

Course Syllabus
MATH M111, Key # 4752
Mathematics in the World, Spring 2007

Classes: TR, 5:30pm – 6:45pm NS 08
Text: For All Practical Purposes: Mathematical Literacy in Today's World, 7th ed., Freeman
Prerequisites: MATH-M014 or equivalent, or Level 3 on the Mathematics Placement Examination
Instructor: Dean Serenevy Office: Northside 309 Email: dean@math.serenevy.net
Web page: <http://dean.serenevy.net/>
Office Hours: MW, 1:00pm – 3:00pm *or by appointment*
Calculator: any basic scientific calculator (has $\sqrt{\quad}$, exponents, π)

The goal of this course is to convey the spirit of the mathematical languages of quantity; students apply concepts from algebra, geometry, management science, probability and statistics, and use scientific software to analyze real world situations. Satisfies LAS Languages of Quantity distribution requirement and General Education requirements for baccalaureate degrees. MATH-M111 grade can replace IU South Bend MATH-M110 grade.

You should plan on spending 2–3 hours working on this course outside of class for every hour of lecture. This is not a passive experience; you must participate actively. One thing you can do to help yourself in this course is to find at least one person with whom you can study. Not only does this help you study better, but also, in the event you miss a lecture, you can get the notes and assignments. Another thing you can do is read the relevant sections of the text book before lecture. Even if you don't understand everything, seeing it once before I explain it will help you follow lecture considerably.

- ★ If you are unclear on something in class, ask a question! ★
- ★ Be actively involved in your education — it is why you are here. ★

Evaluation There will be approximately 12 assignments (about 2–3 problems/short write-ups each) that will be collected at the beginning of each week, 3 special projects, 3 tests, and one final examination. The percentage distribution is as follows.

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|----|-------------|-----|
| 12 | Assignments | 20% |
| 3 | Projects | 20% |
| 4 | Tests | 20% |
| 1 | Final Exam | 40% |

Final grades will be assigned according to the following percentage guidelines.

| | | | | | | | |
|----|---------|----|--------|----|--------|----|--------|
| A | 93–100% | B | 83–86% | C | 73–76% | D | 63–66% |
| A– | 90–92% | B– | 80–82% | C– | 70–72% | D– | 60–62% |
| B+ | 87–89% | C+ | 77–79% | D+ | 67–69% | F | 0–59% |

Office Hours Please come to my office hours for help. This gives me the opportunity to focus on specific problems you may be having and to explain things in a more personal manner. If the scheduled times are bad for you, make an appointment with me.

Homework and Assignments I will assign homework exercises on a more or less daily basis. I will collect around 2–3 problems, which will occasionally include a brief written component, each Tuesday to be graded. You should do all assigned work (not just those to be turned in) for the following reasons. First, it has been my experience that if you do not do the homework, you do not learn the material. Second, most test questions will be very similar to those assigned. We will spend the first few minutes of each class answering questions from the homework. Group study is encouraged.

Late Policy All Assignments are due at the beginning of class on the day they are due. Assignments must be turned in at the beginning of class to qualify for full credit. Assignments received in afternoon of the day they are due will automatically be docked 1 point. For each additional day the assignment is late (non-class days included) an additional point will be docked.

Tests The tests will be taken in class and will be closed book and closed notes. If you have a conflict with any of the test dates, make alternative arrangements with me beforehand. I will only consider make ups in extreme situations. Note that these dates are tentative. I reserve the right to make changes (announced in class) to the test schedule if I find it necessary.

Final Exam The final exam will be comprehensive. Our final exam is scheduled for Tue, May 1 at 5:30pm. If you will not be able to attend the final exam at this time you must notify me at least 30 days prior to the exam.

Extra Credit Extra credit will be made available throughout the semester. Extra credit problems will have due dates and will **not** be accepted late. You may also create your own extra credit. If you have an idea of something you would like to do, let me know. Extra credit projects are graded more strictly than normal course-work and will require a 2–3 page writing component which will be graded using the same standards as in a standard composition course. All extra credit work must be completed and turned in by the last day of class. **No extra credit work will be accepted the day of the final.**

Grading Criteria for Written Work Writing projects need to be neat, clear, and well explained. Projects will need to be typewritten on $8\frac{1}{2}'' \times 11''$ paper, but math formulas, computations, and diagrams should be written in neatly by hand. Written work will be graded on three criteria.

- Mathematical Correctness — correctness of mathematical claims and computations
- Mathematical Clarity — clarity of explanation of mathematical reasoning and problem-solving logic
- Written Clarity — clarity of expression, logical ordering and arrangement of paper components

Tutoring There is free walk-in tutoring available in the Mathematics Department in room NS 310. Tutoring typically begins within the first few weeks of class. The tutoring center is typically open MTWR from 8–7. This semester's hours should be available shortly and will be posted on the door to NS 310 or on the department webpage <http://www.iusb.edu/~sbmath/tutoring.shtml>.

Free tutoring is also available through the Academic Learning Center (AI-122, 520-5022); check schedule at <http://www.iusb.edu/~sbalc/tutoring.shtml>

Finally, the St. Joseph County Public Library will also offer walk-in tutoring Sundays from 1 to 5pm and Wednesdays from 3:30 to 6:30pm.

Missing Class If you will be missing any classes due to University activities you must tell me about these dates at the beginning of the semester. If you have conflicts with test or homework due dates, make arrangements with me beforehand (you can always take a test or turn in homework early). I will only consider make ups in extreme situations.

Course Coordinator If you have a concern about the course that can not be resolved by speaking with me, please contact the course coordinator (Yi Cheng, NS 317, 520-4519, ycheng@iusb.edu).

Accommodations for Religious Observances If any student will require academic accommodations for a religious observance, please provide me with a written request to consider a reasonable modification for that observance by the end of the second week of the course. Contact me after class, during my office hours, or by individual appointment to discuss the issue. If after discussion we reach no consensus, either party or both should seek the advice of the Department Chair or the Dean, and if no consensus is reached, then the advice of the Vice Chancellor of Academic Affairs (“VCAA”). Either the instructor or the student may appeal the VCAA’s decision to the Office of Affirmative Action within ten business days of the determination.

Americans with Disabilities Act If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Disabled Student Services (Administration Building, room 149, telephone number 520-4832), as soon as possible to work out the details. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to me. For more information, please visit the web site for Office of Disabled Student Services <http://www.iusb.edu/~sbdss/services.shtml>

Academic Honesty It is the responsibility of the student to know of the prohibited actions such as cheating, fabrication, plagiarism, academic, and personal misconduct, and thus, to avoid them. All students are held to the standards outlined in the code. Please reference the entire code for a complete listing (<http://www.dsa.indiana.edu/Code/>). Any violation may result in serious academic penalty, ranging from receiving a warning, to failing the assignment, to failing the course, to expulsion from the University.

Days of interest

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|-----------------|--|
| MON, 8 JAN | Classes Begin! |
| MON, 15 JAN | Martin Luther King, Jr., Holiday – No Classes |
| FRI, 12 JAN | Last day to drop a course with no grade or tuition penalty |
| MAR 12 – MAR 16 | Spring Break – No Classes |
| MON, 26 MAR | Last day to withdraw from a course |
| WED, 25 APR | Last day of Classes |
| TUE, 1 MAY | Final Exam, 5:30pm in our classroom |

Tentative Schedule of Topics

| Week | Chapters | Topics |
|---------|----------------|--|
| Week 1 | Ch. 7 Ch. 5 | Basics in sampling, bad sampling methods, simple random sampling Experiments and observational study Randomized comparative experiments Displaying data distribution: histograms |
| Week 2 | Ch. 5 | Numerically describing center and spreading: mean, median, standard deviation, and quartiles 5-number summary and box-plot |
| Week 3 | Ch. 6 | Display relations between two random variables: scatterplot Regression lines. Estimation/prediction based on regression equation Correlation and Least Square Regression |
| Week 4 | Ch. 8 | Basic in probability Sample space, events, probability rules, and probability models Equally likely outcomes |
| Week 5 | Ch. 8 | Mean of a probability model The law of large numbers Sampling distributions Normal distributions: shape, quartiles, and 68-95-99.7 rules |
| Week 6 | Ch. 8 Ch. 7 | Central limit theorem and its application Standard deviation of a probability model Statistical inference, parameters, and statistics |
| Week 7 | Ch. 7 | Estimating with confidence Confidence intervals for population proportions and margin of error Confidence intervals for population means |
| Week 8 | Ch. 1 | Basics of graphs: vertices, links, valences Euler circuits and Euler theorem Chinese postman problem (TSP), circuits with reused edges |
| Week 9 | Ch. 2 | Travelling salesman problem, Hamiltonian circuits Strategies for solving TSP: tree-diagrams, nearest-neighbor algorithm |
| Week 10 | Ch. 2 | Sorted-edges algorithm Minimum cost spanning trees and Kruskal's algorithm Tasks and order-requirement digraph Critical path and least completion time |
| Week 11 | Ch. 3 | Scheduling tasks, list-processing algorithm Critical-path schedules |
| Week 12 | Ch. 3 Ch. 4 | Decreasing time schedules, independent tasks and their scheduling Introduction of mixture problems One product, one resource Mixture charts, resource constraints and feasible sets |
| Week 13 | Ch. 4 | Optimal policy and corner point principle Two products and one resource Two products and two resources |
| Week 14 | Ch. 18 | Geometric similarity, The language of growth, enlargement, and decrease Scaling real objects and solve the problems of scaling |
| Week 15 | Ch. 19 | Golden ratio Balance in symmetry Analyzing patterns |