines.

B. Assignments & Grading

- Unit Exams occur roughly once a month at the end of each Unit; Unit 4 has two assessments due to its length.
- The Unit Exploration Assessment is taken on Canvas after the Unit Exam. There will be a one-week window to complete the assessment, and the assessment can be taken outside of class. Students are allowed to use notes and peers on the assessment.
- The OnRamps Orientation is taken once at the beginning of the year. Students will receive a completion grade in the college course.
- The Learning Strategy Modules will take place in three phases: at the beginning of the year, after your first exam, and at the beginning of the Spring Semester. OnRamps Learning modules are graded based on completion.

Assessment	Description	Frequency	Assignment Type	% Course Grade
Unit Exams	Assessment of core skills and foundational understanding of each unit	Once a Unit (two for Unit 4)	Unit Exams	84%
Unit Exploration Assessments	Assessment of key understandings of each Exploration of a Unit	Once a Unit (two for Unit 4)	Exploration Assessments	9%
Learning Strategy Modules	Modules providing the students with different learning strategies to use through the course	3 times throughout the year	Learning Strategies	5%
OnRamps Student Orientation	Modules introducing students to the OnRamps course	Once at the beginning of the school year	Student Orientation	2%
Total				100%

C. College Course Grading Scale

A	89.5 – 100.00	
B	79.50 – 89.49	
C	69.50 – 79.49	
D	59.50 – 69.49	<i>Minimum Eligibility Grade</i>

F	0 – 59.49
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- a. A cumulative midterm exam may be taken after Unit 3 to replace the lowest exam grade for Units 1, 2, or 3.
- b. A cumulative final exam that covers material from Units 4, 5 and 6 may be taken after Unit 6 to replace the lowest exam grade for Exams 4A, 4B, 5, or 6.
- c. There will be an Exploration Assessment for Units 1, 2, 3, 4A, 4B, 5, and 6. The lowest score will be dropped.
- d. You must earn a minimum average grade of D- on college assignments and assessments during the course eligibility period in order to be eligible for the opportunity to earn college credit. If you do not earn a D- or higher, there may be other ways you can gain eligibility. For more information about eligibility, see **Section 3. College Credit** below.

D. Missed Work

- a. Students who are absent for school-related reasons must take the exam two days before or two days after their section takes the exam.
- b. Students with extenuating circumstances, such as a medical or family emergency, must make up the exam within 5 business days of the student's return to school. Scheduled doctor appointments do not constitute a medical emergency.

3. COLLEGE CREDIT

This is a college course delivered via distance education through a dual-enrollment program, which means you may earn credit for M305G Discovery Precalculus in addition to earning high school credit.

A. Eligibility for the Opportunity to Earn College Credit

You may become eligible for the opportunity to earn college credit in two ways:

- a. **Eligibility by Grade.** If you meet the minimum eligibility grade on college assignments and assessments completed during the first part of the course, you are determined eligible for the opportunity to earn college credit based on your grade.
- b. **Eligibility by Texas Success Initiative (TSI).** If you do not meet the eligibility by grade criteria, you may submit proof of scores on certain standardized assessments, as outlined in the table below, to achieve eligibility by TSI.

Assessment	Subject Area	Minimum Score
TSI	Math Section	350 on the Math Section

SAT (March 1, 2016 or later)	Math Section	530 on the Math Section
ACT	Math Section AND Composite Score	19 on the Math Section AND 23 Composite Score

B. College Credit Decision Period

Students with Eligible status may elect to accept or decline any college credit earned during the five-day College Credit Decision Period, which will occur after you receive your final college grade. You will receive an email notification from OnRamps when your Credit Decision Period begins.

If you do not make a decision During the Credit Decision Period, OnRamps will determine course credit as follows:

- **C or above.** You earned credit and *will* be issued a UT Austin transcript unless you decline credit in the OnRamps Portal.
- **D.** You earned credit but *will not* be issued a UT Austin transcript unless you accept credit in the OnRamps Portal.
- **F.** You did not earn credit and will not be issued a UT Austin transcript.

C. College Transcript

If you earned and accepted college credit, you may request an official UT Austin transcript through the UT Austin Office of the Registrar in June 2021. You will receive an email notification from OnRamps when your transcript is available.

4. POLICY INFORMATION

A. Students with Disabilities

If you receive high-school accommodations related to a disability under the Individuals with Disabilities Education Act (IDEA) or Section 504 of the Rehabilitation Act, you may also receive certain accommodations in your OnRamps college course. Accommodations in an OnRamps course must follow accommodations in your Individual Education Plan or 504 Individual Accommodation Plan and be allowable under the university assessment practices. Accommodations are individualized and based on need and disability.

You must make your need for accommodations known to the OnRamps Course Staff prior to the due date for an assignment in order to access accommodations for that assignment. You are strongly encouraged to provide information about your need for accommodations during registration at the beginning of the course or immediately following changes to your Individual Education Plan or 504.

B. Academic Integrity

OnRamps students are subject to the University's academic integrity policies. Academic integrity is honesty in your academic work. Each student in the course is expected to abide by the University's Student Honor Code:

"As a student of The University of Texas at Austin, I shall abide by the core values of the University and uphold academic integrity."

This means that work you produce on assignments and exams is all your own work, unless it is assigned as group work. The UT Austin Instructor of Record or your high school Instructor will make it clear for each assignment or exam whether collaboration is allowed. Refer to **Section 2, Part B: Assignments and Grading** for further details about assignment types in your course.

You are responsible for understanding UT Austin's Academic Honesty Policy which can be found here: <https://deanofstudents.utexas.edu/conduct/academicintegrity.php> You must respond to email requests from OnRamps staff for investigations of potential academic integrity violations. If you fail to respond to email requests about potential academic integrity violations from OnRamps staff, you may receive an academic disciplinary action.

More information about academic integrity may be found in the OnRamps Orientation in Canvas.

C. Student Code of Conduct

As a participant in the UT Austin OnRamps program, you are expected to uphold a high standard of integrity and ethical behavior. This includes using UT Austin resources in an appropriate, ethical manner for the purpose of learning. Prohibited behavior includes:

- Unauthorized use of institutional technology and services
- Providing false or misleading information about an academic record
- Engaging in violent or disruptive conduct, including hazing, stalking, or behavior that impedes, interferes with, or disrupts any University teaching, research, administrative, disciplinary, public service, learning, or other authorized activity.

Failure to abide by the student code of conduct may result in an academic sanction or removal from the course. For more information about standards of behavior, refer to The University of Texas catalog, Chapter 11, Student Discipline and Conduct: <http://catalog.utexas.edu/general-information/appendices/appendix-c/student-discipline-and-conduct/>

D. FERPA

All students in OnRamps are college students and subject to the federal Family Educational Rights and Privacy Act (FERPA). As a participant in the UT OnRamps program, it is important that you understand these rights as they apply to you.

Under FERPA, university staff may not share information regarding a student's college coursework or academic standing (grade point average, academic transcript, academic probation, or discipline records).

Exceptions:

1. If the student signs a waiver stating that FERPA-protected information may be released to the student's parent/guardian, university staff may share the FERPA-protected information with the parent/guardian.
2. If university staff share FERPA-protected information with high school staff, including the high school instructor, and the student is under 18 years of age, then the high school staff may share that information with the student's parent or guardian.
3. If university staff suspect a student presents a significant risk of harm to self or others, university staff may disclose FERPA-protected information with a student's parent/guardian, high school instructor, principal, or other appropriate authority to ensure the safety of the student and/or other individuals.

For more information about FERPA, refer to The University of Texas catalog, chapter 9, Educational Records: <https://catalog.utexas.edu/general-information/appendices/appendix-c/educational-records/>