



MATH-115: IDEAS OF MATHEMATICS

Effective Term

Fall 2023

BOT Approval Date

06/23/2022

Discipline

MATH - Mathematics

Course Number

115

Course Title

Ideas of Mathematics

Short Title

Ideas of Mathematics

Credit Status (CB 04)

D - Credit - Degree applicable

Units**Lecture Units**

3.00

Total Units

3.00

Hours**Lecture Contact Hours**

48-54

Out of Class Hours Lecture

96-108

Total Contact Hours

48 - 54

Total Out of Class Hours

96 - 108

Total Student Learning Hours

144 - 162

Distance Education

Yes

Distance Education**Distance Education Type**

Both Fully Online and Hybrid Online

Fully Online Delivery Requirements:

- a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course
- b. Any planned face-to-face meetings, such as an orientation or study session, must be optional



c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

Are you using publisher content?

Yes

Link to VPAT

<https://www.myopenmath.com/course/showlinkedtextpublic.php?cid=10962&id=420137>

Attach VPAT

MyOpenMath VPAT.pdf

Regular Substantive Interaction

Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods:

- Orientation - Students must be oriented to the online and face-to-face portions at the start of the course.
- Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc.
- Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction.
- MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students.
- Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS.
- Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times.

ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Catalog Description

This course covers topics in applications of sets, logic, counting, probability, statistics, finance, and using mathematical models. The mathematical concepts taught in this class emphasize applications and can be used in daily life. The material is suitable for students from all pathways and serves as an introduction to several topics in mathematics.

Codes

TOP Code (CB 03)

1701.00 - Mathematics, General

CIP Code

27.0101 - Mathematics, General.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

GE Information

Check GE Types Requested

AA/AS G - Math Competency

Cal-GETC Areas

Approved Cal-GETC Area

AREA-2

Learning Objectives

Learning Objectives

Learning Objective
1. Explain and utilize deductive and inductive reasoning.
2. Create an argument and use Venn diagrams to determine the validity.
3. Calculate and interpret the probability of an event.
4. Utilize combinatorics and expected value to solve culturally relevant applications.
5. Evaluate and interpret visual and numerical summaries of data.
6. Construct and interpret confidence intervals to explore diverse populations.
7. Produce a budget with a net positive balance.
8. Analyze financial scenarios to make informed decisions.
9. Apply mathematical modeling to solve real-world applications.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will analyze the world around them to recognize opportunities for application of their modeling skills.
2. Students will make responsible financial decisions by considering all options and assessing their risks.
3. Students will develop critical thinking in order to recognize valid arguments.

Program Learning Outcomes

Learning Outcome
Students will develop problem-solving and scientific and technological modeling skills to solve mathematical problems. They will be able to reflect on their own thoughts, question and propose problems, and apply past knowledge to new situations.
Students will develop the ability to think critically, independently, as well as interdependently, express ideas concisely, and reason logically.
Students will be able to synthesize ideas and apply mathematical reasoning and logic to relevant real-world applications.
Students will be able to understand, write, and communicate mathematical information symbolically, visually, and numerically with clarity and precision.
Students will be able to refine understanding of mathematical concepts by discussion and explanation with other students from different kinds of backgrounds, including different socioeconomic backgrounds, different cultures, different ethnic backgrounds, as well as at-risk students.

Institutional Learning Outcomes

Communication: The student will effectively express and exchange ideas through listening, speaking, reading, writing, visual works, and other modes of interpersonal expression.

Critical Thinking: The student will analyze problems, gather and synthesize relevant information, evaluate ideas, information, and evaluate alternative points of view to create, innovate and implement effective solutions.

Cultural Awareness and Humility: The student will demonstrate knowledge of and sensitivity toward individuals of diverse ethnicity, age, gender, sexual orientation, and religious affiliations, as well as toward those individuals with diverse abilities and socio-economic classes to respectfully interact with individuals of diverse perspectives, beliefs and values while being mindful of the limitation of their own cultural frameworks.

Personal
and Professional Responsibility
Civic

Content

Course Lecture Content

1. Finance
 - a. Budgeting
 - b. Simple Interest
 - c. Compound interest
2. Set Theory and Logic
 - a. Basics of Set Theory
 - b. Venn Diagrams
 - c. Inductive versus Deductive Reasoning
 - d. Analyzing Arguments
3. Probability
 - a. Basics of Probability
 - b. Combinatorics and Probability
 - c. Expected Value
 - d. Culturally Relevant Applications
4. Statistics
 - a. Visual and Numerical Summaries of Data
 - b. Discrete and Continuous Random Variables
 - c. Normal Distribution
 - d. Confidence Intervals
 - e. Applications Including Those Involving Equity and Diversity
5. Modeling
 - a. Linear Models
 - b. Exponential Models
 - c. Real-world applications
6. Additional Topics (at least one of the following):
 - a. Truth Tables
 - b. Conditional Probability and Independence
 - c. Quadratic and Logarithmic Modeling
 - d. Installments (Mortgages/Loans)

Methods of Instruction

Method

Discussion

Integration

Discussions (student-to-student) may be used for students to interact with their peers to share their interpretations of the content. Discussion (instructor-to-students) may also be used for students to interact with the instructor to clarify concepts. For example, a discussion can be used for students to determine if a given scenario is an example of inductive or deductive reasoning.

DE Adaptations for MOI

Discussions can be adapted via email, accessible virtual chat, or using built-in features of a course management system. For example, student to student interactions can be facilitated using thematic discussion boards, peer review, and group assignments. Student to instructor discussions can be facilitated via email or within the comment section of assignment submission. All communication via email will use either MSJC email or the Course Management System (CMS) inbox messaging.

Method

Group Projects

Integration

Group projects may be used to develop a deeper understanding of topics and provide opportunities for collaboration while centering student voices. For example, groups of students can suggest ideas for items that need to be included in a personal budget.

DE Adaptations for MOI

Group projects can be adapted using built-in features of a course management system (CMS). For example, group projects can be facilitated via threaded discussions. Collaborations can be promoted by creating groups within the CMS and assigning them a topic to research jointly where the students will use their group page within the CMS to communicate, post findings, share notes, discuss their thoughts, and jointly edit any required documents. Instructions to group activities will meet accessibility requirements.

Method

Homework

Integration

Homework may be used by the students to practice the content and determine the extent of understanding. Homework may be used by the instructor to measure the progress toward the course objectives. For example, homework can be used to provide independent practice for modeling.

DE Adaptations for MOI

Homework can be adapted using built-in features of a course management system (CMS). Completed homework may be submitted by uploading the scanned work to the CMS.

Homework may also be assigned and collected using accessible third-party software such as MyOpenMath, which is fully integrated with the CMS to ensure grades and communications are all contained in the CMS.

Method

Lecture

Integration

Lectures may be used to introduce the course material and explain concepts and relationships between concepts. Lectures may also be used to demonstrate the techniques for solving problems. For example, a lecture can be used to explain the purpose, components, and construction of confidence intervals.

DE Adaptations for MOI

Lectures can be adapted to a course management system to be delivered synchronously or asynchronously. For example, videos can be recorded by the instructor and embedded to a course page and lecture notes can be added utilizing a content editor. All material will meet accessibility requirements. A lecture on the purpose, components, and construction of confidence intervals could be recorded using approved captioning where the instructor uses a virtual whiteboard to show examples of confidence intervals.

Method

Online Activity/Discussion

Integration

Online activities such as online homework and online instruction that comes with the course materials will be utilized to illustrate topics such as how to apply counting methods when considering the different number of groups that are possible.

DE Adaptations for MOI

Activities can be adapted using built-in features of a course management system (CMS). For example, an activity can be recorded by the instructor or a link to an online resource can be shared via CMS on how to apply counting methods when considering the different number of possible groups. All material will meet accessibility requirements.

Methods of Evaluation**Method**

Class Participation

Integration

Class participation in the form of group discussions or in-class activities may be used by the instructor to determine whether students are comprehending the material and to evaluate the students' ability to apply their knowledge. Class participation will be evaluated based on completeness.

DE Adaptations for MOE

Class participation is tracked through the CMS by keeping record of students' submissions of assignments, posting on discussion boards, and/or completed quizzes and exams. When necessary, feedback will be provided as comments through the CMS within no longer than seven business days after the due date of the assignment that counts towards participation.

Method

Exams/Tests

Integration

Tests may be used regularly by the instructor as a method of evaluation of students' performance. Instructor may choose the appropriate frequency, modality, and the format of the test. Tests will be evaluated based on both correctness and completion using a rubric established by the instructor.

DE Adaptations for MOE

Tests will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content such as MyOpenMath may be provided or the entire test can be embedded on CMS. Feedback can be delivered using the comment section or within an accompanying rubric. The instructions and the tests will meet accessibility requirements. Instructor may consider using online and real time proctoring services approved by the college. Students will receive feedback on their exam in no more than seven business days after the due date. Flexible scheduled proctored exams may be used for asynchronous modality.

Method

Homework

Integration

Homework may be used to measure the students' advancement through the course content. Homework will be evaluated based on completeness and correctness.

DE Adaptations for MOE

The homework will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content such as MyOpenMath may be provided or the entire assignment can be embedded on CMS. The feedback can be delivered using the comment section or within an accompanying rubric. The instructions and the assignments will meet accessibility requirements. Feedback including grades and comments will be provided to the students in no more than seven business days after the due date of the assignment.

Method

Projects

Integration

A group or individual project(s) may be used by the instructor to provide targeted feedback to enhance the students' learning experience. Projects will be evaluated based on both correctness and presentation.

DE Adaptations for MOE

Group or individual projects will be assigned and submitted through the course management system (CMS). Students can communicate with peers and the instructor through the discussion boards and inbox of the CMS. Student may be required to present their results through the creation of a slide presentation, a written report, or a live video conference and the presentations may then be made available to the entire class through the CMS. Feedback may be provided either through comments or within an accompanying rubric in no more than seven business days after the due date.

Method

Quizzes

Integration

Quizzes may be used by the instructor periodically as a method of low-stakes evaluation of students' ability to apply their skills. Quizzes will be evaluated based on both correctness and completeness.

DE Adaptations for MOE

Quizzes will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content may be provided or the entire quiz can be embedded on CMS. Feedback can be delivered using the comment section or within an accompanying rubric in no more than seven days after the due date. The instructions and the quizzes will meet accessibility requirements. Instructor may consider using online and real time proctoring services approved by the college.

Assignments**Assignment Type**

Writing

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Formative

Assignment

Given a variety of sets, construct a Venn Diagram that accurately depicts the relationships among those sets. Find the intersection and union of the sets. Discuss which sets mutually exclusive and why?

How assignment will be adapted in online format

The problem will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content may be provided or the entire assignment can be embedded on CMS. The feedback can be delivered using the comment section or within an accompanying rubric. The instructions and the assignments will meet accessibility requirements.

Assignment Type

Writing

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Formative

Assignment

A bag contains three balls. One is red, one is green, and one is blue. Suppose that two balls are to be randomly selected with replacement.

- Write out the sample space.
- What is the probability that neither of the balls selected is blue?
- What is the probability that at least one of the balls selected is not red?

How assignment will be adapted in online format

The problem will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content may be provided or the entire assignment can be embedded on CMS. The feedback can be delivered using the comment section or within an accompanying rubric. The instructions and the assignments will meet accessibility requirements.

Assignment Type

Writing

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Formative

AssignmentFind $p(0 < z < 1.42)$ **How assignment will be adapted in online format**

The problem will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content may be provided or the entire assignment can be embedded on CMS. The feedback can be delivered using the comment section or within an accompanying rubric. The instructions and the assignments will meet accessibility requirements.

Assignment Type

Writing

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Summative

Assignment

Rene and Taylor have the same income, and both save 5% of their income annually. Taylor had the privilege of learning the benefits of investing with a retirement account whereas Rene never had that opportunity. If Taylor saves \$5,000 each year in an account with an APR of 3.00%, while Rene saves \$5,000 a year but doesn't invest the amount, determine the economic impact of the investment after 30 years. How much longer will Rene have to work to build the same account balance as Taylor?

How assignment will be adapted in online format

The problem will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content may be provided or the entire assignment can be embedded on CMS. The feedback can be delivered using the comment section or within an accompanying rubric through the CMS. The instructions and the assignments will meet accessibility requirements.

Assignment Type

Writing

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Formative

Assignment

In groups of 2 or 3, discuss the meaning of various regions of a given Venn diagram and describe each region using the proper set notation. Come up with examples of sets for which the given diagram applies.

How assignment will be adapted in online format

This assignment can be added to the course management system as a group discussion. Separate due dates will be used for initial posts and for responses.

Assignment Type

Writing

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Formative

Assignment

In groups of 2 or 3, determine the outcome of flipping a coin 10 times vs 100 times. Flip the coin 100 times and compare the results after 10 flips vs 100. Use this information to discuss how the theoretical probability can be approximated by the relative frequency.

How assignment will be adapted in online format

This assignment can be added to the course management system as a group discussion. Coin flips can be done using an accessible online simulator. Separate due dates will be used for initial posts and for responses.

Assignment Type

Writing

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Summative

Assignment

In groups of 2 or 3, prepare a presentation with a detailed solution to a problem from the example assignments. After completion, the groups will rotate around the classroom to hear their presentations and provide feedback or ask questions for further explanation.

How assignment will be adapted in online format

This assignment can be added to the course management system as a group assignment. The group will come up with a final submission which will be posted in a discussion board for the class to provide feedback and ask questions.

Assignment Type

Writing

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Summative

Assignment

People in Mathematics Project: Find and research a mathematician from a historically marginalized group based on gender, ethnicity or race, and submit a report that includes the following:

- Early Life: try to get at the support or lack of support in the person's early (teen) education, particularly in Mathematics.

-
- Education and Mathematical work: This needs to contain any formal education at the college level and their contributions to Mathematics (focus on concepts from our class if possible)
 - Later Life: How did their mathematical career finish up? How did others regard the person's contributions?
 - Photo or drawing of the Mathematician
 - Describe in what way you relate to the Mathematician
 - Bibliography of all sources used

How assignment will be adapted in online format

This assignment can be added to the course management system. The report would be submitted through the course management system in a specified file type. Grading will be done according to a rubric that will be available through the course management system.

Assignment Type

Reading

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Summative

Assignment

In groups of 2 or 3, determine the average cost of living in Temecula, California. Discuss the expense categories and the average amount per category. Assuming an appropriate tax rate, determine the income that a person would need to earn to live in this area.

How assignment will be adapted in online format

This assignment can be added to the course management system as a group assignment. The group will come up with a final submission which will be posted in a discussion board for the class to provide feedback and ask questions.

Course Materials**Textbooks**

Bennett, Jeffrey, and William Briggs (2019). Using & Understanding Mathematics: A Quantitative Reasoning Approach, 7th Edition (Pearson)

Other Resources

StatCrunch

Microsoft Excel

Desmos

Geogebra

WolframAlpha

Open Educational Resources

Math in Society (Lippman). (2021)

MyOpenMath

Class Size Information**Class Size**

40

Class Size Category

A - Lecture/discussion 40

Diversity and Inclusion

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

The course objectives have been updated to included utilize combinatorics and expected value to solve culturally relevant applications as well as construct and interpret confidence intervals to explore diverse populations. Furthermore, students are asked to find and research a mathematician that they can relate to and submit a report; to find the margin of error associated with to diverse populations; and finally, to compare the long-term benefits of financial literacy in various scenarios.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

The course is designed to utilize culturally relevant teaching through varying methods of instruction. Students will work independently and also in-groups to complete assignments which will promote each student's unique learning style. Revisions of submitted work and the corresponding corrections will be used to emphasize the affective and cognitive aspects of the student's learning. The course content has been altered to reflect practical examples and applications of the mathematics students are learning.

Interactions

Explain how the course will incorporate student-to-student interaction.

Students will interact with each other through in-class discussions on different topics. For examples, students could work together in a group to compare and contrast different types of investments. Students will also interact with each other through online discussion boards where they can ask each other questions on the content and answer each other's questions, and also share relevant outside information related to the course.

Explain how the course will incorporate instructor-to-student interaction.

The instructor will introduce material to the students through lecture both in-class and also through videos online as appropriate. The instructor will also participate as needed in discussion boards to answer questions and address the needs of the students. The instructor will also return comments and feedback for projects, exams, and other assignments through the course management system or in-person.

Explain how the course will incorporate student-to-content interaction.

Students will be asked to read the material given either in a textbook or through the course management system. Students will also solve many problems on the different concepts introduced throughout the class to enhance understanding of the material. Students will also engage in research on real-world issues related to the course material and reflect on their findings to see the applications of the content.

Explain how the course will incorporate student-to-self interaction (metacognitive).

Students will be asked to reflect on how the material relates to their own lives. For example, after learning about finances, students will have opportunities to asses their own financial choices to ensure they are content. Students will also develop a sense of how to properly assess studies, sets of data, and logical statements centered around their interests.

Key: 2098