Cedarville University

Syllabus for GMTH-1010

Introduction to Mathematics (online)

Welcome to Intro to Math!

This Syllabus, together with the Class Calendar, provides you with the all the information you will need to get started and to succeed in this online course.

1. Read through this Syllabus carefully, you may want to refer to it many times throughout the semester if necessary.
2. Familiarize yourself with the Course Calendar which indicates the dates on which you should be reading each of the web lectures, participating in the online discussions, submitting projects, taking tests and quizzes.

Important Information

- Course Name**:** GMTH-1010 Introduction to Mathematics, Syn. No. 7848
- Text Book: Excursions in Modern Mathematics, 7th Edn., Peter Tannenbaum. Prentice-Hall, 2010.
- Semester: Spring 2010 online.
- Final Exam: 4/8/2010 online. Dr. Otis Wright

- Instructor: Dr. Otis Wright

- Contact Information: telephone: 937-766-7690, e-mail: wrighto@cedarville.edu, office: ENS 341B
- Prerequisite: proficiency in high school mathematics.
- Calculator: You will need a scientific calculator for this course (a graphing calculator is not necessary). Use of the calculator is **allowed** on all quizzes, class tests and the final exam.

Assessment

Average of 10 Quizzes (each out of 10 marks)	10%
On-line Discussion Participation	10%
Two Written Projects (each out of 10 marks)	20%
Total of 4 Class Tests (each out of 25 marks)*	40%
Final Exam (out of 50 marks)	20%
Total	100%

*There is also a Learning Journal for homework questions, if completed Satisfactorily, the Learning Journal score replaces the lowest Class Test score; see below for precise details.

Grading Scale

The final grades for this course will be distributed based the student's Total Score out of 100% following the usual 10 point scale. Grades of +/- will be added to the letter grade according to the instructor's discretion but

usually the C grade range, for example, would be divided as follows, 70-72%, C-, and 73-77%,C, and 78-79%,C+.

Discussion Questions

- Many of the web lectures have a discussion question to which you must post a response in the threaded discussions board.
- In order to generate discussion between students, some web lectures require you to post a response to someone's answer to a question from a previous web lecture.
- I monitor your responses to the discussion questions and assign you a grade out of 10 marks for your participation in the online discussions over the whole course.
- Your answers should not be long and complicated, usually one short paragraph is sufficient for a response.
- Your answers should be more than Yes or No or I agree.
- What is required to obtain full credit for the online discussions is that you participate faithfully and respond to each question **within two (2) days** of the web lecture in which the question appears.

Important: Remember to obey the rules of Internet courtesy when you participate in the threaded discussions:

1. Never insult anyone or write something that you wouldn't say to them in public.
2. Never use profanity. Often people forget that the Internet is public and that your words will be viewed by others.
3. You may disagree with someone's opinion but always back up your answers with reasons and facts.
4. You might like to try to convey emotion in your messages using "emoticons" like :) for smiling face, etc.
5. Do not capitalize your words, since this is often interpreted as "shouting".
6. Do be polite and respectful of others.

Learning Journal

Your Learning Journal documents your progress with homework. The learning journal questions are merely a minimum set of questions that you must submit so that I can see if you are attempting to keep up with the course. There are additional questions (that you do not hand in) suggested in the Reading Assignment section of each web lecture which you should attempt in order to be able to take the Quizzes and Tests.

Submission:

1. Your Learning Journal will be submitted in four (4) installments, one installment is submitted each time you take a class Test.
2. Each Learning Journal installment must be a Word document (.doc) or a .pdf document (if you choose to scan your hand-written answers) named according to the following convention: **LJ_#_YourFirstName_YourLastName.doc** or **LJ_#_YourFirstName_YourLastName.pdf** where **#** should be replaced by one of **1, 2, 3, 4,** depending on which installment is in the file.
3. The Learning Journal installments are to be submitted from corresponding page on the Assignments page of the course.

Grading: Your Learning Journal is graded on a Satisfactory/Unsatisfactory scale. I do not correct minor errors in your Learning Journal, rather I am checking to see if you are making a reasonable attempt to stay up to date with the course material.

Each Learning Journal installment that is considered Satisfactory receives a grade of 25/25, if the installment is Unsatisfactory then it receives a grade of 0/25.

Your final grade for the Learning Journal is the average of the four grades for the four installments. This final Learning Journal grade out of 25 marks replaces the lowest of the four class Test grades (if there is a Test grade lower than the Learning Journal grade).

In other words, if you keep up with the Learning Journal, you can cancel out your lowest test score and replace it with 25/25.

Learning Journal installments submitted late will be penalized. Please keep up-to-date with the your Learning Journal throughout the course.

Question Summary: For your convenience, the following is a list of all the Learning Journal questions, page numbers refer to the textbook (7th edition),

1. Installment 1 (due with Test 1):

Lecture	Title	Page No.	Question Nos.
1.2	Math of Logic	web lecture	see web lecture
1.3	Conditional Statements	web lecture	see web lecture
1.4	Contrapositive	web lecture	see web lecture
2.1	Plurality Method	29	1,3,4,11a,12a,13
2.2	Borda Count Method	32	17a,18a,19,23,24
2.3	Plurality-with-elimination	33	27a,29,33
2.4	Pairwise Comparison	35 and 38	35 and 59
3.1	Weighted-Voting Systems	66	1,7
3.2	Banzhaf Power Index	67	11,12,14
3.3	Shapley-Shubik	68	25,26,37,38
3.4	Applications	web lecture	see web lecture

1. Installment 2 (due with Test 2):

Lecture	Title	Page No.	Question Nos.
4.1	Math of Sharing	103	1,5,8
4.2	Divider-Chooser	106	15,16,19
4.3	Sealed Bids	114	53,54
4.4	Markers	116	62,66
5.1	Graphs	192	1,9,14
5.2	Euler Circuits	193	18,19
5.3	Euler's Theorems	194	26,27
5.4	Fleury's Algorithm	195	29,33,37

1. Installment 3 (due with Test 3):

Lecture	Title	Page No.	Question Nos.
7.1	Hamilton Circuits	227	2,4a,6,14
7.2	Complete Weighted Graphs	229	17,18,27
7.3	Brute-Force Algorithm	230	29a,30a
7.4	Nearest-Neighbor Algorithm	230	29bc,30bc,32,37,39

8.1	Fibonacci Numbers	351	1,2,7
8.2	Fibonacci Numbers in Nature	web lecture	reaction statement
8.3	Golden Ratio	353	19,25,29
8.4	Golden Cut	web lecture	phyllotaxis

1. Installment 4 (due with Test 4):

Lecture	Title	Page No.	Question Nos.
9.1	Linear Growth	web lecture	see web lecture for question
9.2	Exponential Growth	393	31,32,37, and see web lecture for question
9.3	Exponential and Linear Growth	web lecture	see web lecture for questions
9.4	Chaos	web lecture	see web lecture for questions
10.1	Fractals in Nature	none	none
10.2	Fractals Generated by Recursion	web lecture	worksheet
10.3	Self-Similarity	web lecture	worksheet
10.4	Fractal Dimension	web lecture	worksheet

(If you are using the old (6th) edition of the textbook, the Learning Journal questions are listed below.)

Only answer Learning Journal questions from the 6th edition or the 7th edition, but not both!

1. Installment 1 (due with Test 1):

Lecture	Title	Page No.	Question Nos.
1.2	Math of Logic	web lecture	see web lecture
1.3	Conditional Statements	web lecture	see web lecture
1.4	Contrapositive	web lecture	see web lecture
2.1	Plurality Method	30	1,2,4,13
2.2	Borda Count Method	32	17,19,23,25
2.3	Plurality-with-elimination	34	27a,29,33
2.4	Pairwise Comparison	35 and 38	35 and 59
3.1	Weighted-Voting Systems	72	1,10
3.2	Banzhaf Power Index	73	11,12,14
3.3	Shapley-Shubik	74	24,25,31,37
3.4	Applications	web lecture	see web lecture

1. Installment 2 (due with Test 2):

Lecture	Title	Page No.	Question Nos.
4.1	Math of Sharing	111	1,4,8

4.2	Divider-Chooser	114	11,14
4.3	Sealed Bids	120	53,54
4.4	Markers	121	61,63
5.1	Graphs	186	7,11
5.2	Euler Circuits	187	18,19
5.3	Euler's Theorems	188	24,25
5.4	Fleury's Algorithm	188	28,34,41

1. Installment 3 (due with Test 3):

Lecture	Title	Page No.	Question Nos.
7.1	Hamilton Circuits	221	2,4,6,14
7.2	Complete Weighted Graphs	223	17,21,27
7.3	Brute-Force Algorithm	223	29,33
7.4	Nearest-Neighbor Algorithm	225	37,39
8.1	Fibonacci Numbers	329	1,2,7
8.2	Fibonacci Numbers in Nature	web lecture	reaction statement
8.3	Golden Ratio	331	19,29,30
8.4	Golden Cut	web lecture	phyllotaxis

1. Installment 4 (due with Test 4):

Lecture	Title	Page No.	Question Nos.
9.1	Linear Growth	364	1,3,6, and see web lecture for question
9.2	Exponential Growth	366	19,29,35, and see web lecture for question
9.3	Exponential and Linear Growth	web lecture	see web lecture for questions
9.4	Chaos	367	45,47
10.1	Fractals in Nature	none	none
10.2	Fractals Generated by Recursion	web lecture	worksheet
10.3	Self-Similarity	web lecture	worksheet
10.4	Fractal Dimension	web lecture	worksheet

Self-Tests

Almost every web lecture has a self-test which you should take to check your understanding of the lecture material. There is no grade associated with Self-Tests, you may take them as often as you like and whenever you like.

Quizzes

Quizzes are open book but you must do them on your own.

Every topic module has a Quiz with ten multiple choice questions that lasts 30 minutes.

The Quiz for each module (prior to module 8) are available for approximately **one week only** after the date of the test that covers that module. The Quizzes for modules 9 and 10 are only available until the day before the final exam. The exact dates of availability for each quiz are specified with the quiz in the Assessments section of the website and on the Course Calendar.

You may attempt each Quiz up to three times and receive the highest of the three grades.

Altogether there are 10 quizzes, your final grade for the quizzes is the average of your highest grade on each quiz.

Class Tests

Class Tests are also open book in the sense that you may use the textbook and your own notes and your calculator. However you must do the test on your own without consulting other people or sources other than the textbook and your own notes.

There are four Class Tests consisting of 25 multiple choice questions and of 1 hour duration.

The Modules covered on each test are noted on the Course Calendar.

- Test 1, Friday, 2/8/2010, covers Modules 1, 2 and 3.
- Test 2, Friday, 2/22/2010, covers Modules 4 and 5.
- Test 3, Friday, 3/22/2010, covers Modules 7 and 8.
- Test 4, Friday, 4/6/2010, covers Modules 9 and 10.

You must take the Class Test on the day specified on the Course Calendar, unless you have made prior arrangements with the instructor.

You can only take the test once.

You must take it on the date specified above unless you have an approved University excuse or illness that prevents you from taking the test on the specified day.

Written projects

There are two Written Projects that you must submit throughout the semester. The precise details of each project and submission instructions are available in the project file on the Assignments page of the course.

Below is a summary of the important dates for each project as shown on the Course Calendar:

Project Topic	Begin Date	Due Date
Voting Theory	Module 1	2/15/2010
Flatland	Module 6	3/15/2010

Final Exam

The Final Exam also is open book in the sense that you may use the textbook and your own notes and your

calculator. However you must take the exam on your own without consulting other people or sources other than the textbook and your own notes.

The Final Exam consists of 50 multiple choice questions covering all the material in the Class Tests and is of 2 hours duration.

The date of the Final Exam is Wednesday 4/8/2010, and you must take the exam on that day.

ADA Statement

If you believe you may need support in managing the impact of a disability, please contact Amy Frey, afrey@cedarville.edu, (Disability Services). Faculty rely on Disability Services to verify the need for academic accommodations and to identify reasonable and appropriate accommodation strategies. Disability Services is part of the Academic Enrichment Center-The Cove located in the BTS building.

Course Description

This course introduces you to the beauty and power of mathematical ideas. We discuss logical argument, the mathematics of voting and power, fair division, management science and graphs, spiral growth in nature and the golden ratio, exponential growth of money and interest, growth of populations and chaos, the fractal geometry of nature and the use of mathematical ideas in literature.

All of these concepts require only algebra and clear logical thinking in order to understand the core ideas, although the ramifications of these concepts are extremely deep and touch on the frontiers of scientific and mathematical research.

Student Learning Outcomes

At the end of the course, the student should be able to:

1. Appreciate the logical nature of mathematical thinking.
2. Explain a mathematical concept to peers.
3. Write a clear explanation of a real-life use of mathematics.
4. Analyze a mathematical model of nature.
5. Analyze a mathematical model from an area of human enterprise.

A Final Word

Once you have familiarized yourself with this Syllabus and looked over the Course Calendar, you are ready to begin the course!

Go to Lecture 1.1 from the Lecture Note page and follow the **Steps to Success** that are found in each web lecture:

1. Read the devotional, make the connection with the course and meditate on the Scripture verse.
2. Read the lecture notes.
3. Read the assigned pages in the textbook.
4. Participate in the threaded discussion by answering the discussion question and reading the responses of others.
5. Answer the questions for the learning journal.

6. Take the self-test.

Welcome to the wonderful beautiful world of Math!