



Mathematical Thinking Syllabus Fall 2024

Course Information

Course Title: **Mathematical Thinking**

CRN: 10169

Course number with Section: **MGF1130-01**

Course Description: In this course, students will utilize multiple means of problem solving through student-centered mathematical exploration. The course is designed to teach students to think more effectively and increase their problem-solving ability through practical application and divergent thinking. This course is appropriate for students in a wide range of disciplines/programs.

Course Location: **D2L Virtual Classroom**

Course Day and Time: New material posted Friday morning

Lecture recorded every Friday 9:30AM – 11:30 AM

Prerequisites: Successful completion of an NFC developmental mathematics course option or appropriate mathematics placement scores on a postsecondary readiness test; successful completion of an NFC developmental reading course option or appropriate readiness test.

Corequisites:

Instructor Information

Name: Glenn Bryce (he /him)

Office Location: Bldg 6 rm 106

Office Hours: **MTWR 11 – 2:30; F 11 – 12:30**

Phone Number: (850)973-1676 (email preferred)

Email: bryceg@nfc.edu

Instructor Response Time for Phone/Email: 1 business day

Response Time for Posting Grades on D2L: 1 week

Department Chair: Phillip Taylor

Department Chair Email: taylorp@nfc.edu

Required Curriculum/Textbook and Course Materials

Required Textbook: Math Through the Ages: A Gentle History for Teachers and Others, Berlinghof & Gouvea, 2nd ed. ISBN 978-0-486-83284-5

You do not need to buy the book at the bookstore if you are not using financial aid to pay for it. It is available cheaper on Amazon in print and on Kindle very inexpensively. The book is designed to be very easy to obtain and is \$1.99 on Kindle. You must have some version of the book beginning week 1.

Required Course Materials/Supplies:

I will be posting many videos hosted on YouTube. You may want to consider a **YouTube Premium** subscription, although this is **optional** if you don't mind sitting through ads.

desmos.com (scientific calculator) (free)

Minimum Technological Requirements and Skills:

Ready access to and use of desktop or laptop computer with reliable Internet access and sound

For textbook questions, please visit:

<https://customersupportcenter.highered.follett.com/hc/en-us>

Grading Policy and Assessment Methods

Course Grading/Student Performance Evaluation:

A: 90 – 100

B: 80 – 89

C: 70 – 79

D: 60 – 69

F: 0 – 59

Your final grade is a weighted average as follows:

D2L Dropbox projects (13, weighted equally, one per unit)	35%
Reflections (13, weighted equally, one per unit)	30%
Projects (4, weighted equally)	20%
Final exam (mandatory)	15%

This course records weekly meetings on D2L Virtual Classroom, Friday mornings 9.30 – 11:00. You may attend class live by joining me online in D2L Virtual Classroom at this time, AND / OR you may also watch the recorded class meeting later in the week. Either way, you are responsible for attending the meeting either live or recorded, taking notes, and asking questions about material you don't understand.

Please email the instructor if you must turn in an assignment late. I will only grade late assignments if we spoke over email in reference to them.

Mid Term and/or Final Exam Information:

The final exam will be available online on D2L on **(DATE)** for 24 hours (midnight to midnight) and due in the dropbox at the end of this time. You do not come to campus for any assignment in this entire class.

Outcomes/Objectives

GENERAL EDUCATION PROGRAM LEARNING OUTCOMES/OBJECTIVES

1. **Communication Skills:** Students will demonstrate competence and understanding in both oral and written expression.
2. **Critical Thinking:** Students will demonstrate mastery of discipline-specific problem-solving skills.
3. **Diversity:** Students will interpret and evaluate societal and ethical issues, problems and values specific to time and place.
4. **Technology:** Students will demonstrate competence in use of technology appropriate to course and/or circumstance.

Course Level Student Learning Outcomes/Goals

All courses with multiple sections must use the same wording for all SLOs, and assessments must share common attributes.

1. Students will be able to determine efficient means of solving a problem through investigation of multiple mathematical models.
2. Students will apply logic in contextual situations to formulate and determine the validity of logical statements using a variety of methods.
3. Students will apply mathematical concepts visually and contextually to represent, interpret, and reason about geometric figures.
4. Students will recognize the characteristics of numbers and utilize numbers along with their operations appropriately in context.
5. Students will analyze and interpret representations of data to draw reasonable conclusions.

Course Level SLO #	Gen Ed/Program Outcome #	Summative Assessments (A student artifact: A specific assignment that could be submitted as evidence of a General Education or program level competency)
1	2.a, 2.b	Unit 6 Project
2	2.a, 2.b	Unit 4 Project
3	2.a, 2.b	Unit 8 Project
4	2.a, 2.b	Unit 10 Project
5	2a, 2b	Unit 6 Project

Course Content and Schedule

PLEASE READ THIS SECTION. This explains the class, how it is set up, and what is expected of you.

This is a different kind of math class.

You have never taken a math class like this. It is not going to be perfect, and I don't expect you to be perfect. This class will (I hope) not be like any math course you have ever had. The point of this course is not to memorize how to do things. The point of this course is to understand how things work, and learn about all the people throughout human history who've contributed to the field of study we call mathematics.

You have an input on what we do and what the rules of the class are. If you don't like how we're doing something, tell me. If there's something in the book (or not in the book) you want to talk about, tell me.

I arrived at the book we use after many semesters and have decided it covers everything I want to do while being very affordable. The book is less than \$20 on Amazon for a physical book and \$1.99 for the Kindle version, so you should be able to obtain it very easily. This book is written at a higher level than I would like, which means you may have to do a bit of your own studying to figure out what the book is

talking about in some sections. **If you run into a math term or concept you're unfamiliar with, ask me about it and do your own research. I will gladly help you understand.**

This is a self-contained class.

Everything you see in this course will most likely be something nobody in the class (other than me) has ever seen before. You may have taken several college level math courses before, or this may be your first one. Either way, you are at the same level as everyone else. There are no stupid questions in this class, and nobody is going to judge you for asking a question. In fact...

I want you to ask questions.

You will not understand everything in this class the first or even second time you see it. I EXPECT you to ask questions about things. We are going to be doing advanced mathematics, and you are going to understand it. The only way you'll understand it is by asking questions about things you don't get. It is my job to help you start thinking like a mathematician.

I want you to pay attention.

I am human, and prone to making mistakes. If I ever write something on the board that's incorrect and you catch it before I do and let me know, I will give you extra credit. (From experience, I can pretty much guarantee at least one of these every class.) Question what I say, what I write, and what you read. It is my job to convince you, not your job to accept blindly.

I want you to participate.

This is more like a literature or history course than a traditional math course; every week you'll have material to read and respond to, and bring in your thoughts and questions so we can discuss the material in class.

I want you to read the book and watch the videos.

Participation includes reading. You will actually have to open your book and read it. Part of the assignment every week will be a reading for next week, maybe out of the book, maybe something online. You will be totally lost and unable to contribute to the class if you don't read, so please read and take notes. Again, you may not understand everything in this book the first time you read it. It is my job to help you understand it. I will post notes each week that briefly touch on the reading and perhaps explain some methods or algorithms the book introduces, but these notes ARE NOT A SUBSTITUTE for actually reading the book, taking notes, and responding to writing prompts or assignments each week.

I want you to be wrong.

I care less about "right" and "wrong" answers in this class than I might in other classes. You can get a "right" answer and not understand the problem at all, and you can understand the problem and get a

“wrong” answer because it’s not the answer the person who posed the problem was thinking of. I care whether you understand what is happening, not whether you get the same result I do. I place MUCH more emphasis on explaining what you’re doing and why, than on what (if any) solution you get.

Mathematics is about making guesses and seeing if your guess works. If it doesn’t work, it doesn’t mean you’re wrong, it means that the approach you took didn’t work. Tell me about it, why it didn’t work, and try something else! **You must show all your work on everything we do in this class. I am grading your work, not your answers.**

I want you to care.

This class IS NOT an easy A. Your grade in this class is a direct function of how much you care. If you don’t care, and you show me you don’t care by missing class, coming in late, not contributing, and not taking assignments seriously, you will be disappointed in your grade and not get anything out of this class. If you care, and you show me you care by coming to class on time, asking questions and explaining things to others, and explaining what you’re doing in your work, you will do very well and hopefully learn a lot.

NOTE: I will be recording a meeting on D2L Virtual Classroom every Friday, 9:30 – 11:00 AM. You are required to view these meetings, either live in Virtual Classroom or by watching the recording of the meeting. You may want to install Zoom if you haven’t already, because if I’m having problems with the Virtual Classroom getting started, Zoom will be my backup plan. Check our D2L page Friday morning for Virtual Classroom instructions or Zoom links. You may not be able to regularly attend these meetings live, this is fine. I will archive every class meeting in the bottom of the Virtual Classroom tab on D2L for you to watch at your leisure during the week. Whether you attend synchronously (live) or asynchronously (recorded), you are expected to watch the meeting, take notes, and ask questions, either in class or via email.

Course Schedule (not finalized)

PART I

Unit 1: Logical statements and qualifiers

Unit 2: Proofs / pigeonhole principle / 1-1 correspondence

Unit 3: Sets of numbers and their properties

Unit 4: Common logical fallacies

PART II

Unit 5: Variables and mathematical modeling

Unit 6: Representations of data, good & bad graphs

PART III

Unit 7: Pythagorean Theorem (history & proof)

Unit 8: Right angle trigonometry and solving triangles

PART IV

Unit 9: Prime numbers

Unit 10 Combinatorics

PART V

Unit 11: Complex numbers and arithmetic

Unit 12: Fractals and fractal geometry

Unit 13: (Julia sets and) the Mandelbrot set

Early Alerts: Full Term

#1: September 10th – 11th

#2: October 10th – 11th

NFC Course Policy Statements

Statement for Online Instructors: At the beginning of the semester, the instructor must report “no show” students for this course. “No show” indicates the student will be removed from the course. To be considered as attending the online course, the student must log in to D2L and complete “Getting Started,” step #1. Students will be prompted to complete the Mandatory Attendance quiz by the deadline as given on the course schedule; this quiz will verify students’ attendance in the course.

NFC Information and Policy Statements

Academic Honesty

NFC is committed to providing a high-quality educational experience to all students, and students are expected to follow appropriate and honest academic practices. This information is available in the Academic Regulations section of the college catalog at www.nfc.edu. All cases of academic dishonesty will be reported to the Office of Academic Affairs.

Instructors use www.turnitin.com to review papers and projects for improper citation and/or plagiarism by comparing each student’s report against billions of internet pages, a repository of works submitted to Turnitin in the past, and thousands of academic sources. A comparison document called the *Similarity Report* details the areas of a student paper that may have been documented incorrectly or used improperly. **Refer to instructor’s course policy statements for usage details.**

Statement about Generative AI Technology:

Individual course instructors are free to set their own policies regulating the use of generative AI tools in their courses, including allowing or disallowing some or all uses of such tools. Course instructors should set such policies in their course syllabi and clearly communicate such policies to students. Students who are unsure of policies regarding generative AI tools are encouraged to ask their instructors for clarification.

Use of or consultation with generative AI shall be treated analogously to assistance from another person. Absent a clear statement from a course instructor, using generative AI tools to complete an assignment or exam (e.g., for idea generation or for entering exam or assignment questions) is not permitted. Students should acknowledge the use of generative AI and default to disclosing such assistance when in doubt.

Attendance Policy

Regular and consistent attendance facilitates student success. Absences beyond the equivalent of two weeks of class are considered to be excessive and thus may impact a student's course grade. Typically, two weeks of class would be described as follows:

- For a three-credit hour class that meets MW or TR: 4 class meetings (2 weeks).
- For a three-credit hour class that meets once a week for three hours: 2 class meetings (2 weeks).

Students are responsible for material covered during their absence. Refer to instructor makeup policy.

If there is no verifiable participation within the first week of the term, a student will be dropped from the class for non-attendance. This includes classes delivered in face-to-face, online, or hybrid format. See instructor policy.

Textbook Purchases

All required course materials are listed in the Virtual Bookstore tab on NFC's homepage. Course materials purchased through Follett, NFC's only contracted vendor, can be charged against a student's financial aid account. Course materials may also be purchased from any other source with the understanding that these non-Follett purchases cannot be charged against a student's financial aid account.

Used Book Purchases

Students should check the Follett book list found in the Virtual Bookstore tab on NFC's homepage for correct titles and editions. Note: The ISBN listed in Follett may include both the required text and a required access code. When considering purchasing used books, students should be sure the purchase includes the ACCESS CODE in courses where required. If not, the access code must be purchased separately at an additional cost.

Students/Visitors: Where to Park on Campus

If you have any questions about parking on campus, contact Campus Security at (850) 973-0280. Park in designated parking spaces only. Do not park on the grass or in undesignated areas. Faculty/Staff parking areas are to be used only by full- and part-time employees of the college. Faculty and staff parking spaces are lined in yellow and are clearly marked "STAFF". Students and visitors can park in any spaces that are lined in white. **NOTE: Some visitor parking spaces are lined in yellow with the word "Visitor" in the center. These are for visitors only. Students are not allowed to park in these spaces. Vehicles cannot**

be parked by backing into the space. Any vehicle that is illegally parked will be towed at the owner's expense. Refer to the college catalog or student handbook for all other parking regulations.

Enforcement: If a vehicle is parked illegally anywhere on campus, it is subject to be towed at the owner's expense (\$85.00+). An illegally parked vehicle will be given a **WARNING on the FIRST OFFENSE**. **There will be no second warning.** Illegally parked vehicles will be **TOWED ON THE SECOND OFFENSE**. Signs will be displayed near parking areas with the name and address of the company to contact if the vehicle is towed.

The company that tows the vehicle is an independent company contracted by North Florida College. The College has no authority to negotiate towing fees and is not in any way responsible for damage or liability to the vehicle or its contents. The company that provides the towing service is:

Jimmie's Firestone
6025 South SR 53
Madison, FL 32340
(850) 973-8546

Campus Security

The administration of NFC works diligently to make the campus as safe as possible. A few of the procedures in place include the use of security officers, the placement of security lights at strategic locations, and the locking of buildings when not in use. Students should always be alert and use normal precautionary measures. Campus crime statistics are documented annually and are available in the college catalog. Campus security can be contacted at 850-973-0280 from 7:30 a.m. until 11:30 p.m. for assistance while on campus with non-emergency security concerns. All emergency incidents should be reported directly to 911.

Library Services

The Marshall Hamilton Library, located in Building 4 at NFC, is open during the following hours (hours are subject to change):

Fall/Spring Term

Monday – Thursday 8:00 a.m. – 7: 00 p.m.

Fridays 8:00 a.m. – 4:30 p.m.

Summer Term

Monday – Thursday 8:00 a.m. – 4:30 p.m.

Resources and staff are available in the library to support student learning in the classroom. Students are encouraged to visit our website and use the online resources. Librarians are on duty to help with questions and research strategies. To gain access to the library's extensive collection of electronic resources such as eBooks and academic databases with full-text articles, students will use the Single Sign-on through the MyNFC portal or Library Website. Students should contact the library at library@nfc.edu or call (850) 973-1624 if they are having login issues. Online library resources are available to students 24 hours a day through the library's website, <https://www.nfc.edu/learning-resources/>. Wireless Internet is also accessible in the library and on the patio after hours. Specific policies and regulations applicable to the library are available in the Library or by visiting the Library's website.

Academic Success Center

The Academic Success Center (ASC) exists to provide all NFC students, regardless of academic proficiency, the help and support necessary to ensure successful completion of studies and programs. Services include one-on-one peer and professional tutoring assistance, online tutoring, organized group

study sessions, workshops, study skills training, academic coaching, web resources, and more. The ASC takes pride in working closely with faculty and staff to develop resources and to support the various academic programs offered at NFC.

Walk-in and by appointment services: Students may visit the ASC (Bldg. 4) for in-person services or make an appointment to receive in-person or virtual academic support services during the posted hours:

Fall/Spring Term

Monday – Thursday 8:00 a.m. – 5:30 p.m.

Fridays 8:00 a.m. – 4:30 p.m.

Summer Term

Monday – Thursday 8:00 a.m. – 4:30 p.m.

- **Workshops, organized group study sessions, and professional tutoring:** See the ASC calendars and schedules on NFC's website for specific dates, times, and delivery methods. For additional information visit <https://guides.nfc.edu/asc>.

Academic Success Center Online Tutoring

Online tutoring is available to NFC students 24 hours a day, 7 days a week, through the Academic Success Center. The ASC offers 1 to 1 tutoring available on demand in a variety of subjects, 24/7 anytime, anywhere.

For more information about accessing the ASC online tutoring service, see the ASC webpage or contact Elizabeth Gonzales at gonzalese@nfc.edu or (850) 973-1719 and/or Brianna Kinsey at kinseyb@nfc.edu or (850) 973-9458.

For **any** additional information regarding services provided by the **Academic Success Center**, please contact any of the following:

- Elizabeth Gonzales, Academic Success Center Coordinator (850) 973-1719 / gonzalese@nfc.edu
- Brianna Kinsey, Tutor Lab Manager (850) 973-9458 / kinseyb@nfc.edu

Americans with Disabilities Act

NFC is dedicated to the concept of equal opportunity. Students desiring modifications in class or on campus due to a disability may choose to inform the instructor at the beginning of the semester or contact the Disability Resource Center directly. Accommodation and modifications will be made after the student registers with the Disability Resource Center and provides appropriate documentation of disability. After the documentation is evaluated, the instructor may be involved in providing accommodations to equalize the student's educational experience. Students may call (850) 973-1683 (V) or (850) 973-1611 (TTY) for an appointment or additional information.

Technology Access

All NFC online learning tools are available on the MyNFC portal. To access the portal, students should click the MyNFC link at the top of the NFC website (<http://www.nfc.edu>) or type the following URL into the Internet address bar: <https://my.nfc.edu>. **When accessing the portal for the first time, students should click the "First Time User" link and follow the instructions to set up the account.**

Each NFC student is provided an email account through GoMail. The student's GoMail account is the official email address used by faculty and staff for communication with the student. A student can access

his/her GoMail account via the MyNFC portal. Students are expected to check their GoMail accounts regularly.

Desire2Learn (D2L) is the learning management system that houses all online and supplemented face-2-face courses. Students can log in to an online or supplemented course by accessing the MyNFC portal. Students will then see their course(s) listed under the "My Courses" widget on the D2L homepage. Click the name of the course to begin.

Student Ombudsman

The Student Ombudsman provides confidential, informal, and neutral assistance to students seeking to resolve disputes or address issues of importance. The Student Ombudsman does **not** serve as a student *advocate*, but rather serves as a guide to assist students in the navigation of college organizational structure and in understanding of policies and procedures. David Paulk is the current Student Ombudsman. He can be reached at (850) 973-9418 or paulkd@nfc.edu.

Equal Opportunity Statement

North Florida College is dedicated to the concept of equal opportunity and access to all programs and activities. In accordance with federal and state laws, and College policy, NFC does not discriminate in any of its policies, procedures, or practices based on race, ethnicity, color, religion, sex, national origin, gender, age, disability, pregnancy, marital status, genetic information or any other characteristic protected by law. Inquiries or complaints regarding equity issues of any nature may be directed to Denise Bell, Equity Coordinator, 325 NW Turner Davis Drive, Madison, FL 32340, Telephone (850) 973-9481 or email equity@nfc.edu.

Student Rights

As members of the College community, students have certain rights that include the following.

Students have the

- Right to a quality education.
- Right to freedom of expression.
- Right to hold public forums.
- Right to peacefully assemble.
- Right to a fair and impartial hearing.
- Right to participate in Student Government.
- Right to be a member in authorized student organizations.
- Right to appeal College decisions through established grievance procedures.
- Right of personal respect and freedom from humiliation and control.
- Right to make the best use of the student's time and talents and to work toward the goal which brought the student to the College; and
- Right to ask about and recommend improvements in policies that affect the welfare of students.

Student Responsibilities

As members of the College community, students have certain responsibilities that include the following.

Students are

- Expected to assume responsibility for knowing the rules, regulations, and policies of the College.
- Expected to meet the course and graduation requirements of the students' program of study.
- Expected to keep college records current with up-to-date addresses and other information.
- Expected to meet with an academic advisor at least once each term.

- Expected to comply with the College rules, regulations, and policies; and
- Expected to behave in a manner which demonstrates respect for others and self.

Student Rights Under the Family Educational Rights and Privacy Act (FERPA)

FERPA affords students certain rights with respect to their educational records.

1. The right to inspect and review the student's educational records.
2. The right to request the amendment of the student's educational records to ensure that they are not inaccurate, misleading, or otherwise in violation of the student's privacy or other rights.
3. The right to consent to disclosure of personally identifiable information contained in the student's educational records, except to the extent that FERPA authorizes disclosures without consent.
4. The right to file with the U.S. Department of Education a complaint concerning alleged failures by North Florida College to comply with the requirements of FERPA. Please write to U.S. Department of Education, 600 Independence Ave. S.W., Washington, D.C. 20203.
5. The right to obtain a copy of North Florida College's student record policy from the Office of the Registrar, North Florida College, 325 NW Turner Davis Drive, Madison, Florida 32340.

Vulnerable Persons Act

All faculty and staff of North Florida College are required by law to report any type of abuse of minors that they witness or become aware of through written or verbal communication, regardless of the time that has passed since the abuse occurred. Students are advised that any information, written or verbal, communicated in this class, or to the instructor in any way, in regards to any willful act or threatened act that results in any physical, mental, or sexual abuse, injury, or harm that causes or is likely to cause harm to the physical, mental, or emotional health of another to be significantly impaired is subject to disclosure as required per Florida State Statutes.



NORTH FLORIDA COLLEGE QUALITY ENHANCEMENT PLAN CAREER COMPASS

Increasing the completion rate of NFC students through intentional educational planning.