**MAT 110: Mathematics in Our Society**
**Fall 2009**
**12:40 – 1:40 pm MWF Olin 128**

**Professor:** **Sarah Murray**
**Office:** **315 Grant Hall**
**Extension:** **5376**
**Email:** **sarah.murray@centre.edu**
**Office Hours: MW 10:30 – 11:30 am, TTh 9 – 11 am, and by appointment**

***Note: Instructor is typically available beyond the listed office hours. However, office hours may be subject to change due to observing a student teacher this semester. Please do not hesitate to call, email, or stop by the office for assistance!***

**Tutor:** Cara Newcomb, Olin 123, 9-10pm. Study sessions are every Sunday, Tuesday, and Thursday, on the nights before MWF classes. They will begin on Tuesday, Sep. 1 and end the Thursday of the last week of class, Dec. 3.

**Text**: *Fundamentals of algebraic modeling* by Timmons et al, the fifth edition, Brooks/Cole, ISBN: 9780495555094.

**Course Description**:
An introduction to applied mathematics devoted to solving contemporary problems from diverse disciplines. This course helps students develop logical thinking skills and improve quantitative skills, particularly with linear equations, exponential models, and statistics.

**Goals and Objectives:**

- To examine how mathematics plays an important role in the world around us.
- To apply problem solving skills and strategies to real-life mathematical situations.
- To communicate mathematical solutions with both written and oral clarity and accuracy.
- To demonstrate the use of multiple representations and appropriate reasoning.
- To make connections to real life situations and the use of mathematics in other disciplines.

**Basic Expectations:**

- Attend every class period.
- Be prepared for each class having completed both the homework and reading assignments to the best of your ability.
- Be ready to ask questions and contribute to the classroom discussion and presentation of problems.
- Be respectful, kind, and courteous of one another and your instructor!!
- Remain focused on the discussion and work being presented.
- Please do not excuse yourself from the classroom unless it is an emergency or health issue. It disrupts the flow of the class when students enter and/or leave the classroom once instruction or group work has begun.

- Turn off all cell phones during class! If situation arises where it is absolutely necessary that you have your cell phone on (ex: family emergency) then please notify instructor.
- Make your time and effort in class count! Smile and enjoy☺

**Grades and Grading Scale:**

| | |
|---|---|
| A | 93-100 |
| A- | 90-92 |
| B+ | 87-89 |
| B | 83-86 |
| B- | 80-82 |
| C+ | 77-79 |
| C | 73-76 |
| C- | 70-72 |
| D | 62-69 |
| U | below 62 |

Numerical grades that fall between letter grades will be rounded to the nearest whole number. For example, 89.3 is a letter grade of B+ and 89.6 is a letter grade of A-.

| **Assessment** | **Points** | **Approximate Percentages (%)** |
|---|---|---|
| Homework (25) | 100 | 21 |
| Daily Quizzes/Attendance/Participation (25) | 50 | 10 |
| Labs (7) | 70 | 15 |
| Lab Group Presentation (1) | 10 | 2 |
| Exams (3) | 150 | 31 |
| Comprehensive Final (1) | 100 | 21 |
| **Total** | **480** | **100** |

**Homework** (4 points each) will be assigned during each class period and should be completed for the next class meeting. Students may be asked to present problems on the board. Selected homework sets will be graded on the following basis:

- Demonstration of accurate work used to arrive at solution
- Correctness of solution on selected problems
- Appropriate grammar
- Correct use of mathematical syntax
- Explanation and/or justification of work where appropriate

Solutions will be posted on WebCT after submission!

**Quizzes** (2 points each) will be administered randomly. Problem(s) on the quizzes may be similar to or come directly from the reading, class discussion, or previous homework set. Students will be given a set time period to complete the quiz. Therefore, it is important to attend all class meetings and keep up with assignments on a regular basis. Quizzes will be graded based upon the same criteria as homework.

**Labs** (10 points each) will be assigned for each chapter. One lab report per chapter will be turned in for each team on the designated lab/review day. Lab reports should include the following information: (Word Document)

- Title, Date, Name of each team member
- Copy of the original lab problem(s)
- All steps used to arrive at your solution
- Written explanation and justification of your work
- Connection to daily life if applicable
- Appropriate grammar and mathematical syntax
- Well organized and coherent
- Correctness of your work and final results
- One lab write-up per group
- Include an assessment of the presentation based on criteria under lab presentation
- Include both the draft and final copy of your lab report (draft should include appropriate peer feedback)

**Lab Presentation** (10 points total) will be given by each team. The presentation can be made using either PowerPoint or chalkboard/white board. Each of the following items should clearly be addressed:

- Collect questions in advance from each group and give appropriate feedback
- Time interval 5-10 minutes
- Restatement of what is asked (actual problem(s))
- Appropriate overall process
- Accurate work and solutions
- Justification of work to the class (appropriate eye contact)
- Clear, coherent, and well organized explanation
- Appropriate grammar and mathematical syntax
- Connection to daily life if applicable
- Class involvement during presentation
- Overall conclusion

Groups not presenting:

- Make a draft of your lab for peer feedback
- Submit specific questions in advance
- Do not just request the final results
- Assess the corresponding lab presentation

Note: Groups/teams will be assigned at the beginning of the semester.

**Exams** (50 points each) will include material covered in class, labs, and homework assignments. Material tested will span over multiple chapters and/or portions of chapters from the textbook.

**Final** (100 points total) will be comprehensive and given at the college's scheduled exam time.

**Attendance and Participation**
Participation in class discussions and activities is essential to the success of this course. Each student has a responsibility to read assignments before class. The professor expects notification of excused absences. The Student Handbook explains the college absence policy of a maximum of three excused absences. Unexcused absences will reduce the final average. If at all possible, assignments should be submitted when due. Conferences with the professor regarding late assignments will determine point deductions.

**Students with Physical or Learning Disabilities:**
(From written work of Jamey Leahey)

Students with physical impairments and learning disabilities will sometimes need accommodations to help them have an equal opportunity to learn. These can include seating location preferences, permission to tape lectures, and extra time on tests and other assignments. Federal and state laws require the College to provide reasonable accommodations to students with documented disabilities who request such accommodation. Whatever accommodations are provided, if any, should be the result of a discussion between the student and the College's student life coordinator for disabilities, Dr. Mary Gulley, who will then inform the student's professors of any necessary accommodations. In summary:

1. Centre is committed to making its programs accessible to students with disabilities.
2. In the higher education setting, it is the student's responsibility to inform the College of any disabilities for which he or she seeks accommodation.
3. The College has designated Dr. Mary Gulley as the beginning point of this process. She is charged with reviewing all documentation of disabilities and with coordinating any accommodations offered to students.
4. A faculty member will likely not know of a student's disability unless the student or the disability services coordinator discloses the disability.
5. If a student wishes to seek any accommodations for disabilities, he or she must initiate the process immediately, for relief cannot always be granted at the last minute and will not be granted after the fact.

**Academic Honesty:** Never give or receive assistance on a quiz, test, or exam. Feel free to work together on homework assignments, but realize that final solutions and explanations should be in your own words. Each student at Centre College is responsible for understanding and abiding by the *Academic Honesty* section of the *Centre College Student Handb*ook.

***This syllabus/schedule may be modified as the term progresses in order to better accommodate the needs of the class.***

| MAT 110: MATHEMATICS IN OUR SOCIETY<br>TENTATIVE SCHEDULE FALL 2009 | | | | |
|---|---|---|---|---|
| **Class** | **Day** | **Section(s)** | **Topic** | **Class Assignment** |
| 1 | Aug 31 | 1-1, 1-2 | Mathematical Models<br>Mathematical Operations | Selected Exercises From 1-2;<br>Read Sections 1-4 and 1-6<br>Start "How Many Pets?" |
| 2 | Sept 2 | 1-4, 1-6 | Formulas, Ratios and Proportions, Percents | Selected Exercises From 1-4 and 1-6;<br>Read Sections 2-1 and 2-2 |
| 3 | Sept 4 | 2-1, 2-2 | The Rectangular Coordinate System/Graphing | Selected Exercises From 2-1 and 2-2;<br>Read Sections 2-3 and 2-4<br>Start "Toto Are We Still In Kansas?" |
| 4 | Sept 7 | 2-3, 2-4 | Graphing Linear Equations Using Slope Writing Equations of Lines | Selected Exercises From 2-3 and 2-4;<br>Read Section 2-5 |
| 5 | Sept 9 | 2-5 | Applications and Uses of Graphs | Selected Exercises From 2-5;<br>Read Sections 3-1 and 3-2 |
| 6 | Sept 11 | 3-1, 3-2 | Functions, Graphs, and Function Notation | Selected Exercises From 3-1 and 3-2;<br>Read Section 3-3<br>Start "The Population Bomb" |
| 7 | Sept 14 | 3-2, 3-3 | Linear Functions as Models | Selected Exercises From 3-2 and 3-3;<br>Read Sections 3-4 |
| 8 | Sept 16 | 3-4 | Direct and Indirect Variation | Selected Exercises From 3-4;<br>Read Sections 3-5 |
| 9 | Sept 18 | 3-5 | Quadratic and Power Functions<br>***Chapters 1 and 2 Group Lab Presentations*** | Selected Exercises From 3-5;<br>Read Section 3-6 for Sept 25th |
| | Sept 20 | | | **7:10pm; Location Olin 124** |
| 10 | Sept 21 | Review | **CLASS TIME RESCHEDULED!** | |
| | Sept 22 | | | **7:10pm; Location Olin 124** |
| 11 | Sept 23 | | **Exam 1 (Chapters 1 – 3)** | |
| 12 | Sept 25 | 3-6 | Exponential Functions as Models | Selected Exercises From 3-6;<br>Read Section 4-1<br>**Submit Lab Reports for Chapters 1 & 2** |
| 13 | Sept 28 | 4-1 | Mathematical Models in the Business World | Selected Exercises From 4-1;<br>Read Section 4-2<br>Start "Should We Use 100% Financing" |
| 14 | Sept 30 | 4-2 | Mathematical Models in the Banking | Selected Exercises From 4-2;<br>Read Section 4-3 |
| 15 | Oct 2 | 4-3 | Mathematical Models in Consumer Credit | Selected Exercises From 4-3;<br>Read Section 4-4 |
| 16 | Oct 5 | 4-4 | Mathematical Models in Purchasing Automobiles | Selected Exercises From 4-4;<br>Read Section 4-5 |
| 17 | Oct 7 | 4-5 | Mathematical Models in Purchasing a Home | Selected Exercises From 4-5;<br>Read Section 4-6 |
| 18 | Oct 9 | 4-6 | Mathematical Models in Insurance Options and Rates | Selected Exercises From 4-6;<br>Read Section 4-7 |
| 19 | Oct 12 | 4-7 | Mathematical Models in Stocks, Mutual Funds, and Bonds | Selected Exercises From 4-7;<br>Read Section 4-8 |
| 20 | Oct 14 | 4-8 | Mathematical Models in | Selected Exercises From 4-8; |

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|---|---|---|---|---|
| | | | Personal Income | Read Section 6-1 for Oct 23rd |
| | Oct 16 | | Fall Break | |
| 21 | Oct 19 | Lab/Review | ***Chapters 3 and 4 Group Lab Presentations*** | |
| 22 | Oct 21 | | **Exam 2 (Section 3.6 and Chapter 4)** | |
| 23 | Oct 23 | 6-1 | Solving Systems by Graphing | Selected Exercises From 6-1;<br>Read Section 6-2<br>**Submit Lab Reports for Chapters 3 & 4** |
| 24 | Oct 26 | 6-2 | Solving Systems Algebraically | Selected Exercises From 6-2;<br>Read Section 6-3<br>Start "The Chemistry of Salt Water" |
| 25 | Oct 28 | 6-3 | Applications of Linear Systems | Selected Exercises From 6-3;<br>Read Section 7-1 |
| 26 | Oct 30 | 7-1 | Sets and Set Theory | Selected Exercises From 7-1;<br>Read Section 7-2<br>Start "Triangulating a Probability" |
| 27 | Nov 2 | 7-2 | Probability | Selected Exercises From 7-2;<br>Read Section 7-3 |
| 28 | Nov 4 | 7-3 | Theoretical Probability and Odds | Selected Exercises From 7-3;<br>Read Section 7-4 |
| 29 | Nov 6 | 7-4 | Tree Diagram | Selected Exercises From 7-4;<br>Read Section 7-5 |
| 30 | Nov 9 | 7-5 | "Or" and "And" Problems | Selected Exercises From 7-5;<br>Read Section 7-6 |
| 31 | Nov 11 | 7-6 | The Counting Principle, Permutations, and Combinations | Selected Exercises From 7-6;<br>Read Sections 8-1 and 8-2 for Nov 18th |
| 32 | Nov 13 | Lab/Review | ***Chapters 6 and 7 Group Lab Presentations*** | |
| 33 | Nov 16 | | **Exam 3 (Chapters 6-7)** | |
| 34 | Nov 18 | 8-1, 8-2 | Introduction to Statistics Descriptive Statistics | Selected Exercises From 8-1 and 8-2;<br>Read Section 8-3<br>**Submit Lab Reports for Chapters 6 & 7** |
| 35 | Nov 20 | 8-3 | Organizing and Displaying Data | Selected Exercises From 8-3;<br>Read Section 8-4<br>Start "Gentlemen, Start Your Engines!" |
| 36 | Nov 23 | 8-4 | Variation | Selected Exercises From 8-4;<br>Read Section 8-5 |
| | Nov 25 & 27 | | Thanksgiving Break | |
| 37 | Nov 30 | 8-5 | The Normal Curve | Selected Exercises From 8-5;<br>Read Section 8-6 |
| 38 | Dec 2 | 8-6 | Scatter Diagrams and Linear Regression<br>***Chapter 8 Group Lab Presentations*** | Selected Exercises From 8-6; |
| 39 | Dec 4 | Overview | Corrected problems | **Submit Lab Report for Chapters 8** |
| | **Dec 8** | | **Comprehensive Final Exam** | **1:30 – 4:30 pm** |