



K-12
TEXAS TECH

Mathematical Models with Applications B v8.0 – Syllabus

Course Name

MTHMOD-B

Mathematical Models with Applications v8.0– Semester B

Course Information

This is the second semester of this two-semester course.

Mathematical Models B gives you the opportunity to explore a range of mathematical concepts and fields, all while connecting ideas to their application in our world. Major topics in this course include linear and exponential functions, geometry in the real world, analysis of data and probability, and the use of functions as models. Logic and theory as they apply to the practical use of mathematical concepts are introduced, giving you an understanding of how the principles of higher-level math connect to everyday life.

Students will also explore quadratic and exponential models, as well as proportionality and similarity in science and engineering through a project-based learning opportunity. Students will apply proportionality and inverse variation to describe physical laws such as Hook's Law, Newton's Second Law of Motion, and Boyle's Law. Students will also use exponential models through technology to model radioactive decay in areas, and quadratic functions to model motion. Students will wrap the project up by applying geometry to explain mathematical patterns and structure in architecture.

Course Delivery Method

Online

Contacting Your Instructor

You may contact your instructor using your Canvas Inbox. Technical support is available 24/7 at [TTU K-12](#).

Course Topics

After completing this course, the students should have increased knowledge of:

- use proportionality and inverse variation to describe physical laws such as Hook's Law, Newton's Second Law of Motion, and Boyle's Law
- use exponential models available through technology to model growth and decay in areas, including radioactive decay
- use quadratic functions to model motion
- use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in architecture

Textbook and Materials

No textbooks required. All content is within Canvas.

Materials

- [Desmos Graphing Calculator](#)

Technical Requirements

- Internet access – preferably high speed (for accessing Canvas)
- browser (we recommend Chrome)
- supported browser plugins and settings
The following plugins and settings may be required to use our courses.
 - JavaScript enabled
 - Cookies enabled
 - Java installed
- Email
- Printing capabilities
- Adobe Reader (download from [Adobe](#))
- Audio and video capabilities (for watching/listening to course content)
- PDF app (free options available)

Technical Skill Requirements

Be comfortable with the following:

- accessing online learning materials via Canvas
- Internet search engines and browsers (we recommend Chrome)
- uploading assignments into Canvas (there will be instructions for uploading assignments)

Course Pacing

This course is designed to be completed in 18 weeks.

- Print this guide and use a calendar to fill in your goal dates for completing each Module.
- To achieve success, students are expected to submit work in each course weekly.
- Students can learn at their own pace; however, "any pace" still means that students must make progress in the course every week.
- Post the pace guide in a place where you and your Parent or Guardian will see it every day (on the refrigerator or next to the computer). Give yourself a check every time you complete a task, and celebrate your efforts!

Note: when you access some lessons, the numbering you see inside the lesson may differ from the course numbering. Please reference the course numbering as seen here and in Canvas.

Weeks	Lessons	Due Date (you write this in)
1-4	Checkpoint 1 05.00 Transformations and Applications of Geometry Introduction 05.01 Congruence and Similarity 05.02 Transformations 05.03 Triangle Trigonometry 05.04 Types of Area 05.05 Volume 05.06 Scale Factor and Dilation 05.07 Transformations and Applications of Geometry Practice Exam *05.09 Transformations and Applications of Geometry Exam	
5-8	06.00 Modeling and Analyzing Data Pretest 06.01 Data Displays 06.02 Interpreting Data Distributions 06.03 Comparing Data 06.04 Linear Models 06.05 Exponential Models 06.06 Modeling and Analyzing Data Practice Exam Checkpoint 2 06.07 Modeling and Analyzing Data Discussion-Based Assessment *06.08 Modeling and Analyzing Data Exam	

Weeks	Lessons	Due Date (you write this in)
9-12	07.00 Exploring Events Using Probability Pretest 07.01 Exploring Set Relationships Using Venn Diagrams 07.02 Events and Sample Spaces 07.03 Applying Two-Way Frequency Tables 07.04 Conditional Probability 07.05 Interpreting Independence 07.06 Addition and Multiplication Rules for Probability 07.07 Exploring Events Using Probability Practice Exam *07.09 Exploring Events Using Probability Exam	
14-15	08.00 Making Sense of Logic and Theory Introduction 08.01 Set Operations and Relations 08.02 Logic and Truth Tables 08.03 If... Then Statements 08.04 Logic Operations and Equivalence 08.05 Laws of Logic and Valid Arguments 08.06 Permutations and Combinations 08.07 Making Sense of Logic and Theory Practice Exam Checkpoint 3 Final Project Preview: Engineering Habitats Project – Introduction and Task 1 08.08 Making Sense of Logic and Theory Discussion-Based Assessment *08.09 Making Sense of Logic and Theory Exam	
16-17	*Engineering Habitats Project – Task 1 *Engineering Habitats Project – Task 2 *Engineering Habitats Project – Task 3 *Engineering Habitats Project – Task 4 *Engineering Habitats Project – Project 2 Notebook	
18	Floating Vacation Week	

Course Credit

Your grade will be calculated as follows:

- formative assessments (50%)
- summative assessments (20%)
- summative final exam (30%)

Assignments are labeled as “summative” or “formative” under Grades in Canvas.

Course Completion and Extensions

- Students may not complete the course in less than 30 days.
- All courses expire 180 days after the enrollment date.

Academic Integrity

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

“Scholastic dishonesty” includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

Artificial Intelligence (AI) Use Policy

This policy covers any generative AI tool, such as ChatGTP, Elicit, Photo Math, etc. This includes text and artwork/graphics/video/audio, etc.

All work submitted in this course must be your own. You may not use artificial intelligence tools to complete your assignments in this course.

If an instructor suspects that an assignment is not the work of the student, it will receive a score of zero. The instructor will message the student or provide feedback on the assignment indicating the need to schedule a one-on-one video conference, during which the student will be required to demonstrate their skills or knowledge through an alternative or mutually agreed-upon assignment. The grade of the alternate or agreed upon assignment will be determined at the instructor’s discretion with the highest possible score being 70%.

If it is determined that a student has violated final exam directions on Final Exam A or CBE Set 1, the exam will be scored as zero. The student may take Final Exam B or CBE Set 2 with the highest possible score being 70%.

The incident will be reported to Texas Tech K-12 Administration and documented in the student’s file. Continued violations of Texas Tech University’s Academic Integrity Policy will result in the removal of the student from the program.

Student/Parent Expectations

You will be expected to log into the Canvas course regularly to be aware of possible announcements/reminders and to pace your student's progress in the course.

The following are prohibited while using the Canvas interface:

- spamming;
- hacking; and
- using TTU or Canvas email for commercial purposes;

Inappropriate behavior shall result in consequences ranging from a request to correct the problem, to removal from the course or even the university, depending on the severity of the behavior. Disciplinary actions will be taken according to the TTU K-12 Student Handbook.

Communication

- You can expect a reply from your instructor within 2 business days.
- Use the Canvas Inbox for sending messages to your instructor.

Submitting Assignments

You will submit all assignments through Canvas, rather than by mail or email.

Technical Difficulties

Getting Help

For student assistance with Canvas, visit [TTU K-12 Support](#).

Computer Problems

A working computer is necessary for online coursework. Computer problems will not be accepted as a valid reason for failure to complete course activities within the allotted time frame. Identify a second computer, before the course begins, that you can use if you experience computer problems.

Server Problems

When the Canvas server needs to be taken down for maintenance, the Canvas administrator will post an announcement in your course informing you of the time and date. If the server experiences unforeseen problems, your course instructor will notify you.

Lost or Corrupted Files

You must keep/save a copy of every project/assignment on an external disk or personal computer. In the event of any kind of technology failure (e.g., Canvas server crash or

virus infection, students' own computer problems, loss of files in cyberspace, etc.) or any disputes, the instructor may request or require you to resubmit the files. In some instances, the instructor may need to open another attempt within Canvas, so communication with your instructor is critical in these circumstances.