

Math 101 Syllabus
Introduction to Contemporary Mathematics
Summer 2016

Instructor: Dr. Dean Office: Neckers 373 Office Hours: Monday 8-12 Library 680	Phone: 618-543-5302 E-mail: rdean@siu.edu Open Computer Lab and Tutoring Hours: <ul style="list-style-type: none">• Morris Library 680, days/hours TBA
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Required Materials:

- **Math 101 Lecture Notes**
 - These can be purchased at the University Bookstore in the Student Center on SIU Campus or at 710 Bookstore.
 - If you are not a local student, they can be ordered and shipped to you.
 - You must have these notes by the first day of class.

- **MyLabsPlus (MLP) and Textbook**
 - The course fee paid as part of your tuition covers access to MyLabsPlus (MLP), which includes the e-book for this course.
 - MLP is an online program on which you will submit homework and quizzes.
 - On MLP there are links to the sections of the e-book that correspond to the material on homework and quizzes. MLP allows you to highlight and print these pages.
 - If you would like to purchase a physical copy of the textbook, it is *Contemporary Mathematics (Custom Edition for SIUC)*. However, most students find that the physical textbook is not necessary. The Lecture Notes and e-book are usually sufficient.

- **Technology**
 - Scientific Calculator
 - Recommended: Texas Instruments TI-30XIIS (under \$15)
 - These are the calculators used in the lecture videos (available on MLP)
 - NOT PERMITTED: TI-83/84/85/86/89/84 Plus/89 Titanium/92
 - In the lecture videos there is mention of using I-Clicker or TopHat. These are NOT NECESSARY for the course.

Grading:

- The percentage break-down is as follows:
 - Homework (Drop lowest score): 15%
 - Quizzes (Drop lowest score): 15%
 - Attendance: 05%
 - Exams: 40%
 - Final Exam: 25%

- This course uses a 90/80/70/60% grade scale for assignments and exams. This scale may be altered at the end of the semester depending on the average scores on the Final Exam.

CATALOG DESCRIPTION: Elementary mathematical principles as they relate to a variety of applications in contemporary society. Exponential growth, probability, geometrical ideas and other concepts. This course does not count towards the major in mathematics. Prerequisite: Mathematics 107 or 3 years of college preparatory high school mathematics including geometry and Algebra II. Students must present satisfactory placement scores or obtain the permission of the Department.

PREREQUISITES: 3 years of high school preparatory mathematics including geometry and Algebra II, AND satisfactory placement score or permission of the Department.

Exams: There will be no makeup tests. We take four exams and I will drop the lowest regular exam.

Online Homework Assignments: All of the homework will be submitted online. You will see the due date schedule under Course Home. You should be able to earn close to 100% on this homework. If you miss a question, you can create a new question to replace it by clicking “similar exercise” up to 3 times. You can submit homework assignments up to two days late. However a 10% per day late penalty will be applied. Otherwise, a grade of “0%” will be assigned.

Online Quizzes: Do not take the online quizzes before you have completed the corresponding homework. You will find that many of the quiz problems come from the homework. You will not be given the help features when completing a quiz, and you will need to submit it all at once (you cannot check the individual questions like you do on the homework). The quizzes are timed. So be sure that you have at least 50 minutes of uninterrupted time to take the quiz. **NO LATE QUIZZES ARE ACCEPTED.**

GOALS & OBJECTIVES:

Primary Goal: Students will develop their analytic and critical thinking skills by learning how to apply elementary mathematics to the solution of practical problems arising from a great variety of phenomena in science and society.

Secondary Goals: Students will develop their communication skills by learning to correctly interpret the vast quantities of information that are typically expressed mathematically in today's society (for example, information that is expressed by tables, bar graphs or in the language of statistics and probability) and by learning to express information appropriately through tables, charts, bar graphs, etc. Students will develop an appreciation of how mathematics infuses virtually every area of everyday life from banking to barcodes to preserving natural resources to presidential elections to scheduling to quality control, etc.

Objectives:

By the end of the course, students should be able to:

- model various real-life problems in terms of elementary graph theory (e.g. as Euler circuit, traveling salesman, spanning tree, machine scheduling problems, etc.)
- apply various heuristic methods to solve these graph theoretic models;
- select a simple random sample without bias and recognize possible sources of bias in a sample;
- compute elementary probabilities;
- represent statistical information numerically and graphically using appropriate measures of center and spread;
- compute and interpret information based on a normal probability distribution;
- compute and interpret confidence intervals based on a normal probability distribution;
- understand how different voting systems work and how they can be influenced by insincere voting;
- encode and decode identification numbers such as ISBN numbers and bar codes.

TOPICS/SECTIONS/DAYS:

The course will cover a wide variety of topics in contemporary mathematics from both course powerpoint slides and from the texts. Class meetings will include some video presentations, some lecture and some "hands-on" calculation activities.

Unit 1 – Graph Models and Applications (5 lectures)

ITCM Chpt. 1 (Sections 1-5, 7) – Graph models, Euler circuits, Euler's Theorem, Eulerizations

ITCM Chpt. 2 (Sections 1-5, 8) – Hamiltonian circuits, traveling salesman problems and strategies for solutions. Counting Hamiltonian circuits in complete graphs. Brute-force, Nearest neighbor, and Cheapest-link Algorithms.

ITCM Chpt. 3 (Sections 1-3) Minimum-Cost Spanning Trees and Kruskal's algorithm.

Unit 2 – Probability and Statistics (6-7 lectures)

ITCM Chpt. 4, (Sections 1-3, 5) Introduction to Probability: properties of probability, equally likely outcomes, mutually exclusive events, expected value.

ITCM Chpt. 5 (Sections A-C) – Introduction to Statistics: Sampling methods, simple random samples, observational studies and experiments, statistical tables and graphs.

ITCM Chpt. 6 (Sections A-D), – Characterizing data. Mean, median, mode. Symmetry and skewness of distributions. Quartiles and the 5-number summary. Standard deviation. Normal distributions, z-scores. Statistical inference.

Unit 3 Transmitting Digital Data and Voting

ITCM Chpt. 7 (Section 1-4) – Congruence and modular arithmetic, error-detecting and correcting codes, matrix codes, matrix codes that correct all single digit errors.

ITCM Chpt. 8 (Sections 1-2) – Social choice: elections with 2 alternatives, elections with more than two alternatives - paradoxes, approval voting.

Unit 4 Consumer Mathematics

ITCM Chpt. 9 (Section 1-5) – Percents, simple interest, compound interest models, effective annual yield, investment models, loans and amortization.