

Course Syllabus

Math 144-05: Mathematics for Business

In-Person / Synchronous • Fall 2026 • 4 Credits

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Instructor Contact & Course Information

Instructor: Vignesh Jagathese

Course & Section: Math 144-05

Delivery Format: In-Person / Synchronous

Meeting Days, Times & Location:

MWF 3:00–3:50 PM, Barry Hall 358

Tues 3:00–3:50 PM, Barry Hall 118

Office Location: Minard 406K

Office Hours (In-Person):

MW 12:00 - 1:30 PM

Or by appointment

Phone: (701) 231-8171 (Math Department)

Email: vignesh.jagathese@ndsu.edu — Note: this address ends in @ndsu.edu, not @ndus.edu. Email is the best way to contact the instructor outside of office hours.

Time Zone: All times in this course are Central (Fargo) time.

About the Instructor

Vignesh Jagathese is a (new!) Visiting Assistant Professor at NDSU. Before joining North Dakota State, Vignesh completed his PhD in Mathematics at the University of Illinois Chicago. Before that, he worked as a quantitative trader and researcher at VECO Power Trading, a proprietary trading firm specializing in electricity derivatives. Even before that, he earned his B.S and M.S in Math at the University of Michigan (Go Blue!). Outside of math, Vignesh loves playing board games and Bridge, reading (mostly) science fiction, trying out new restaurants, and hanging out with his cat Robin.

Course Description & Objectives

Bulletin Description:

Mathematics of finance, linear programming and its applications in business, limits, continuity, derivatives, implicit and logarithmic differentiation, higher-order derivatives, optimization and extrema, partial differentiation, and extreme values of functions of two variables.

Prerequisite: Math 103, Math 107, or placement exam. Credit awarded for Math 144 or Math 146, not both.

Upon successful completion of this course, students will be able to:

- Understand, assess, and describe changes in one quantity relative to changes in another.
- Optimize one- and two-variable functions, especially those related to models in business, economics, and finance.
- Compute the elasticity of demand and apply it to pricing decisions.
- Evaluate models in investing and finance and understand the role and power of compound interest.
- Construct, assess, and analyze models and data in economics and business to support predictions and decisions.

Required Student Materials

- Required Text: *Essential Calculus with Applications, 3rd Edition*. Wright, Hurd, New. Hawkes Learning, 2023. Inclusive Access ISBN: 978-1-64277-554-9
- A graphing calculator (TI-80 series: TI-83, TI-84, or TI-86 recommended).
- Notebook, pencils, and an eraser.

Course Schedule

For a detailed day-by-day schedule, refer to the Daily Schedule on Blackboard under “Syllabus, Daily Schedule & Textbook.” The overview below summarizes the weekly progression. If a class is cancelled (weather, unplanned instructor absence, etc.), the Daily Schedule will still be followed, including all deadlines and due dates.

- **Week 1 (Aug 24–28):** Welcome & Introduction, Basics Quiz, [01] Functions & Domains
- **Week 2 (Aug 31–Sep 4):** [02] Polynomials & Rationals, [03] Linear Functions, [04] Business Models
- **Week 3 (Sep 7–11):** Labor Day — No Class (Mon Sep 7); Basics Quiz, [05] Exponential Functions, Group Day
- **Week 4 (Sep 14–18):** [06] Logarithms, Review, **Exam #1 (In-Class Fri, Sep 18)**
- **Week 5 (Sep 21–25):** [07] Feasible Regions, [08] Linear Programming, [09] Annuities & Sinking Funds (FV)
- **Week 6 (Sep 28–Oct 2):** [10] Loans & Mortgages, Review
- **Week 7 (Oct 5–9):** **Exam #2 (In-Class Fri, Oct 5)**, [11] Limits & Continuity, [12] Def. of Derivative
- **Week 8 (Oct 12–16):** [13] Rules & Shortcuts, [14] Product & Quotient Rules, [15] Chain Rule
- **Week 9 (Oct 19–23):** [16] Higher-Order Derivatives & Concavity, [17] Applications in Business
- **Week 10 (Oct 26–30):** [18] Implicit Differentiation & Related Rates, Review
- **Week 11 (Nov 2–6):** Review, **Exam #3 (In-Class Wed, Nov 4)**
- **Week 12 (Nov 9–13):** [19] Derivatives of Exponentials & Logarithms, [20] Elasticity Veterans Day — No Class (Wed, Nov 11); [21] Optimization
- **Week 13 (Nov 16–20):** [22] Optimization in Business
- **Week 14 (Nov 23–27):** Catch-Up & Review, Thanksgiving Break — No Class (Nov 25–27);
- **Week 15 (Nov 30–Dec 4):** Review, **Exam #4 (In-Class Tues, Dec 1)**; [23] Multivariable Functions & Domains
- **Week 16 (Dec 7–11):** [24] Partial Differentiation, [25] Two-Variable Optimization, [26] Multivariate Applications, Review
- **Finals Week (Dec 14–18):** Final Exam — **[Tuesday, Dec 15, 3:15 – 5:15 PM; Location TBD]**

Grading & Evaluation

Yuja Questions (YQs)

After watching each recorded lecture, students complete a short three-question Yuja Question (YQ) assignment to confirm they have watched the lecture. Letter grades follow the standard scale: A (90–100%), B (80–89%), C (70–79%), D (60–69%), F (below 60%). Grades are posted and updated regularly on Blackboard under “My Grades.” Numerous

opportunities for bonus points and extra credit are available throughout the semester. If you are falling behind, contact the instructor and/or LAs immediately.

- **Review Material [10%]:** Basics Quiz, Basics Practice, and Practice Exams; weighted equally.
- **Yuja Questions (YQs) [10%]:** Three-question lecture completion checks; weighted equally.
- **Homework [10%]:** Online assignments with unlimited attempts; highest score counts; weighted equally.
- **In-Class Work [15%]:** Group work completed and submitted during class; weighted equally
- **Exams (4 regular) [40%]:** Four exams weighted equally at 10% each (50 minutes each).
- **Final Exam [15%]:** Cumulative assessment during Finals Week (120 minutes).

Assignment Details

tched the lecture and taken notes. YQs are found on Blackboard under “Yuja Questions.”

Key policies:

- Each YQ is timed at two minutes per attempt (most complete them in under a minute).
- Students receive two attempts; the higher score is used.
- Notes are permitted during YQs. Questions are designed to check attentiveness, not mathematical ability.
- Due dates are listed on the Daily Schedule. Late YQs are not accepted.
- YQs are worth an easy 10% of the overall grade. Missing several can significantly impact a final grade.

Advice:

Use the blank skeleton notes provided under “Blank Course Notes” on Blackboard while watching each lecture. These notes follow the lectures exactly and make it straightforward to answer YQs correctly. It is strongly recommended to watch the lecture, take notes, and complete the YQ at least a day before the deadline to allow time for a second attempt if needed. Do not wait until the last minute.

Homework

Homework is the primary vehicle for developing mathematical skill and mastering exam material. Assignments are accessed through Blackboard under “Homework.” Homework is the bridge between passively watching the Yuja lectures and eventually mastering the material. Homework is worth 10% of the overall grade.

Key policies:

- Students have unlimited attempts on each homework assignment before the due date.
- The highest-scoring attempt counts toward the grade.
- Due dates are listed on the Daily Schedule. Late homework is not accepted.
- Homework assignments are weighted equally.

Advice:

- Attempt homework soon after watching the Yuja lecture and completing the YQ, even if it feels difficult at first. An initial low score is fine and expected.
- Come to class and office/help hours with specific questions identified from your homework attempts. This allows for targeted, efficient help.
- Revisit the assignment; scores typically improve substantially.

- The instructor may award bonus points on exams to students who complete a full homework attempt in accordance with the Daily Schedule. Bonus points do not penalize those who do not earn them.
- If you are struggling with homework, seek help immediately. The instructor and LAs hold regular help/office hours throughout the week.

Success on homework is directly tied to success in the course. Students who consistently engage with homework tend to find exams significantly less stressful.

Review Material

Regular practice is key to mastery in mathematics. Students complete several assignments in this category: the Basics Quiz, Basics Practice Problems, and practice exams for each corresponding exam. Other review or practice assignments may be added to this category throughout the semester and will be noted as such when created and announced.

In-Class Work

Group work is given in class to provide much-needed practice. These assignments vary in length, scope, and content, but they must be completed during class time and turned in at the end of class. Only students who are present and active during class will receive credit. In-class assignments are weighted equally. In-class work makes up 15% of the overall grade.

Rules for in-class work:

- Most in-class work is graded based on effort: full credit is earned if your group makes an honest effort and remains active for the entire period. Assignments labeled “Quizzes” are graded on correctness.
- In-class assignments are collected only in the last minute of class; early submissions are not accepted. Turn in work to the instructor (Vignesh), not an LA.
- If you finish early, hold the assignment until the end of class and work on other math-related material (homework, review, Yuja lectures, YQs).
- Bring your laptop or tablet to work on assignments. If you do not have a device, help your group members with their work.
- Students who are inactive, unproductive, or leave early may be asked to leave and will forfeit their in-class points for the day.
- Include answers along with your complete solution and all work, even if it is incorrect. Answers without sufficient work may not be graded.
- In the upper-right corner of the page (one page per group), include the full preferred names of only the students present and active, the date, the class (Math 144), the meeting time, and your group number. **If a name appears for a student who was not present or active, the entire group receives 0% and is reported for academic misconduct.**

Exams

There are four regular exams (10% each) and one cumulative final exam (15%). Exams are taken in person during class time on paper.

Practice Exams

Each regular exam has a corresponding practice exam available on Blackboard. Practice exams mirror the actual exam in number of questions, question types, and time limit (50 minutes). Students are given unlimited attempts before the deadline. Practice exams are graded (the highest score counting toward your grade) and are included in the “Review Material” category.

Bonus points for practice exams:

For each practice exam attempt scoring 70% or higher, students earn +1 bonus point on the corresponding exam, capped at +4 bonus points total. Because each regular exam is worth 45 points, this can raise an exam score by up to about 8.9%. Scores above 100% are possible.

Exam Policies

- No notes, books, phones, or other resources or materials are allowed during the exam. Any access to a phone or other device during an exam is strictly prohibited, including using a phone’s calculator app.
- Exams are taken in person during class time (see the Daily Schedule).

Make-Up Exams: Make-up exams are given only to students with excused absences who notify the instructor in writing before the exam date. Any make-up must be taken within one week (seven calendar days) of the missed exam; otherwise, the student receives 0% and forfeits all bonus points. Students without excused absences, or who do not notify the instructor before the exam, will not be given a late make-up exam and will receive a 0%. Alternatively, a penalty may be applied to a make-up score at the instructor’s discretion.

Final Exam: The final exam is held in person during Finals Week (**Tuesday, December 15 from 3:15 – 5:15 PM; location TBD**). You must be available during that time. Trips, vacations, and flights should be booked for travel after the final exam.

If the final exam cannot be held in person (weather, unplanned instructor absence, or another unavoidable reason), one or more of the following may be considered: students all earn the grade they received before the final exam; students with a sufficiently high pre-final grade may receive the grade they have earned while remaining students take a remote proctored final; or, if space and proctors are available, early or late in-person final exam options may be offered. Details would be provided well ahead of time, if possible.

Written Work Submission Standards

In-class and other hand-written assignments must follow these formatting guidelines. Work that does not follow them may not be accepted for full credit.

- In the upper-right corner (one page per group), include: full preferred names of only the students present and active, the date, the class (Math 144), the specific meeting time, and your group number.
- Include answers along with your entire solution and all work, even if it is all wrong, include everything you tried. Answers without sufficient work may not be graded.
- Remove the frilly edges from notebook paper, and please do not leave them on the floor.
- **Due dates are firm.** Late work is not accepted.

Attendance & Absences

The Flipped Classroom Model

Topics are introduced in prerecorded Yuja lectures. Class time is used to go deeper into the material, answer questions, work in small groups and with LAs, complete in-class assignments, and even work on homework. This model gives students access to the instructor and LAs while practice and mastery are happening. Student participation is necessary for success. Students are required to bring their filled-in notes from each covered Yuja lecture to class each day, and should bring a laptop or other device for group work.

General Attendance Policy

Attendance is taken almost every class, usually through in-class assignments or quizzes. Students are expected to attend each scheduled class and to be respectful of classmates, the LAs, the instructor, and their own learning. Distracting behavior or misuse of technology (phones, tablets, computers) will not be tolerated; in such cases the student will be asked to leave and will forfeit their points for the day. Students who leave early or are otherwise inactive or unproductive may not receive points for the day.

Illness & Instructor Absences

- **If you are sick:** Stay home and notify the instructor before class so your absence is excused. You are still expected to watch Yuja lectures and complete work on time. The same applies if you test positive for COVID-19.
- **If the instructor must miss class:** An announcement will be sent as soon as possible. For a planned absence, an assignment or task will be given in lieu of class. If the instructor is absent with no announcement, carry on with class as best you can; an LA may conduct class if available.
- **If NDSU goes 100% virtual:** Very little changes. Attendance happens on Zoom, groups meet virtually, work is still due, prerecorded lectures remain available, and exams are proctored remotely. Exams, in this case, will be administered via the Lockdown Respondus Browser. Students are responsible for accessing this exam via their laptop and having the necessary software set up prior to the exam. If the student needs a laptop to take this exam, they must contact the instructor with sufficient notice before the exam takes place.

Excused vs. Unexcused Absences

Assignments are available in advance. It is each student's responsibility to do work on time, to anticipate personal, professional, or scholastic events that may affect submission, and to keep prompt communication with the instructor. Deadlines are firm; late work is not accepted.

Excused Absences. Examples include medical emergencies, school-sponsored activities and travel, illness, doctor appointments, and deaths in the immediate family. Students must email the instructor before the absence and keep up with the pace of the course. The email must include the class (Math 144), the meeting time, the day(s) to be missed, and the reason. If any of this is missing, the absence will not be excused. Vague or potentially misleading excuses (such as "something came up" or "I have an appointment") may be considered unexcused.

- **Yuja Lectures, YQs, and Homework:** Available ahead of time and must be completed by the deadlines on the Daily Schedule. Late YQs and homework are not accepted.

- **In-Class Assignments:** When an absence is excused ahead of time, associated in-class assignment grades are nulled (they do not count against the student). Coordinate with your group to learn what was covered.
- **Exams:** Only an absence excused ahead of time allows an early or late make-up exam, which must be taken within seven calendar days of the missed exam.

Unexcused Absences. These include sleeping in, forgetting to come to class, going on vacation, or not providing timely, sufficient information for a potentially excused absence.

- **Yuja Lectures, YQs, and Homework:** Still due by the deadlines on the Daily Schedule. Late work is not accepted.
- **In-Class Assignments:** Students receive no credit (0%) for in-class assignments missed for an unexcused reason.
- **Exams:** Students who miss an exam for an unexcused reason receive a penalized make-up or no credit, at the instructor's discretion. Any make-up must be taken within seven calendar days of the missed exam.

Communication

All course announcements are posted on Blackboard, often accompanied by an email to your NDSU address. Students are expected to check both at least once every 24 hours.

Email guidelines:

- Email is appropriate for general questions and concerns only.
- Math-related questions should be brought to office/help hours, not email. If a math question is sent via email, you will likely be directed to attend help hours.
- All emails must include the course name (Math 144) and the days/times the class meets.
- If emailing about an excused absence, send the email before class starts and include the reason and the date(s) you will miss.
- Use your official NDSU email address when emailing the instructor.
- The instructor replies to emails within 24 hours.

Netiquette:

All course communications should be professional and respectful. Use standard written English (no netspeak) in emails and discussion posts, and treat all classmates and instructors with courtesy, even when disagreement arises.

Course Policies

Late Work:

Late work is not accepted for any assignment category. Please regularly consult the Daily Schedule and plan accordingly. Work submitted before any deadline will always be accepted, so turn work in early if a conflict is anticipated.

Instructor Responsibilities:

- Attend all scheduled office hours; provide make-up hours if cancellation is necessary.
- Reply to emails within 24 hours.

- Keep Blackboard grades current.
- Send regular emails summarizing upcoming tasks and reach out proactively to students who appear to be struggling.
- Work within course and university policies to support student success.

Artificial Intelligence (AI) Policy

AI tools such as ChatGPT, Perplexity, Claude, and Gemini are powerful resources. Used appropriately, they can support learning. Used inappropriately, they constitute academic dishonesty. Over the past several semesters, it has become increasingly clear that AI has been misused in this course, and it has had a direct negative impact on student performance. Here, we will outline appropriate and inappropriate uses of AI in this course. If you have any questions, please ask the instructor instead of assuming.

Appropriate uses:

- Asking AI to clarify a general concept or type of problem (e.g., “Can you explain what the chain rule does and when I need it?”).
- Asking AI to generate practice problems and solutions for self-study.
- Asking AI about real-world applications of mathematical topics covered in the course.

Inappropriate uses:

- Having AI generate **any** answer or solution that is submitted for points or credit in this course. This includes partial credit or bonus points.
- Using AI to solve homework, practice exam, or exam problems.

Instructor uses: Instructor use of AI will be minimal. The instructor will never use AI to grade assignments, and your identifying information will never be given to any LLM. All grading will either be done automatically by Blackboard/Hawkes or by your instructor, learning assistant, or other qualified human grader. All assignments in this course are human-made, unless otherwise noted. Handwritten solutions to various exercises have been digitally typeset with AI (Claude) to comply with accessibility standards. Finally, as an experiment, this course syllabus was initially created by feeding AI various handouts and syllabi from past semesters, then proofread and customized by your instructor.

Academic Honesty

NDSU Policy 335: The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335 applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and include suspension and/or expulsion. Students' academic records are maintained by the Office of Registration and Records.

Code of Academic Responsibility and Conduct applies to all aspects of this course. Cheating, plagiarism, and other forms of academic misconduct are taken seriously. **A first instance of cheating will result in a zero on the assignment and the filing of an Academic Misconduct Tracking Report with the university**, sent to the student, their department and college, the Provost, and other relevant parties. Depending on severity, **the student may**

also automatically earn an F in the course. Repeated misconduct may result in suspension or expulsion. For more information, visit [Academic Honesty and Integrity Policy — North Dakota State University](#).

Technical Requirements & Support

This course is facilitated through NDSU Blackboard. Log in at the NDUS Blackboard portal using your NDUS Identifier, Username, and Password. For password issues, visit the Account Hub. Students must use their official NDSU email address. Microsoft Office is available free to NDSU students via the Microsoft Office 365 ProPlus page. For technical support, contact NDSU IT at 701.231.8685 or visit the IT Help Desk.

Minimum technical skills:

- Navigate Blackboard, including Yuja for recordings and proctoring.
- Download, open, and upload electronic documents and PDF files.
- Operate a TI-80 series graphing calculator.
- Use NDSU Zoom for virtual office hours.

Campus & Student Resources

- Writing assistance: NDSU Writing Center
- Free online tutoring: Brainfuse (available through Blackboard)
- Center for Accommodations and Disability Resources (CADR): 701-231-8463 — [Center for Accessibility and Disability Resources](#)
- Counseling Services: 701-231-7671
- Student Health Services: 701-231-7331

Crisis & Emergency Contacts:

- Emergency: 911
- University Police: 701-231-8998
- Suicide and Crisis Lifeline: 988
- Prairie St. Johns (Needs Assessment): 701-476-7200 — 510 4th St. S, Fargo
- FirstLink Help Line: 1-800-273-TALK (8255) or 2-1-1
- Sollera: 701-293-7273 — [Sollera — Hope. Safety. Healing.](#)

NDSU Policies

Military & Veteran Needs:

Veterans and student service members with special circumstances or who receive activation orders are encouraged to notify the instructor as soon as possible.

Americans with Disabilities Act:

Students with disabilities or special needs should contact the Center for Accessibility and Disability Services ([Center for Accessibility and Disability Resources](#)) and share accommodation requests with the instructor as early as possible.

FERPA:

Personally identifiable information and educational records in this course are subject to the Family Educational Rights and Privacy Act (FERPA).

Getting Started

Complete the following steps at the beginning of the semester:

- Come to class on the first day, get introductory information, and ask any questions you may have.
- Read this syllabus and complete the “Syllabus Assignment” on Blackboard.
- Review the Daily Schedule on Blackboard — refer to it every day throughout the semester.
- Stay tuned for the Basics Quiz during the first weeks of class.
- Print the Section 1.1 blank course notes, watch the Section 1.1 Yuja lecture, and take detailed notes.

Each week:

- Consult the Daily Schedule daily for assignments, due dates, and pacing guidance.
- Watch all assigned Yuja lectures and take notes using the blank skeleton notes; bring your filled-in notes to class each day.
- Complete Yuja Questions promptly after each lecture.
- Come to class ready to work in your group; bring a laptop or device for in-class assignments and homework.
- Work on homework assignments with unlimited attempts; revisit after class and help hours.
- Do multiple practice exam attempts before each exam to get valuable practice and earn possible bonus points.
- Attend in-person or Zoom help/office hours whenever questions arise.