

Division: MSAH
Subject Code: MATH Course #: 181
Course Title: Environmental Awareness through Mathematical Modeling

HARRISBURG AREA COMMUNITY COLLEGE
CREDIT COURSE PROPOSAL
FORM B

1. NEW COURSE
 COURSE REACTIVATION
 COURSE INACTIVATION
 SELECTED TOPIC
 REVISED COURSE

Proposed Changes:

- Title
 Digital Description
 Catalog Description
 Pre- or Corequisite
 Type of Instruction
 Existing Course Equivalent
 Course Fees
 Core Addition
 Gen. Ed. Transfer Elective Addition
 Program-Restricted Course

2. FIRST TERM ACTION IS REQUESTED TO BE EFFECTIVE: **Fall 2007**

3. SHORTENED COURSE TITLE: (limit of 30 characters)

Current:

Proposed: **Environmental Modeling**

4. DIGITAL DESCRIPTION: CURRENT PROPOSED

Credit Hours:	3
Lecture Hours:	3
Laboratory Hours:	0
Lecture Pay Hours:	3
Laboratory Pay Hours:	0

5. CATALOG DESCRIPTION: (complete only if revised)

Current:

Proposed: **SEE ATTACHED FORM 335**

6. PRE OR COREQUISITE: (complete only if revised; indicate Subject, Course Number, minimum grade required, and/or Test Code and numeric score required)

Current:

Proposed: **SEE ATTACHED FORM 335**

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7. TYPE(S) OF INSTRUCTION:	<u>CURRENT</u>	<u>PROPOSED</u> (if applicable)
Lecture/Laboratory (C)	[]	[]
Lecture Only (A)	[]	[x]
Laboratory Only (B)	[]	[]
Internet (I)	[]	[]
Videocourse (V)	[]	[]
Independent Study (D)	[]	[]
Private Lessons (P)	[]	[]
Internship (E)	[]	[]
Cooperative Work-Study (F)	[]	[]
Practicum (X)	[]	[]

8. IF THE COURSE BEING PROPOSED IS EQUIVALENT TO A PREVIOUSLY OFFERED COURSE INDICATE:

Subject: _____ Course #: _____

9. ADDITIONAL COURSE FEES:	<u>CURRENT</u>	<u>PROPOSED</u> (if applicable)
No course fees:	[]	[x]
Course Fee Required:	[]	[]
Fee Amount:	\$	\$
Detail Code: (Records Office will enter)		

10. CORE/TRANSFER ELECTIVE:	<u>CURRENT</u>	<u>PROPOSED</u> (if applicable)
Core A	[]	[]
Core B	[]	[]
Core C	[]	[x]
GE Transfer Elective	[]	[]

Justification: **The course is a comprehensive, general, introductory survey and encompasses all the learning outcomes for mathematics outlined in the General Education Core.**

11. PROGRAM RESTRICTION: IF THIS COURSE IS RESTRICTED TO STUDENTS IN A PARTICULAR PROGRAM, LIST THE MAJOR CODE OF THE PROGRAM(S):

Major Code(s): _____

12. LIBRARY COLLECTIONS:

[Need only be completed for new courses or courses with significantly revised content. A summary statement will be completed by the librarian and submitted

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to the proponent within five working days after they have met to review the collection.]

The proponent has forwarded Form B and the 335 to the Coordinator of Collection Development [x2466] for the HACC Library System and has met with the Coordinator or his/her designee to review library holdings to support this course. A collection review summary and a list of any additional resources needed is included below, together with the name of the librarian and the date on which he/she met with the proponent.

- Existing resources are adequate
- The following new resources are recommended. (List new resources with cost)

13. NEW FACILITIES AND EQUIPMENT: A Smart Classroom would be helpful, but is not mandatory if the course is offered when the Math Computer Lab is available.

NAME AND SIGNATURE	DATE
14. Proposed by: Marci Henzi Office Number: Whitaker 218 (W223)	3/7/07
15. Approved by Catalog Editor:	
16. Dean: Library and Information Resources Division:	
17. Division Administrator:	
18. Approved by Division:	
19. Approved by Curriculum Coordinator:	
SEND ORIGINAL DOCUMENT TO OFFICE OF VICE-PRESIDENT, ACADEMIC AFFAIRS AND ENROLLMENT MANAGEMENT	
20. Preliminary Approval by VP, AA&EM:	
21. CI&L Committee (Chairperson):	
22. Faculty Council (President):	
23. Academic Council (VP, AA&EM):	
24. President:	

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RECORDS OFFICE USE

Department Code:

Attribute:

Print in Schedule/WEB:

Occupational Course:

CR level restriction:

12/1/04

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HARRISBURG AREA COMMUNITY COLLEGE

FORM 335

Course Form 335 must be updated at least every five years to qualify for state reimbursement.

1. Digital Description [§335.2]:

Credit hours: 3

Lecture hours: 3

Lab hours: 0

- 2. Catalog Description [§335.2]:** Students develop mathematical literacy and environmental awareness as they model natural processes using algebraic, graphical, and numerical methods, and analyze data quantitatively to assist in objective decision making. Collaborative projects are incorporated into each part: (1) Basic Numeracy; (2) Function Modeling; (3) Difference Equation Modeling.

Minimum Grade Required

- 3. Prerequisites:** Math 051
or the equivalent College Placement and Testing Program score

C

Corequisites:

Other:

4. Learning Outcomes [§335.2]

[These outcomes are necessary to enable students to attain the essential knowledge and skills embodied in the program's educational objectives.]

Upon successful completion of the course the student will be able to:

1. Apply principles and techniques of measurement.
2. Compare, estimate, and predict using proportions, percent, and probability.
3. Create and analyze charts and graphs representing univariate or bivariate data.
4. Model linear change, and exponential growth and decay using equations, tables, and graphs
5. Approximate models using the straightedge method or regression of transformed data.
6. Use power law distributions to predict frequency of catastrophic events and define fractals.
7. Describe sequences using first order difference equations and their corresponding solution equations.
8. Model data with linear, exponential, and affine difference equations.
9. Compare the function modeling, and difference equation modeling approaches.

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10. Find and classify equilibrium values.
11. Examine logistical models that lead to periodic or chaotic behavior.
12. Explore the effects of harvesting on carrying capacity (sustainability.)
13. Apply systems of difference equations to model stable age distributions, and changes in pollution levels in systems of lakes connected by rivers.
14. Analyze models, assess their accuracy, and use them for prediction.

5. Planned Sequence of Learning Activities [§335.2]

[These must be designed to help students achieve the learning outcomes.]

Basic Numeracy (10 total) Hours

- | | |
|---------------------------|---|
| 1. Measurement and Units | 2 |
| 2. Ratios and Percentages | 3 |
| 3. Charts and Graphs | 2 |

- | | |
|----------------------------------|---|
| Project: Melting of the Ice Caps | 2 |
| Test | 1 |

Function Modeling (17 total)

- | | |
|---|---|
| 4. Linear Functions and Regression | 3 |
| 5. Exponential Functions and Regression | 6 |
| 6. Power Functions | 5 |

- | | |
|--|---|
| Project: Fertility Rates in Developing Countries | 2 |
| Test | 1 |

Difference Equation Modeling (18 total)

- | | |
|--|---|
| 7. Introduction to Difference Equations | 4 |
| 8. Affine Solution Equations and Equilibrium | 4 |
| 9. Logistic Growth, Harvesting and Chaos | 3 |
| 10. Systems of Difference Equations | 3 |

- | | |
|---|---|
| Project: Water Pollution in a System of Lakes | 3 |
| Test | 1 |

6. List of Texts, References, Selected Library Resources or other Learning Materials (code each item based on instructional use: C-lecture/lab, A-lecture, B-lab, I-internet, and V-videocourse) [§335.2]

[These resources must be easily accessible to students.]

1. Langkamp, G. & Hull, J., Quantitative Reasoning and the Environment: Mathematical Modeling in Context.
2. Graphing Calculator (TI-83/84) is required.

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7. Prepared by Faculty Member: _____ Date: 3/7/07
Marci Henzi

8. Approved by Dean: _____ Date:

This course meets all reimbursement requirements of Chapter 335, subchapters A / B.

This course was developed, approved, and offered in accordance with the policies, standards, guidelines, and practices established by the College. It is consistent with the college mission.

If the course described here is a transfer course, it is comparable to similar courses generally accepted for transfer to accredited four-year colleges and universities.

Whether transfer or career, this course is articulated with other courses so that it is an elective or a requirement of one of the college programs and it does not require students to have more than 30 credit hours of post secondary study prior to enrolling in the program.

9. VP, Academic Affairs and Enrollment Management: _____ Date:
10. Original Date of course approval by the college:
11. Date(s) of subsequent reviews: