Mount Saint Mary College
Newburgh, New York

MST 101: Math, Science, and Technology I

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Course Description:
This course will introduce students to the scientific method, experimental design, mathematical data analysis, information retrieval and assessment. Integrated throughout the course will be the history and philosophy of science, mathematical theory and problem-solving strategies. Students will engage in inquiry based and collaborative learning and develop both written and oral communication skills. This course will satisfy the college's computer literacy requirement.

Outcomes:
Students will lessen their anxiety of math and science, and be able to appreciate the relevance of math and science in everyday situation. At the end of MST 101, students will be able to:

- ask questions that can be answered by an experiment
- design an experiment
- analyze data for trends
- used a spreadsheet
- present experimental findings orally and in writing
- use word processing
- make and interpret graphs
- uses statistics to assess the validity of data
- use fractions, ratios, decimals, and irrational numbers
- understand and use scientific notation
- understand and use different methods of measurement
- understand the limitations of measuring devices
- understand the differences between qualitative and quantitative data
- retrieve information by traditional and electronic means
- understand the development and use of, the real number system
- classify 2-dimensional and 3-dimensional shapes and solids
- find perimeter, area, surface area and volume

Attendance:
Attendance is mandatory. Excessive absenteeism can be cause for loss of a grade or

failure. Attendance will be part of your participation grade.

Assessment
All assignments will be graded according to the following scale:

Grade	Criteria/Performance
A	Consistently outstanding work that shows mastery of the material relevant to the assignment. Work displays evidence of well-developed high-order thinking and problem-solving skills, including the ability to define a problem, recognize, develop and evaluate different hypotheses or solutions, find patterns and meaning in complex data, evaluate the reliability of different sources of information, where warranted, generalize from specifics, and make reasoned judgements, even with incomplete information.
B	Consistently very good work that shows mastery of material relevant to the assignment. Work displays evidence of high-order thinking and problem solving skills as above, but with some difficulties.
C	Good quality work showing mastery of the material, but with some weakness. Work meets the requirements fo assignment, but shows little, if any, evidence of high-order process such as those listed above.
D	Assignment complete, but is of poor quality with major weaknesses. Master of material is in doubt, and higher-order processes are not evident
F	Assignment is not completed on time, does not meet minimum criteria, or is plagiarized or otherwise dishonest.

Final grades will be weighted as follows:

Participation	10%
Candle Report	5%
Pseudoscience Presentation	5%
Consumer Reports Project	15%
Tests	30%
Final Project	20%
Portfolio (with corrections!)	15%

Grading Scale:

A	**94-100**	**C**	**73-76**
A-	**90-93**	**C-**	**70-72**
B+	**87-89**	**D+**	**67-69**
B	**83-86**	**D**	**63-66**
B-	**80-82**	**D-**	**60-62**
C+	**77-79**	**F**	**<60**

Math, Science, and Technology
Fall 2006

Welcome to MST 101! I am glad that you have chosen to participate in this exciting inquiry into the world of mathematics, science and technology. Throughout this semester you will conduct hands-on investigations to help you learn how to conduct scientific experiments, make calculations and analyze data, and utilize technology to present information. To ensure a safe and comfortable classroom and laboratory, there are a few procedures you must become familiar with and follow on a daily basis.

While there are no prerequisite classes for this course, it is important that you have a basic understanding of mathematics and the use of computers. If you have difficulty with these areas, please let me know ASAP so that I can help you to succeed. This class can be very demanding at times, but you will get out of it what you put in.

Materials needed for this class

- 3-ring binder and loose leaf paper You will be required to keep a portfolio in this class, which will count as your final exam grade. It is in your best interest to keep up with the portfolio as the semester progresses so that you avoid having a great deal of work at the end of the semester. You will also need paper for taking notes and for class activities.
- Calculator The "M" in MST stands for math. You will find that many activities proceed more quickly and smoothly with the assistance of a calculating device. While a simple calculator may be sufficient for many of the activities in this course, if you plan to continue on with MST 201 and 202, I would recommend the purchase of a quality scientific calculator. Cellphone calculators will not be allowed during exams.
- Computer disk While all students have access to disk space on the college server, I recommend backing up all class projects on a disk for safety. This also allows you to work on projects away from college network access or if the network goes down. Do not delete any classwork until the end of the semester. You may need to reprint it for your Portfolio.

Classroom Procedures

1. Any homework or assignments to be submitted at the beginning of class.

2. It is your responsibility to make up any work missed due to absence, excused or unexcused. You will be given two class days after your return to complete all missed work, after which you will receive a zero for the missed assignments. You are also responsible for all missed notes and information. Speak with the instructor to obtain any missed worksheets or handouts and for guidance in completing the missed work. "I DID NOT KNOW WHAT TO DO" IS NOT AN EXCUSE. This is a college class and you must take responsibility for your own learning.

   * If you miss a lab activity, you are still responsible for the activity. You must schedule a time that is convenient for the instructor to make up the activity. You will be given one week to make up the activity, after which you will receive a zero.

3. I do NOT want cell phones in my class. It is rare that one phone call will have as much impact on your future as your grade in this class. If I am made aware of your cell phone **for any reason** during this class, I reserve the right to hold the phone until the end of the period.

4. If you need help during an activity or lecture, raise your hand and wait for the attention of the instructor or assistant. This class will also require a great deal of collaborative learning (group work). I encourage you at these times to discuss the issue with the other members of your group first (four minds are better than one). Science **requires** active learning. If you choose not to participate in activities, pay attention to instructions and discussions, and work assigned problems, you will not be successful in this class.

5. This syllabus includes a schedule of the activities we will complete in this course. A detailed description of activities is posted on Dr. Markel's website (http://faculty.msmc.edu/markel). Links to electronic copies of most handouts will also be provided on these sites. This schedule is provided to help you succeed in this course.

6. **Student Portfolios:** Every student in this course will be required to keep a portfolio. This should be in the form of a 3-ring binder. All of the graded work you submit in this course should be stored in your portfolio when it is returned to you. In addition, you are required to correct any mistakes and respond to all comments on these returned papers for your portfolio. These corrections are essential to your receiving a good grade on the portfolio. Having the assignment is only worth one point; the corrections are what count most. It is recommended that you make the corrections soon after the assignment is returned and ask for any help from the instructor or assistant. This will lead you to a better understanding of the assignment, and a better grade on the exam.

7. **PLAGIARISM WILL NOT BE TOLERATED!!!** Plagiarism is defined as the act of using and passing off another person's ideas, writings, inventions, etc. as one's own[1]. All material from other sources requires an in-text citation and a reference at the end. You may use whatever format you are familiar with (MLA or APA), but you must be **complete and consistent**. Please include with your papers a copy of the style you are using so that it can be appropriately graded. Plagiarism is considered cheating and can result in your receiving a zero on the assignment, failure of the course, or dismissal from college[2]. **If you are unclear how to cite correctly, please do not hesitate to ask.**

Hints for success in this class

1. Maintain a positive attitude towards the subject matter. Math and science can be fun, exciting, interesting, and inspiring!
2. Understand the basic concepts and principles before attempting to solve problems.
3. Keep up! Avoid the harmful practice of delaying study until a day or two before a test. Begin work on a major project soon after it is assigned and avoid procrastinating until the night before it is due.
4. Take GOOD notes. Good note taking does not necessarily mean writing down everything put on the board or said in the class. YOU need to pay attention and write things to help YOU understand. Keep your notebook neat and organized.
5. Use your notes to help you set up problems and solve them correctly.
6. **Get help before you get behind.** If you find that you are having trouble understanding a concept, ask for extra help from me, the assistant, or a fellow student.

1. New Webster's Dictionary and Thesaurus of the English Language. Lexicon Publications, Inc.: Danbury, CT. 1995. p.767.
2. MSMC 2004-2006 Student Handbook, p. 38.

Grading Procedures and Opportunities

1. Participation: All of the daily work that you complete will fall into this category. While you will not receive a letter or percentage grade on these assignments, they are still important to your understanding of the class material and your grade. The percentage of these assignments that you complete will be part of your participation grade, along with attendance and tardiness. *If you fail to turn in an assignment for comments and corrections, you can only receive **one point** for the assignment in the portfolio.*

2. Pendulum Lab Report/Pseudoscience Presentation: These assignments have been designed to give you practice in writing a lab report and designing/giving a presentation before your consumer reports project. While they count less that other assignments, they will affect your grade if you do not take them seriously. Grading may seem harsh at first, but these comments will allow you to learn what will be expected from you on later assignments.

3. Consumer Reports Project: This project will give you the opportunity to demonstrate the science skills you have learned in the first part of the class. You will conduct three experiments on a consumer product of your choice. The work you submit for this project will consist of two parts. The report (10% of final grade) will contain background research on the product, your experimental procedures, experimental data, a discussion of the results and what they mean, and conclusions and recommendations. The presentation (5% of final grade) will be created with PowerPoint and will follow a format similar to that of the report.

4. Tests: There will be three tests in this course. These exams will not simply ask for you to restate class information. They will require you to think and utilize what you have learned to solve complex problems. The purpose of this class is to help you **build** your understanding of scientific and mathematical reasoning. Therefore, each test will build upon, and require an understanding, of past concepts.

5. Final Project: You will design and present an experiment that you have designed and conducted. Students will be allowed to work individually or with a partner. The majority of this assignment will be conducted outside of class. More details will follow at a later date.

6. Portfolios: Your portfolio is worth 15% of your final grade in MST 101. It is ***your responsibility*** to submit your portfolio on time and completed. Portfolios are due near the end of the semester. All portfolios should be bound in a three-ring binder. Items need to be in the order listed below (tentative list), and all corrections need to have been made and clearly identified, and comments addressed. Neatness and organization count! Just having the item is only worth one point. The credit comes from making the corrections and responding to comments on your work.

The following items need to be included in your portfolio.

1. Course Syllabus
2. Student Understanding Contract
3. The final checklist
4. Classification activity: buttons
5. Observations on a Candle: Handout and Lab Report
6. Measurement Activity
7. Conversions using Dimensional Analysis Homework
8. LEGO™ Procedures
9. Lowest Common Multiple/Greatest Common Divisor
10. Pattern Block Activity
11. Cuisinaire Rods
12. Fractions: In class activity
13. Fraction Homework
14. Spreadsheets and Table Activity: Class survey
15. In class graphing activity
16. Understanding Graphs Homework
17. Pie and Bar Graph Homework: Graph from web
18. Pseudoscience Presentation
19. Consumer Reports Plan
20. Assessment #1
21. Geometric Conclusions
22. Geoboard Activity
23. Area and Perimeter Homework
24. Volume and Surface Area of Solids: Calculated and with Rice
25. Volume and Surface Area Homework 2
26. New Boxes from Old
27. Density & Linear Regressions
28. Linear Regression Homework
29. Consumer Report/Presentation
30. Mid-semester self-evaluation: an evaluation of your progress in the course. This should include your strengths and weaknesses at the beginning of the course and how these have been affected by the course.
31. Assessment #2
32. Geometer's Sketchpad & Pinwheels
33. Tetrahedron Activity
34. Probability and Skittles Activity
35. Probability homework (M & M questions, and Probability questions)
36. Bases Activity
37. Tessellations Activity (Symmetry Handout, Tessellations handout, your tessellation)
38. End of semester self-evaluation (one page, typed, essay discussing how you think that you progressed in MST 101. Identify your strengths and your weaknesses; also note if any perceptions about math and science were changed by this course).

****Please note that this is a tentative list and is subject to change – a final list will be given towards the end of the semester*