COURSE CHANGE
GENERAL EDUCATION

Proposal for a Course Change

Department __Mathematics and Computer Science_ **Date** __January 8, 2008_____

_**X**__Original Submission ____ Resubmission   Date of Original Submission_____
                                                 Date of Implementation__Fall 2008__
Retroactive? (If yes, please specify)_____

I.   Proposed Course Change Information

	CURRENT	PROPOSED CHANGE
Discipline Prefix	MATH	
Course Number	121	
Course Title	Functions and Graphs	
Credit Hours	3	
Prerequisite Course	None	
Speaking Intensive	No.	
Writing Intensive	No.	

If Cross-Listed:
   Secondary Prefix _____   _____
   Course Number   _____   _____

Present Course Description: **MATHEMATICS 121.** *Functions and Graphs.* Graphical, numerical, and algebraic approaches to modeling functions. Emphasizes constructing models based on linear, exponential, power, and trigonometric functions. 3 credits. *

Proposed Course Description: **MATHEMATICS 121.** *Functions and Graphs.* A graphical, numerical, and algebraic study of functions. Functions will include linear, polynomial, radical, and exponential as well as their applications in sequences and series. Linear and quadratic equations and linear systems of equations and inequalities will also be studied.   3 credits. *

____ Delete Course from Catalog   ____ Submit to Storage
____ Remove Course from Storage, Add to Catalog
General Education Goal(s) for which course is designed: **Goal 5**

Does the proposed change affect how the course will satisfy the nine (9) required General Education Course Criteria (page 12)? If so, please explain: **Yes. See attached matrices.**

Please attach a proposed syllabus in SACS format that contains proposed changes.

II.   Required for Major, Minor, Concentration (please specify): **Liberal studies, K-6 licensure**

III. Rationale for Proposed Changes: **Changes in state licensure requirements demand a more in-depth study of functions for elementary education licensees. This course seems the natural place to include the topic and will allow us to address the topic in detail.**

IV.   Resource Assessment, if change warrants it:
    A.   How frequently do you anticipate offering this course? **Every semester.**
    B.   Describe anticipated change in staffing for the course: **None**
    C.   Estimate the cost of new required equipment due to change: **None**
    D.   Estimate the cost of and describe additional library resources: **None**
    E.   Will the change in the course require additional computer use, hardware or software?
If so, please describe and estimate cost: **No**

V.   Approvals

	Date Rec'd	Signature Date	Approved
1. Department Curriculum Committee Chair	_____	_____	_____
2. Department Chair	_____	_____	_____

The Department Chairs, whose programs may be affected, have been notified:
    Department _Liberal Studies_____ Date Notified _January 8, 2008__
    Department _____ Date Notified _____
    Department _____ Date Notified _____

3. College Dean	_____	_____	_____
4. College Curriculum Committee	_____	_____	_____
5. General Education Committee	_____	_____	_____
6. Educational Policy Committee	_____	_____	_____
7. Faculty Senate Chair	_____	_____	_____
8. Date received by Registrar	_____		

Proposals must be submitted early enough to reach EPC by March 1 in order to be included in next year's catalog.

General Education Component Matrix

Department: Mathematics   Proposed Course Prefix/Number: MATH 121

Course Title: Functions and Graphs

What General Education Goal is this course intended to address? Goal 5

Required Outcomes for this Goal	Relevant Course/Institutional Components (refer specifically to syllabus)	Specific Assessment Method for Outcome
Understand how mathematical and/or statistical models can be used to study real-world situations	Course objectives 2, 3, 4, and 6	Common Exam Question Report number of students who got problems totally correct, partially correct, and incorrect.
Understand the limitations of and assumptions behind typical mathematical models	Course objectives 1, 3, 4, and 6	Common Exam Question Report number of students who got problems totally correct, partially correct, and incorrect.
Use mathematical and statistical analysis to interpret such models by testing hypotheses, making predictions, drawing conclusions, checking results for plausibility, and finding optimal results	Course Objectives 1, 2, and 6	Common Exam Question Report number of students who got problems totally correct, partially correct, and incorrect.
Understand when technology might be helpful in mathematical or statistical analysis and apply technology when appropriate	Course Objectives 1 and 6	Common Exam Question Report number of students who got problems totally correct, partially correct, and incorrect.

General Education Criteria	Relevant Course Components (refer specifically to course syllabus)
1. Teach a disciplinary mode of inquiry and provide students with practice in applying their disciplinary mode of inquiry, critical thinking, or problem solving strategies.	Students are taught to construct graphical models for data and then analyze the graphs mathematically. (weeks 1-15)
2. Provide examples of how disciplinary knowledge changes through creative applications of the chosen mode of inquiry.	Applications of models. (weeks 1-10)
3. Consider questions of ethical values.	Course material does not lend itself very well to ethical considerations. We do examine when models may be inappropriate or misleading. (weeks 2, 3, and 7)
4. Explore past, current, and future implications of disciplinary knowledge.	Applications throughout the course have implications. (weeks 1-15)
5. Encourage consideration of course content from diverse perspectives.	Functions are looked at from graphical, numerical, and algebraic (symbolic) points of view throughout the course. (weeks 1-15)
6. Provide opportunities for students to increase information literacy through contemporary techniques of gathering, manipulating, and analyzing information and data.	Research project involves gathering data from library/internet sources. Entire course involves analyzing graphs. (weeks 1-15)
7. Require at least one substantive written paper, oral report, or course journal and also require students to articulate information or ideas in their own words on tests and exams.	Research project; exam questions.
8. Foster awareness of the common elements among disciplines and the interconnectedness of disciplines.	Examples and applications are drawn from throughout the natural sciences, the social sciences, economics, and business. (weeks 1-15)
9. Provide a rationale as to why knowledge of this discipline is important to the development of an educated citizen.	Students learn to analyze data and solve problems in areas such as ecology, business, economics, and the physical sciences. The ability to interpret and analyze such data is clearly important for informed citizens. (weeks 1-15)

MATHEMATICS 121-01
FUNCTIONS AND GRAPHS
Spring 2008

Instructor: Dr. Sharon Emerson-Stonnell   **Office:** Ruffner 333
E-mail: emersonstonnellss@longwood.edu   **Telephone:** 395-2197
Office Hours: M-F   1 - 2:15pm

Text: Hungerford, Thomas W. <u>Contemporary College Algebra: A Graphing Approach</u>. Second Edition. New York: Brooks/Cole Publishing Company, 2005.

Supplies: Graphing calculator.

Course Description: A graphical, numerical, and algebraic study of functions. Functions will include linear, polynomial, radical, and exponential as well as their applications in sequences and series. Linear and quadratic equations and linear systems of equations and inequalities will also be studied. 3 credits. *

Course Objectives: Students should be able to

1. Use graphing calculators to graph and analyze functions.
2. Analyze and interpret linear, polynomial, and exponential functions.
3. Solve linear and quadratic equations.
4. Solve a system of linear equations.
5. Distinguish between arithmetic and geometric sequences and determine the next elements in the sequence.
6. Apply functions to business, social science, and natural science applications.

This course meets the General Education criteria and the required outcomes for General Education Goal 5 as indicated in the attached matrices.

Course Requirements:

1. There will be three tests. Each test will be worth 18% of your final grade.

2. Attendance is mandatory. Each student is expected to actively participate in all group work and class discussions.

3. Daily class assignments will constitute 18% of your final grade.

4. A research project will be due in early April. The project will constitute 8% of your final grade. Details will be provided in early March.

5. There will be a comprehensive final exam for this course. The exam will be worth 20% of your final grade.

6. Absences are excused only for illness, college sponsored activities, and recognizable emergencies. You must assume full responsibility for all material covered during your absence. A grade of "0" will be assigned for all work missed due to unexcused absences.

7. Make-up tests will be given only when the reason for missing the test meets the criteria for an excused absence. Make-up tests will always be more difficult then regularly scheduled tests.

8. I expect you to conform to the Longwood College Honor Code as contained in the *Student Handbook*. All assignments and tests must be pledged.

Grade Scale: A 90 – 100   B 80 – 89   C 70 – 79   D 60 – 69   F 0 - 59

Feel free to come by my office at any time during office hours for help. If you are unable to come during office hours call and make an appointment for another time period.

Class Schedule:

Week 1   January 14 - 18
        Tuesday   0.3, 0.4 Integral Exponents, Roots, Radicals, and Radical Exponents
        Thursday   1.1, 1.2 The Coordinate Plane and Graphing Technology

Week 2   January 21 - 25
        Tuesday   1.3 Lines
        Thursday   1.4 Linear Models

Week 3 January 28 – February 1
        Tuesday   2.1 First Degree Equations and Applications
        Thursday   2.2 Quadratic Equations and Applications

Week 4 February 4 - 8
        Tuesday   2.3 Solving Equations Graphically and Numerically
        Thursday   2.4 Linear Inequalities

Week 5 February 11 - 15
        Tuesday   **Test Chapters 0 - 2**
        Thursday   3.1 Functions

Week 6 February 18 - 22
        Tuesday   3.2 Functional Notation
        Thursday   3.3 Graphs of Functions

Week 7 February 25 - 29
        Tuesday   3.6 Rates of Change
        Thursday   4.1 Quadratic Functions and Models

Week 8 March 3 - 7
        Tuesday   4.3 Graphs of Polynomial Functions
        Thursday   **Test Chapters 3 and 4**

Week 9 March 10 - 14
        Spring Break

Week 10 March 17 - 21
        Tuesday   5.1 Exponential Functions
        Thursday   5.2 Applications of Exponential Functions

Week 11 March 24 - 28
      Tuesday   6.1 Systems of Linear Equations in Two Variables
      Thursday   6.2 Large Systems of Linear Equations

Week 12 March 31 – April 4
      Tuesday   6.5 Systems of Linear Inequalities
      Thursday   6.6 Introduction to Linear Programming

Week 13 April 7 - 11
      Tuesday   Test Chapters 5-6
      Thursday   7.1 Sequences and Sums

Week 14 April 14 - 18
      Tuesday   7.2 Arithmetic Sequences
      Thursday   7.3 Geometric Sequences

Week 15 April 21 - 25
      Tuesday   7.4 Introduction to Infinite Series
      Thursday   Final Exam Review

Final Exam
      Wednesday, April 30 8:00 a.m. - 10:30 p.m.

Writing: As a general education course, Mathematics 121 will require more writing than in some non-general education mathematics courses. Some exam questions will be short essay questions. The research project will require using library and internet sources to gather data. You will then analyze the data and write up the results. The result will be graded both for mathematical accuracy and for writing style. The project will be due in mid November. More details will be provided later.

Attendance Policy: Students are expected to attend all classes. Work missed because of illness or other excused absences may be made up. Work missed because of unexcused absences receives a grade of 0. If you miss an exam or are late with an assignment you may be asked to provide proof that you had a legitimate reason (such as illness, certain college-sponsored activities or recognized emergencies). When possible, you should
notify the instructor in advance of assignments you expect to miss because of legitimate absences.

Honor Code: Students are expected to abide by the Longwood College Honor Code. Assignments should be pledged, but the provisions of the Honor Code are assumed to apply to all work, pledged or not. Some of the homework, projects, and in-class assignments may be designated by the instructor as group assignments; all other work that is turned in to be graded should be the student's own individual work. Students are encouraged to study together and to seek help from the instructor or tutors when needed, but receiving unauthorized help, copying, or working together on any non-group assignments that will be graded is a violation of the Honor Code. For any group assignments, all members of a group are expected to sign the work turned in, indicating that all members of the group helped prepare and understand the assignment being turned in.