*Marshall University*

*COURSE SYLLABUS*

**MTH 121B: Concepts and Applications of Mathematics with Algebra Review (CT)**

**Fall 2014**

**MTH 121B-206 CRN: 4107 Day/Time: M, W 4:30-6:15**

**Instructor: Dr. Mary Jane Wolfe**

**Email:** [**wolfem@marshall.edu**](mailto:wolfem@marshall.edu)

**Office Hours: by arrangement**

**Phone: (740) 245-5198 (Leave a message.)**

**Domains**: Critical Thinking -- Quantitative Thinking; Information Literacy; Communication Fluency.

**Description**: A quantitative reasoning skills course for non-science majors, this course meets a Core I/Critical Thinking requirement and a Core II/Social Sciences requirement. Topics include logical thinking, problem solving strategies, beginning statistics and probability, exponential and logarithms modeling, formula use, with basic algebra review. **4 semester hours**.

**Prerequisites:** ACT Math 17 - 18, OR permission of University College

**Text:** Using and Understanding Mathematics: A Quantitative Reasoning Approach by Jeffrey Bennett and William Briggs, 5th Ed.

**University Policies:** By enrolling in this course, you agree to

the University Policies listed below. Please

read the full text of each policy by going to [www.marshall.edu/academic-affairs](http://www.marshall.edu/academic-affairs)

and clicking on “Marshall University Policies.” Or, you can access the policies

directly by going to <http://www.marshall.edu/academic-affairs/?page_id=802>

**Technology:** Students will be required to create critical thinking papers and projects using a **computer**. There are many computer labs located around campus.

**Calculators:** Students are required to have a **scientific or graphing calculator** for the course.

**Course Objectives:** This course will focus on domains of **Critical Thinking** as a basis for understanding and interpreting mathematical topics that will enable students to develop the quantitative reasoning skills they will need for college, career, and life. Emphasis will be placed on **improving Algebraic skills** necessary for future science classes.

The **Quantitative Thinking** domain objectives ask to students to **analyze** real-world problems, **formulate** plausible estimates, **assess** the validity of visual representations of quantitative information, and **differentiate** valid from questionable statistical conclusions.

The **Information Literacy** domain objectives ask students to **revise** their search strategies and **employ** appropriate research tools, **integrate** relevant information from reliable sources, **question** and **evaluate** the complexity of the information environment, and use information in an ethical manner.

The **Communication Fluency** domain objectives ask students to **develop** cohesive oral, written, and visual communication **tailored** to specific audiences.

**Learning Outcomes:** Students will **practice each outcome** during

in-class discussions, board work, low-stakes writing assignments, group activities, and homework. Student **achievement of each outcome will be** **assessed** using Basic Skills quizzes, in- class exams, research projects, group activities or homework assignments.

Outcomes are:

* Student will show mastery of basic Algebra Skills.
* Students will demonstrate an ability to analyze arguments and construct fallacies.
* Students will solve real-world problems using unit analysis.
* Students will interpret and analyze numbers that they will encounter in the real world.
* Students will demonstrate a proficiency in utilizing formulas from basic financial concepts such as loan payments, credit cards, and mortgages.
* Students will interpret and analyze statistical studies.
* Students will create tables and graphs from statistical data.
* Students will analyze and interpret statistical concepts such as measures of central tendency, measures of variation, and normal distributions.
* Students will demonstrate a proficiency in the fundamentals of probability including expected value.
* Students will compare linear growth and exponential growth rates and their real-world applications.
* Students will apply techniques employing common logarithms to solve equations.

**Text** *Using and understanding mathematics: A quantitative reasoning approach* (5th Edition), Jeffrey Bennett & William Briggs, Addison Wesley ISBN-13 978-0-321-65279-9

**Course**

**Content** Chapter 2 Approaches to Problem Solving

Chapter 3 Numbers in the Real World

Chapter 4 Financial Management

Chapter 5 Statistical Reasoning

Chapter 6 Putting Statistics to Work

Chapter 1 Thinking Critically

**Course** Two 100-point exams:

**Grading** Exam 1 Chapters 2 & 3 February 11

Exam 2 Chapters 4 & 5 March 11

Three 25-point quizzes:

Quiz 1 Chapter 2 January 28

Quiz 2 Chapter 4 February 18

Quiz 3 Chapter 6 April 8

Comprehensive final exam May 4

One 25-point homework assignment

Two 25-point extra credit opportunities occur

during the semester: A group problem solving

activity and a group correlation analysis.

Course averages falling in the following ranges

should result in receiving a course grade no

lower than the one listed:

100%–90% A, 89%–80% B, 79%–70% C, 69%–60% D

Borderline grade decisions may be influenced by

class attendance and class participation. No

excuse is needed if you miss a class, a quiz, or

an exam. If you need to miss an exam, make

arrangements with your instructor to take it at

4 PM - before the start of the next class meeting.

If that is not possible, the percent score you

receive on the final exam will be entered as the

score for at most one quiz and one exam. If more

than one missed quiz or more than one missed exam

is not taken before the following class period,

no make-up credit will be given for the second

missed quiz or second missed exam.

Note: Weekly homework assignments are printed at

the end of each individual unit’s handout.

**Academic** Work submitted for credit in this course(quizzes,

**Honesty** exams, and homework) must be composed entirely by the student whose name appears on it – with one exception: students may receive help on homework assignments. This help may consist of solving specific questions from the homework, but the student must be able to then solve the problem without looking at the helper’s work.

**Topic Outline**

Week 1– January 12 & 14 2015

Unit 2A *The Problem-Solving Power of Units* 81–96

Week 2 – January 21 2015

Unit 2B *Standardized Units: More Problem-Solving Power* 96–112

Unit 2C *Problem-Solving Guidelines and Hints* 112–125

Week 3 – January 26 & 28, 2015

Unit 3A *Uses and Abuses of Percentages* 128–144

Chapter 2 Quiz

Unit 3B *Putting Numbers in Perspective* 144–160

Week 4 – February 2 & 4, 2015

Unit 4A *Taking Control of your Finances* 198-208

Unit 4B The *Power of Compounding* 209-227

Week 5 – February 9 & 11, 2014

Unit 4D *Loan Payments, Credit Cards, and Mortgages* 248–266

Chapters 2 & 3 Exam

Cost to Cover an Acre

Week 6 – February 16 & 18, 2015

Cost of a Kg of Protein

Group problem solving presentations)

Chapter 4 Quiz

Unit 5A *Fundamentals of Statistics* 296–310

Week 7 – February 23 & 25, 2015

Unit 5B *Should You Believe a Statistical Study* 311–320

Unit 5C *Statistical Tables and Graphs* pages 320–335

Unit 5D *Graphics in the Media* 336–352

Week 8 – March 2 & 4, 2015

Unit 5E *Correlation and Causality* pages 352–367

Chapters 3 & 4 Exam

Unit 6A *Characterizing a Data Distribution* 371–381

Week 9 – March 9 & 11, 2015

Unit 6A *Characterizing a Data Distribution* (cont.)

*Are You a Square?*

Chapters 4 & 5 Exam

Unit 6B *Measures of Variation* pages 382–391

Week 10 – March 23 & 25, 2015

Unit 6C *The Normal Distribution* pages 391–400

Week 11 – March 30 & April 1 2015

Unit 1A *Recognizing Fallacies* pages 19–22

• *Quick Quiz* (problems 1-10)

• *Basic Skills & Concepts (problems 11-20)*

• *Further Applications* (problems 21-36) Note: At first you may not see the problems inherent in the arguments presented by fallacies. What are learning will strengthen your understanding of what is wrong.

Week 12 – April 6 & 8, 2015

Unit 1C *Sets and Venn Diagrams* pages 34-50

Chapter 6 Quiz

Week 13 – April 13 & 15, 2015

Unit 1D Analyzing Arguments 50-65

Week 14 – April 20 & 22, 2015

Unit 1E Critical Thinking in Everyday Life 65-76

Week 14 – April 27 & 29 2015

Final Exam Review

Final Exam – May 4, 2015