

**EASTERN CONNECTICUT STATE UNIVERSITY  
DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE  
MATHEMATICS 135 – MATH FOR LIBERAL ARTS (ONLINE)  
SPRING SEMESTER 2009**

**CHARACTERISTICS OF THE SUCCESSFUL ONLINE STUDENT**

Before registering for this online course verify that you are sufficiently prepared for the demands of an online course. This online course requires:

- Computer literacy
- Time
- The ability to work independently
- The ability to read notes and examples from the textbook
- Experienced users of email with attachments
- Experienced navigators of the World Wide Web
- Willingness to contact WebCT support at [webctsupport@easternct.edu](mailto:webctsupport@easternct.edu) if necessary when encountering technical difficulties
- The ability to download files, save files and upload files
- The ability to download and install free software from the Internet
- Access to and the ability to use/learn Excel

## **INSTRUCTOR INFORMATION**

Name: Dr. K. Y. Ward  
Title: Assistant Professor of Mathematics  
Office: Science, Room 154  
Phone: (860) 465-4544  
Dept. Phone: (860) 465-4510  
Fax: (860) 465-4614  
Email: WardK@Easternct.edu  
Office hours: Monday 8:30 – 9:00 am and 10:00 -11:00 am  
Tuesday 9:15 -11:00 am  
Thursday 9:15 -11:00 am

## **COURSE INFORMATION**

Title: Math for Liberal Arts (ONLINE)  
Credit: Three Hours  
Section: E25

## **PRE-REQUISITES**

MAT 101 or placement or SAT score

## **REQUIRED TEXTBOOK**

Comap, *For All Practical Purposes*, 7<sup>th</sup> edition, W. H. Freeman and Company

## **SUPPLEMENTARY TOOLS AND SERVICES**

- 1). TI-83/84 graphing calculators or equivalent (no cell phone calculators)

## **COURSE DESCRIPTION**

Mathematics applied to solving practical problems in political science, sociology, ecology, geography, visual arts and geometry. Mathematical methods are used to examine how groups make voting decisions, achieve power, divide resources, resolve conflicts, to study landscape species patterns, economic and biological population growth, and artistic and mosaic patterns.

## **COURSE DELIVERY**

All course related materials will be posted in Blackboard. Course material will be uploaded every Monday, Wednesday, and Friday by 8 am. All notes will be located under the

**Learning Modules** tab and all homework assignments will be located under the **Assignments** tab. Students are required to check the tabs every Monday, Wednesday, and Friday for lectures and to keep current with the course.

### **LEARNING MODULES AND OBJECTIVES**

The course material is divided into five learning modules. Within each learning module there will be several lectures followed by respective homework assignment(s). The content of the learning modules are as follows:

#### **Module 1: Identification Numbers**

We will cover sections from Chapter 16 which covers composing/validating identification numbers.

##### **Objectives**

1. Understand the purpose of a check digit and be able to determine one for various schemes
2. Given an identification number and the scheme used to determine it, be able to decide if the number is a valid number for the scheme
3. Given an identification number and the scheme, use it to decipher the information such as birth, date and sex
4. Be able to convert a given ZIP code to its corresponding bar code, and vice versa
5. Be able to convert a given UPC number to its corresponding bar code

#### **Module 2: Linear Programming**

We will cover sections from Chapter 6 which covers the topic of maximizing and minimizing problems.

##### **Objectives**

1. From its associated chart, write the constraints of a linear programming problem as linear inequalities
2. List two implied constraints in every linear programming problem
3. Formulate a profit equation for a linear programming problem when given the per-units profits
4. Draw the graph of a line in a coordinate-axis system

5. Graph a linear inequality in a coordinate-axis system
6. Determine by a substitution process whether a point with given coordinates is contained in the graph of a linear inequality
7. Indicate the feasible region for a linear programming problem by shading the graphical intersection of its constraints
8. Locate the corner points of a feasible region from its graph
9. Evaluate the profit function at each corner point of a feasible region
10. Apply the corner point theorem to determine the maximum profit for a linear programming problem
11. Interpret the corner point producing the profit maximum as the solution to the corresponding linear programming problem

### **Module 3: Voting**

We will cover sections from Chapter 9 which looks at various techniques of voting.

#### **Objectives**

1. Analyze and interpret preference list ballots
2. Explain three desired properties of Majority Rule
3. Apply the plurality voting method to determine the winner in an election whose preference list ballots are given
4. Explain the Condorcet winner criterion
5. Rearrange preference list ballots to accommodate the elimination of one or more candidates
6. Structure two alternative contests from a preference schedule by rearranging preference list ballots; then determine whether a Condorcet winner exists
7. Apply the Borda count method to determine the winner from preference list ballots
8. Apply the sequential pairwise voting method to determine the winner from preference list ballots
9. Apply the Hare system to determine the winner from preference list ballots

#### **Module 4: Fair Division**

We will cover sections from Chapter 13 which include topics about strategies to divide items.

##### **Objectives**

1. Describe the goal of a fair division problem
2. Use the adjusted winner procedure to determine the division of a set of objects among two players
3. Use the Knaster inheritance procedure to determine the division of a set of objects among more than two players

#### **Module 5: Finance**

We will cover sections from Chapters 21 and 22 which include topics about saving and borrowing money.

##### **Objectives**

1. Apply the simple interest formula to calculate the balance of a savings account
2. Apply the compound interest formula to calculate the balance of a savings account
3. Describe the difference between arithmetic and geometric growth
4. Apply the interest formula for continuous compounding to calculate the balance of a savings account
5. Use the savings formula to determine required deposits into a sinking fund
6. Know the basic loan terms principal and interest
7. Be able to solve the simple interest formula to find the amount of a loan over time
8. Understand the compound interest formula and use it to find the amount of a loan over time
9. Use the amortization formula to determine the payments required to fully amortize a loan
10. Understand how an annuity functions and be able to use the annuity formula

**CONTENT OF LEARNING MODULES**

**LEARNING MODULE 1: IDENTIFICATION NUMBERS**

<b>ORDER OF ACTIVITY</b>	<b>TOPIC</b>
Lecture 1 .....	Check Digits
Lecture 2 .....	UPC
Lecture 3 .....	U.S. Banking System
Lecture 4 .....	Codabar Method
Homework Assignment 1 .....	Material from Lectures 1 - 4
Lecture 5 .....	ISBN
Lecture 6 .....	Zip Codes, Zip + 4 Codes
Lecture 7 .....	Bar Codes and Zip Code Bar Code
Lecture 8 .....	Decimal Digits and Several Examples
Lecture 9 .....	Delivery Point Bar Code and UPC Bar Code
Lecture 10 .....	Soundex Coding System
Lecture 11 .....	Driver's License Schemes
Homework Assignment 2 .....	Material from Lectures 5 - 11

**LEARNING MODULE 2: LINEAR PROGRAMMING**

<b>ORDER OF ACTIVITY</b>	<b>TOPIC</b>
Lecture 1 .....	Review Graphing Techniques
Lecture 2 .....	Review Graphing Linear Equations
Lecture 3 .....	Review Graphing Linear Inequalities
Lecture 4 .....	Review System of Linear Equations
Lecture 5 .....	Feasible Regions, Corner Points, Profit Formula
Homework Assignment 3.....	Material from Lectures 1 - 5
Lecture 6 .....	Mixture Problem (Skates and Dolls)
Lecture 7 .....	Mixture Problem (Juices)
Lecture 8.....	Mixture Problem (More than two products)
Homework Assignment 4.....	Material from Lectures 6 - 8

### LEARNING MODULE 3: VOTING

#### ORDER OF ACTIVITY

#### TOPIC

Lecture 1 .....	Background
Lecture 2 .....	Plurality Voting and Condorcet winner
Lecture 3 .....	Borda Count
Lecture 4 .....	Sequential Pairwise Voting
Lecture 5 .....	Hare System
Homework Assignment 5.....	Material from Lectures 1 - 5

### LEARNING MODULE 4: FAIR DIVISION

#### ORDER OF ACTIVITY

#### TOPIC

Lecture 1 .....	Taking Turns
Lecture 2 .....	Adjusted Winner Procedure
Lecture 3 .....	Knaster Inheritance Procedure
Homework Assignment 6.....	Material from Lectures 1 - 3

### LEARNING MODULE 5: FINANCE

#### ORDER OF ACTIVITY

#### TOPIC

Lecture 1 .....	Simple Interest
Lecture 2 .....	Compound Interest
Lecture 3 .....	Compounded continuously
Homework Assignment 7.....	Material from Lectures 1 - 3
Lecture 4 .....	Saving: Example for needing an annuity
Lecture 5 .....	Borrowing: car loan
Lecture 6 .....	Borrowing: credit cards
Homework Assignment 8.....	Material from Lectures 4 - 6
Lecture 7 .....	Borrowing: home loans (30 vs. 15 yr.)
Lecture 8 .....	Borrowing: home loans (paying additional to 30 yr. vs. biweekly)
Lecture 9 .....	Borrowing: home loans (summary)
Homework Assignment 9.....	Material from Lectures 7 - 9

## COMMUNICATION TOOLS

### A. BLACKBOARD MAIL

All students will send email using the Blackboard mail tool. I will respond to all email messages within 48 hours, except on weekends.

### B. DISCUSSION BOARD

In order to encourage communication and collaboration with classmates, we will have online discussions about the course material. There are two forms of discussions, of which both will be located under the **Discussions** tab in Blackboard.

#### I. INFORMAL DISCUSSIONS FOR HOMEWORK ASSIGNMENTS (NOT GRADED)

You are encouraged to use the informal discussion board to find answers to your course related questions and provide answers to the questions of your classmates on an informal basis.

#### II. LEARNING MODULE DISCUSSIONS (GRADED)

Upon completion of each of the five learning modules, I will post a question encouraging students to think about the “big picture” of how mathematics can be applied to everyday life. In your responses, you may initiate the discussion or respond to another student’s entry. This is the class participation part of the course and you will be evaluated on the quality, relevance, and clarity of your responses.

### SUBMITTING YOUR WORK

All coursework will either be submitted to me directly under the **Assignments** tab or placed under the **Discussions** tab in Blackboard. In order for me to effectively manage an online course, I am requiring all students to use the following file naming system when submitting work: **FirstName.LastName.AssignmentNumber**. For example, if your name is John Smith and you are completing Assignment 1, then name your file **JohnSmith[1]** before submitting. The turnaround time for homework assignment results will be 48 hours.

### REVIEWING YOUR GRADED WORK AND ANSWER KEYS

All coursework will be returned to you and answer keys will be made available. To access your graded work, go to the **Assignments** tab in Blackboard select the **Graded** tab.

## EVALUATION

Your progress in this course will be evaluated using homework assignments and discussion board participation.

Homework Assignments.....	90%
Discussion Board Participation.....	10%

The **Grading Scale** is as follows:

95	-	100	A
90	-	94	A-
87	-	89	B+
84	-	86	B
80	-	83	B-
77	-	79	C+
74	-	76	C
70	-	73	C-
65	-	69	D+
60	-	64	D
0	-	59	F

## MAKEUP POLICY

Late homework assignments **will not** be accepted and there will be **no makeup** homework assignments given. When computing the final course grade, the lowest homework assignment grade will be dropped.

## ACADEMIC INTEGRITY

Violations of academic integrity will be penalized in one of the following ways; failing grade on assignment, failing grade in course, and/or student meeting with department chair.

## SPECIAL ARRANGEMENTS

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact the Office of AccessAbility Services at (860) 465-5573. To avoid any delay in the receipt of accommodations, you should contact the Office of AccessAbility Services as soon as possible. Please understand that I cannot provide accommodations based upon disability until I have received an accommodation letter from the Office of AccessAbility Services. Your cooperation is appreciated.

## A FEW IMPORTANT DATES

Classes Begin	Monday, January 26
Lincoln's Birthday Observed –No Classes	Friday, February 13
Washington's Birthday Observed –No Classes	Monday, February 16
Mid-Semester Grades Due	Monday, March 16
Spring Recess- No Classes	Monday, March 23 – Friday, March 28
Credit/No Credit Deadline	Thursday, April 9
Class Withdrawal Deadline	Thursday, April 9
Days of Reflection- No Classes	Friday, April 10 –Saturday, April 11
Classes End	Wednesday, May 13

## SPRING 2009

## WHAT TO DO ON THE FIRST DAY OF THE SEMESTER

### I. READ DOCUMENT

During the first week of class, all students must read the information located under the **Course Content** tab in Blackboard. Topics covered include

- The Characteristics of the Successful Online Student
- Course Details
- The Learning Modules Master Lesson Plan
- What to Do on the First Day of the Semester

### II. COMPUTER READINESS

Make sure your computer is ready for use. Contact WebCT support at [webctsupport@easternct.edu](mailto:webctsupport@easternct.edu) when encountering technical difficulties or acquiring MS Word, Excel, or PowerPoint.

### III. SEND EMAIL TO INSTRUCTOR

All students must send an email (using the Blackboard mail tool) confirming that you have read the information located under the **Course Content** tab in Blackboard.

**This email must be sent by Sunday, February 1 at 11 pm.**

**NOTE ABOUT ATTACHMENTS**

All documents are to be sent by email (using the Blackboard mail tool) using MS Word. Refer to page 6 of this document for file naming system for submitting your work.

**DISCLAIMER**

The instructor maintains the right to adjust the course syllabus as needed. The syllabus provides a tentative framework.