Approved 2-6-07
Senate Info. 2-27-07

06-30

Undergraduate Distance Education Review Form

(Required for all courses taught by distance education for more than one-third of teaching contact hours.)

Existing and Special Topics Course

Received
JAN 31 2007
Liberal Studies

Course: MATH 105

Instructor(s) of Record: Brian D. Sharp

Phone: 7-2600 **Email:** bds@iup.edu

Step One: Proposer

A. Provide a brief narrative rationale for each of the items, A1- A5. **Responses Attached**

1. How is/are the instructor(s) qualified in the distance education delivery method as well as the discipline?
2. How will each objective in the course be met using distance education technologies?
3. How will instructor-student and student-student, if applicable, interaction take place?
4. How will student achievement be evaluated?
5. How will academic honesty for tests and assignments be addressed?

B. Submit to the department or its curriculum committee the responses to items A1-A5, the current official syllabus of record, along with the instructor developed online version of the syllabus, and the sample lesson. This lesson should clearly demonstrate how the distance education instructional format adequately assists students to meet a course objective(s) using online or distance technology. It should relate to one concrete topic area indicated on the syllabus.

Step Two: Departmental/Dean Approval

Recommendation: ☑ Positive (The objectives of this course can be met via distance education)

☐ Negative

John J. Pattanayak 01/24/07
Signature of Department Designee Date
Curriculum Committee Chair

Endorsed: Renee Brink 1/24/07
Signature of College Dean Date

Forward form and supporting materials to Liberal Studies Office for consideration by the University-wide Undergraduate Curriculum Committee. Dual-level courses also require review by the University-wide Graduate Committee for graduate-level section.

Step Three: University-wide Undergraduate Curriculum Committee Approval

Recommendation: ☒ Positive (The objectives of this course can be met via distance education)

☐ Negative

Gail S Sechrist 2/6/07

Signature of Committee Co-Chair Date

Forward form and supporting materials to the Provost within 30 calendar days after received by committee.

Step Four: Provost Approval

☒ Approved as distance education course ☐ Rejected as distance education course

2/9/07

Signature of Provost Date

Forward form and supporting materials to Associate Provost.

Undergraduate Distance Education Proposal
For
Mathematics 105

Instructor: Brian Sharp
Phone: (724) 357-2600
Office: 216 Stright Hall, Department of Mathematics
Email: bds@iup.edu

Step One Questions

1. **How is/are the instructor(s) qualified in the distance education delivery method as well as the discipline?**

   I have been a member of the Mathematics Department faculty since the 2004-2005 school year. During that time I have taught seven (7) sections of Mathematics 105. During the Fall 2005 semester, I taught one section of Mathematics 105 in a computer laboratory. For this section, I utilized the same Course Compass software that I would use to deliver instruction in a distance education format. This experience enabled me to become familiar with the idiosyncrasies of the software and tailor my instruction around the strengths of the Course Compass. My professional vita is enclosed.

2. **How will each objective in the course be met using distance education technologies?**

   Course Compass has several nice features including PowerPoint slides, a multimedia textbook, animations, sound, and video-taped lectures. These features make on-line delivery of Mathematics 105 a suitable substitute for the traditional classroom in several ways. First, students can watch video-taped lessons over the Internet for every section covered in Mathematics 105 (see Figure 1).

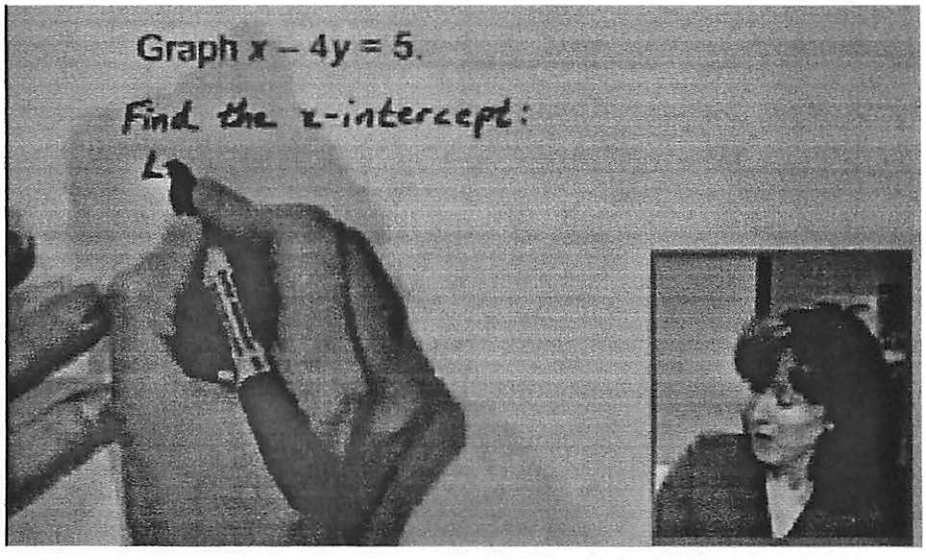

Figure 1. A screenshot of a video-taped lesson.

These video-taped lesson show a teacher delivering instruction in much the same way as a traditional instructor would do. However, these lessons include animations that cannot be used by a traditional instructor in the classroom. Second, additional multimedia applets are included that model various problems types that students encounter in their assignments. These applets allow students to see demonstrations as they work through homework problems. Third, Course Compass provides hints on how to work problems when students are unable to arrive at a correct solution (see Figure 2). The hints are designed to help students overcome their difficulties without 'giving' away the answer. When a student uses the hint feature on an assignment, the instructor is notified.

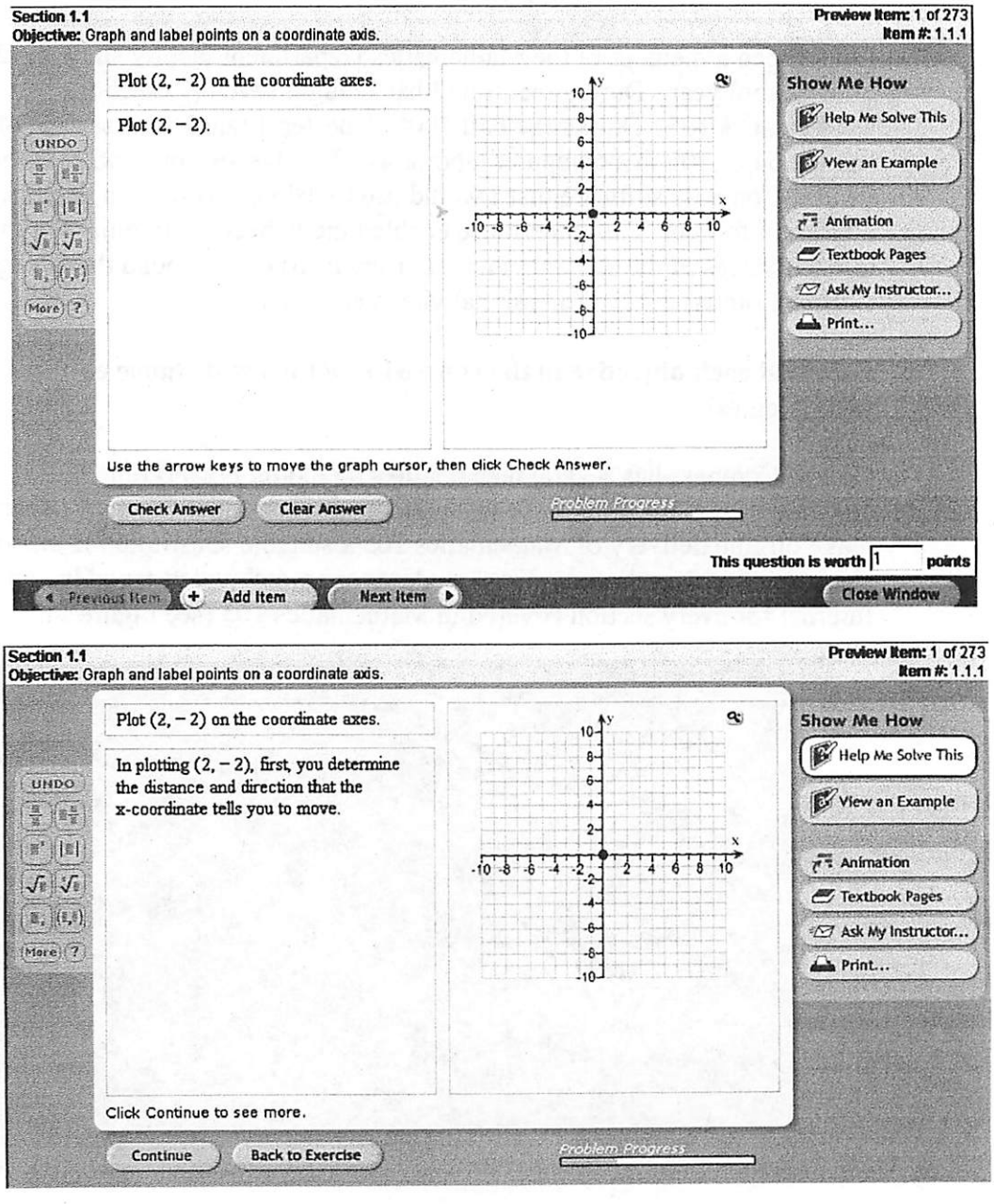

Figure 2. The original homework problem (top) and a hint (bottom).

Fourth, Course Compass has a data bank consisting of several hundred problems. This allows students to work extra problems in addition to those assigned by the instructor. Fifth, students have access to a multimedia textbook that looks identical to the paper textbook. Students do not need to buy the paper textbook when they purchase a subscription to Course Compass. A benefit to the multimedia textbook is that examples are explained step-by-step instead of written out on the page in its entirety. This allows students to think about steps in the solution process without seeing the final answer.

The official syllabus of record for Mathematics 105 lists five broad objectives for the course:

a) Students will understand and take advantage of pattern recognition in the study of mathematics
b) Students will make a careful study of functions and their applications to science, business, and economics
c) Students will understand how to interpret functions expressed analytically and graphically
d) Students will be able to calculate the rate of change of a function and interpret its meaning
e) Students will leave the course with a solid set of skills and a conceptual framework to equip the students for the future study of calculus, science, and business

These objectives will be met in the following ways:

a) The video-taped lessons and classroom assignments use an inductive approach whenever possible. Students are lead through several specific examples of a concept and then make conjectures about the overall patterns they observe in the examples. For example, students may solve several slope-related problems using the informal idea of *rise over run*. After they have sufficient experience working with the specific examples, they use same patterns and techniques to find the slope between more abstract points such as (x_1, y_1) and (x_2, y_2). This example leads the students to the more formal definition of slope, namely $m = \frac{y_2 - y_1}{x_2 - x_1}$.

b) The course is centered on the idea of functions and learning about families of functions. Beginning in Chapter 1, students develop the definition of a function and learn about range and domain. From there students learn about linear and functions in Chapter 1, quadratic functions in Chapter 2, polynomial functions in Chapter 3, and logarithmic and exponential functions in Chapter 4. In each chapter, students explore real-world applications related to business, science, and economics via story problems. For example, students have to calculate the compound interest rate during Chapter 4, the rate of inflation in Chapter 1, and the maximum height a rockets attains in Chapter 2.

c) During this course students are encouraged to analyze problems using graphical, numeric, algebraic, and verbal information. The use of graphing calculators is heavily encouraged in this course. By using graphing calculators, students can quickly generate graphs and numeric tables to represent data. For example, during Chapter 1, students use linear regression techniques to generate graphs and tables of population growth rates. They use these graphs and tables to make decisions about how limited resources should be allocated. In Chapter 2, students use graphs and tables to determine the solution to optimization problems.

d) During Chapters 1 and 2, students develop the idea of slope as a rate of change. Students then use the idea of rate of change to solve a variety of problems related to real-world applications. During Chapter 4, students use the concepts like rate of decay, compound interest rate, and population growth rate to solve problems related to science, business, and economics.

e) This course provides students with the necessary background in algebra to enable them to be successful in calculus courses, statistics courses, as well as courses outside of mathematics. Many of the concepts covered in this course are tied to real-world applications so students can see the relevance of this course to their chosen field of study.

3. How will instructor-student and student-student, if applicable, interaction take place?

Notice in Figure 2, the right side of the screen contains a link labeled "Ask My Instructor." If a student needs additional help on any given problem, they can email the problem to the instructor in order to get feedback. In addition to the email link, the instructor will maintain office hours in which off-campus students can contact the instructor via phone or instant-messaging service. Students can communicate with each other via a discussion board or chat room included in the Course Compass subscription.

4. How will student achievement be evaluated?

Student achievement will be evaluated in the same manner as in a traditional course. Students will complete homework assignments, take quizzes and test, and sit for a final exam (see attached syllabus).

5. How will academic honesty for tests and assignments be addressed?

Chapter tests and final exam questions will be randomly generated from the Course Compass data bank of questions. Since this data bank contains several hundred items, the probability of multiple students receiving identical test questions is remote. Students will also be required to digitally sign an honor statement on each test and exam.

Sample Lessons
(Course instructions for students)

Daily Work

For each section, students should:

a. Watch each sections video lecture
b. Read the corresponding section using the multimedia textbook
c. While reading the textbook, students should work each example
d. After reading each section, students should complete the respective on-line homework assignment. It is recommended that students complete all exercises in each section to gain a deeper understanding of the material.
e. Students should contact the instructor with any questions or concerns as they arise.
f. Before the specified due date, students should submit their completed on-line homework assignments.

Quizzes

For each quiz, students should:

a. Complete all associated homework assignments prior to taking each on-line quiz. Student will only be allowed one attempt to take each quiz, so prior preparation is very important.
b. Complete and submit each on-line quiz within the specified dates and times that each quiz is available.
c. Once a student starts a quiz, they will have exactly 30 minutes to complete and submit their work.
d. Student must complete the Honor Statement prior to submitting their completed quizzes. Quizzes submitted without a completed Honor Statement will not be accepted.

Chapter Tests

For each test, students should:

a. Complete all associated homework assignments prior to taking each on-line chapter test. Student will only be allowed one attempt to take each test, so prior preparation is very important. It is recommended that students complete the corresponding sample chapter test prior to taking an actual chapter test.
b. Complete and submit each on-line chapter test within the specified dates and times that each test is available.
c. Once a student starts a test, they will have exactly one hour to complete and submit their work.
d. Student must complete the Honor Statement prior to submitting their completed chapter test. Chapter tests submitted without a completed Honor Statement will not be accepted.

Final Exam

For the Final Exam, students should:

a. Review all homework, quizzes, and tests assigned during the semester.
b. Complete and submit the final exam within the specified date and time that the final exam is available.
c. Once a student starts the final exam, they will have exactly two hours to complete and submit their work.
d. Students must complete the Honor Statement prior to submitting their final exam. Final exams submitted without a completed Honor Statement will not be accepted.

I. Catalog Description

MATH 105 College Algebra — 3 credits
3 lecture hours
(3c-0l-3sh)

Prerequisite: MATH 100 or appropriate Placement Test score or permission of the Mathematics Department Chairperson.

Note: Students may not take MATH 105 after successfully completing a calculus course or MATH 110 without the written approval of the Mathematics Department Chairperson.

Prepares students for the study of calculus for business, natural and social sciences. Topics include detailed study of polynomial, exponential, and logarithmic functions.

II. Course Objectives

1. Students will understand and take advantage of pattern recognition in the study of mathematics.
2. Students will make a careful study of functions and their application to science, business, and economics.
3. Students will understand how to interpret functions expressed analytically and graphically.
4. Students will be able to calculate the rate of change of a function and interpret its meaning
5. Students will leave the course with a solid set of skills and a conceptual framework to equip the students for the future study of calculus, science, and business.

III. Course Outline

A. Review of Basic Algebra (3 hours)
   1. Exponents, Radicals, Rational Exponents
   2. Polynomials and Factoring
   3. Rational Expressions

Treat this as a review of MATH 100; do not spend a great deal of time on this!

B. Equations and Inequalities (6 hours)
   1. Equations
   2. Setting Up Equations: Applications
   3. Quadratic Equations
   4. Other Types of Equations
   5. Solving Inequalities
   6. Equations and Inequalities Involving Absolute Value

C. Graphs (5 hours)
   1. Rectangular Coordinates; Graphs of Equations
   2. Lines
   3. Parallel and Perpendicular Lines
   4. Scatter Diagrams; Linear Curve Fitting (graphing calculator users only)
   5. Variation

D. Functions and Their Graphs (8 hours)
   1. Functions
   2. Properties of Functions
   3. Library of Functions
   4. Graphing Techniques: Transformations
   5. Operations on Functions; Composite Functions
   6. Mathematical Models: Constructing Functions

E. Polynomial and Rational Functions (5 hours)
   1. Quadratic Functions and Models (non calculator users omit curve fitting)
   2. Polynomial Functions
   3. Rational Functions I (can omit oblique asymptotes if desired)
   4. Rational Functions II: Analyzing Graphs
   5. Polynomial and Rational Inequalities

F. Exponential and Logarithmic Functions (10 hours)
   1. One-to-One Functions; Inverse Functions
   2. Exponential Functions
   3. Logarithmic Functions
   4. Properties of Logarithms; Exponential and Logarithmic Models (non calculator users omit curve fitting)
   5. Logarithmic and Exponential Equations
   6. Compound Interest
   7. Growth and Decay; Newton's Law; Logistic Models

This syllabus covers 37 hours, leaving 5 hours for testing and/or review.

IV. Evaluation Methods

The final grade for the course will be determined as follows:

50% Tests. Tests will include problems on basic competency and critical thinking.
20% Final Examination. The final examination will be comprehensive and cover both basic competency and critical thinking.
30% Homework, Quizzes, and Projects. These will cover textbook assignments and applications to business and economics.
Grades will be assigned as follows:

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

V. Required Textbook

Sullivan, Michael. College Algebra, 6th ed. Upper Saddle River, NJ: Prentice-Hall, Inc., 2002.

VI. Special Resource Requirements

Some instructors may require students to purchase a graphing calculator.

VII. Bibliography

Committee on the Mathematical Sciences in the Year 2000. Everybody Counts: A Report to the Nation on the Future of Mathematics Education. Washington, DC : National Academy Press, 1989.

Connally, Eric, et al. Functions Modeling Change. New York: John Wiley & Sons, Inc., 2000.

Hughes-Hallet, Deborah, et al. Applied Calculus. New York: John Wiley & Sons, Inc., 1999.

MATH 105
College Algebra
COURSE SYLLABUS (On-line)

Instructor: Dr. Brian D. Sharp Phone: (724) 357-2600 E-mail: bds@iup.edu

Address: 216 Stright Hall
Department of Mathematics
Indiana University of Pennsylvania
Indiana, PA 15705

Yahoo Messenger ID: bsharp67@verizon.net

Office Hours: MWF: 9:30 – 10:30, TR: 11:00 – 12:00 *and by appointment*

Textbook: -Beecher, Penna, and Bittinger, *College Algebra*, IUP Custom Edition.**(Optional)**
-CourseCompass Access Code for the course textbook **(Required)**.

This course utilizes CourseCompass.com to provide students with video lectures delivered via the Internet. Students will complete all assignments using the CourseCompass interface. In order to register an account with CourseCompass, each student must have an individual access code. Access codes are included with the purchase of a new textbook. Students can purchase the access code separately from: http://info.coursecompass.com/website/students.html

Minimum Computer Requirements:

Operating system
- Windows® 2000 or XP
- Macintosh® OS 9.2, 10.1 or 10.2

Internet connection
-Minimum of 28.8 kbps (kilobits per second)

Browser
- Microsoft® Internet Explorer, Version 5.x up to Version 6.0
- Netscape® Communicator or Netscape Navigator, Version 6.2 and 7.0

CourseCompass uses both cookies and JavaScript technology. Both of these features must be turned on in your browser, and are usually turned on by default. Make sure pop-up blockers are turned off. Information on how to set up your CourseCompass account can be found at: www.coursecompass.com

Chapters covered: Chapters 1 – 4. (Sections 2.2 and 3.5 will not be covered). The sections in the review chapter are optional. Review these concepts as needed.

Course Expectations: Students will

a. Be familiar with material in the review chapter.
b. Complete all required work on time.
c. Spend at least one hour a day watching assigned video lectures and two hours a day completing assignments and studying for quizzes and tests.
d. Maintain the highest level of academic honesty throughout the course.
e. Contact the instructor if additional help and/or tutoring is required.

Calculators: Students will be permitted to use graphing calculators on all course assignments including chapter tests and the final exam.

Work Submission Policy: Each assessment will have a specific deadline before which students need to submit their work. Students missing more than three deadlines will receive a failing grade for the course. Once a deadline has passed, assignments associated with the respective deadline will not be accepted. This 3-credit course is compressed into 24 calendar days (see the calendar on Page 3 of this syllabus). Hence, this is a *very* fast-paced course. To succeed in this course, students must be willing to dedicate large amounts of time to watching video lectures, doing homework, and studying for quizzes and tests.

Evaluation:

Your grade will be determined by the number of points accumulated during the course. Points will come from homework assignments, quizzes, tests, and a final exam.

Homework – Eight (8) homework assignments consisting of 25 exercises each will be assigned during the course. However, these assignments should be considered as **minimal** preparation for quizzes and tests. Students are expected to know all the material covered in each section. It is suggested that students complete all exercises contained in each section.

Quizzes – Four (4) quizzes will be given during this course. Quizzes are to be taken near the midpoint of each chapter. Each quiz will consist of material covered in the specified sections of each respective chapter (e.g., the Chapter 1 Quiz will be on material covered in Section 1.1 through Section 1.3).

Tests - Four (4) tests will be given during this course. Each test will consist of material covered from each the four respective chapters (e.g., the Chapter 1 Test will be on all the material covered in Chapter 1).

Final Exam – The final exam will be comprehensive in nature.

The point values for assignments are as follows:

4 Quizzes x 50 points	= 200 points
8 Homework assignments x 25 points	= 200 points
4 Chapter tests x 100 points	= 400 points
1 Comprehensive final exam x 200 points	= 200 points
Total	1,000 points

Assignment of Letter Grades:

900 -1000 points	A
800 - 899 points	B
700 - 799 points	C
600 – 699 points	D
0 - 599 points	F

Course calendar for a 6-week summer session: This calendar shows the due dates for each assignment **(in bold)** and suggested times for watching each lecture.

Day 1 Lectures: Look over review chapter as needed R.2, R.3, R.4	Day 2 Lectures: Look over review chapter as needed R.5, R.6	Day 3 Lectures: Section 1.1 Section 1.2 Assignments: Start Homework 1	Day 4 Lectures: Section 1.3 Assignments: Homework 1 con't	Day 5 Lectures: Section 1.4 Assignments: **Quiz 1 Available** Start Homework 2
Day 6 Lectures: Section 1.5 Section 1.6 Assignments: **Homework 1 Due** **Quiz 1 Due** Homework 2 con't	Day 7 Lectures: Section 1.7 Assignments: Homework 2 con't **Test 1 Available**	Study Day (Day 8)	Day 9 Lectures: Section 2.1 Assignments: **Homework 2 Due** **Test 1 Due** Start Homework 3	Day 10 Lectures: Section 2.3 Assignments: Homework 3 con't **Quiz 2 Available**
Day 11 Lectures: Section 2.4 Assignments: **Homework 3 Due**	Day12 Lectures: Section 2.5 Assignments: **Quiz 2 Due** Start Homework 4	Day 13 Lectures: Section 2.6 Assignments: Homework 4 con't **Test 2 Available**	Study Day (Day 14)	Day 15 Lectures: Section 3.1 Assignments: **Homework 4 Due** Start Homework 5
Day 16 Lectures: Section 3.2 Assignments: Homework 5 con't **Test 2 Due**	Day 17 Lectures: Section 3.4 Assignments: **Homework 5 Due**	Day 18 Lectures: Section 3.5 Assignments: **Quiz 3 Due** Start Homework 6	Day 19 Lectures: Section 3.6 Assignments: Homework 6 con't **Test 3 Available**	Study Day (Day 20)
Day 21 Lectures: Section 4.1 Assignments: **Homework 6 Due** **Test 3 Due** Start Homework 7	Day 22 Lectures: Section 4.2 Assignments: Homework 7 con't	Day 23 Lectures: Section 4.3 Assignments: **Homework 7 Due**	Day 24 Lectures: Section 4.4 Section 4.5 Assignments: **Quiz 4 Due** Start Homework 8	Day 25 Lectures: Section 4.6 Assignments: Homework 8 con't **Test 4 Available**
Study Day (Day 26)	Day 27 Assignments: **Homework 8 Due** **Test 4 Due** Review for final	Day 28 Assignments: Review for final	Day 29 Assignments: Review for final	Day 30 Assignments: **Final Exam Due**

Course calendar for a fall or spring session: This calendar shows the due dates for each assignment and suggested times for watching each lecture.

Week 1		
Lectures to watch R.3, R.4 R.5, R.6 Review as needed	Homework Assignments None	Additional Assessment None
Week 2		
Lectures to watch Section 1.1 Section 1.2 Section 1.3	Homework Assignments (#1) Section 1.1 Section 1.2 Section 1.3 Due before midnight Sunday	Additional Assessment **Quiz 1** Due before midnight Sunday
Week 3		
Lectures to watch Section 1.4 Section 1.5	Homework Assignments Section 1.4 Section 1.5 Due with the homework from Sections 1.6 and 1.7	Additional Assessment None
Week 4		
Lectures to watch Section 1.6 Section 1.7	Homework Assignments (#2) Section 1.6 Section 1.7 Due before midnight Sunday	Additional Assessment None
Week 5		
Prepare for Chapter 1 Test		Additional Assessment **Test 1** Due before midnight Sunday
Week 6		
Lectures to watch Section 2.1 Section 2.3 Section 2.4	Homework Assignments (#3) Section 2.1 Section 2.3 Section 2.4 Due before midnight Sunday	Additional Assessment **Quiz 2** Due before midnight Sunday

Week 7		
Lectures to watch Section 2.5 Section 2.6 Section 2.7	Homework Assignments (#4) Section 2.5 Section 2.6 Section 2.7 Due before midnight Sunday	Additional Assessment **None**
Week 8		
Prepare for Chapter 2 Test		Additional Assessment **Test 2** Due before midnight Sunday
Week 9		
Lectures to watch Section 3.1 Section 3.2 Section 3.4	Homework Assignments (#5) Section 3.1 Section 3.2 Section 3.4 Due before midnight Sunday	Additional Assessment **Quiz 3** Due before midnight Sunday
Week 10		
Lectures to watch Section 3.5 Section 3.6	Homework Assignments (#6) Section 3.5 Section 3.6 Due before midnight Sunday	Additional Assessment **None**
Week 11		
Prepare for Chapter 3 Test		Additional Assessment **Test 3** Due before midnight Sunday
Week 12		
Lectures to watch Section 4.1 Section 4.2 Section 4.3	Homework Assignments (#7) Section 4.1 Section 4.2 Section 4.3 Due before midnight Sunday	Additional Assessment **Quiz 4** Due before midnight Sunday

<table>
<tr><td colspan="3"><u>Week 13</u></td></tr>
<tr><td><u>Lectures to watch</u>
Section 4.4
Section 4.5
Section 4.6</td><td><u>Homework Assignments (#8)</u>
Section 4.4
Section 4.5
Section 4.6
Due before midnight Sunday</td><td><u>Additional Assessment</u>
None</td></tr>
<tr><td colspan="3"><u>Week 14</u></td></tr>
<tr><td colspan="2">Prepare for Chapter 4 Test</td><td><u>Additional Assessment</u>
Test 4
Due before midnight Sunday</td></tr>
<tr><td colspan="3"><u>Final Exam</u>

Due by noon on the last Friday of Final Exam Week.</td></tr>
</table>

Brian Douglas Sharp

Indiana University of Pennsylvania
Department of Mathematics
216 Stright Hall
Indiana, Pennsylvania 15705
724-357-2600

Academic Experience

Higher Education

Indiana University of Pennsylvania — Indiana, Pennsylvania
Assistant Professor of Mathematics — *Fall 2004 - Present*

University of Virginia — Charlottesville, Virginia
Graduate Fellow — *Fall 2000 – Summer2004*
Center for Technology and Teacher Education
Curry School of Education

D. S. Lancaster Community College — Clifton Forge, Virginia
Adjunct Faculty — *Summer 1997 – Summer 1999*

West Virginia University — Morgantown, West Virginia
Graduate Teaching Assistant — *Fall 1989 – Fall 1991*

K-12 Education

Bath County High School — Hot Springs, Virginia
Mathematics Teacher/ — *Fall 1994 – Spring 2000*
Technology Coordinator

Culpeper Middle School — Culpeper, Virginia
Mathematics Teacher — *Fall 1993 - Spring 1994*

Elkins Junior High School — Elkins, West Virginia
Mathematics Teacher — *Fall 1992 – Spring 1993*

Academic Background

University of Virginia — Charlottesville, Virginia
Ph.D. – Mathematics Education, Advisor Joe Garofalo — *August, 2004*

West Virginia University — Morgantown, West Virginia
M.A. Mathematics Education — *August, 1992*
M.S. Mathematics — *December, 1991*

West Virginia University — Morgantown, West Virginia
B.A. Mathematics — *May, 1989*

Publications

Sharp, B. (Fall, 2005). Scrolling through mathematical concepts using Excel. *PCTM Magazine,* XLIV(1) pp.16-17. IUP: Indiana, PA.

Sharp, B. (Spring, 2005). Randomly using spreadsheets. *PCTM Magazine,* XLIII(4) pp.15-16. IUP: Indiana, PA

Sharp, B., Thompson, A., & Garofalo, J.(January, 2005). Digital imagery in the mathematics curriculum. In Bull, G., & Bell, L. (Eds.), *Teaching with digital images: Acquire, analyze, create and communicate*. Eugene, OR: International Society for Technology in Education

Cory, B., Manizade, A., Sharp, B., Steckroth, J., & Garofalo, J. (2004). A new look at Geometer's Sketchpad: Teaching area across grade levels. *School Science and Mathematics, 104*, 232.

Sharp, B. D., A Thompson, and Garofalo, J. (2003). Digital imagery in the mathematics classroom. *Learning and Leading with Technology*, 31(8), 30-33.

Sharp, B. D. and Teahan, J. (2003). Math in a flash: Educational uses of flash technology. *National Consortium for Specialized Secondary Schools of Mathematical, Science and Technology Journal*, 8(2), 19-20.

Garofalo, J. and Sharp, B. D. (2003). Teaching fractions using a simulated sharing activity. *Learning and Leading with Technology*, 30(7), 36-41.

Sharp, B. D. and Garofalo, J. (2003). Kids and Cookies. *Virginia Mathematics Teacher.*

Teahan, J. and Sharp, B. D. (2003). Picture Perfect: Using digital cameras for teaching mathematics. *National Consortium for Specialized Secondary Schools of Mathematical, Science and Technology Journal*, 8(1), 17-18.

Materials Development

Formerly part of a team that developed materials to help pre-service and in-service teachers effectively integrate technology into the middle and secondary mathematics curriculum. The materials utilize technology tools such as *The Geometer's Sketchpad, Microsoft Excel, MicroWorlds* (Logo), *Fathom, ExploreMath.com,* Global Positioning Systems, interactive websites, and graphing calculators. Materials disseminated for use in mathematics methods courses at other colleges and universities.

Presentations

National

Sharp, B., Steckroth, J., & Garofalo, J. (June 2005). *Digital imagery in the mathematics curriculum.* Session to be presented at the National Educational Computing Conference, Philadelphia, PA.

Sharp, B. D., Cory, B., and Sharp, D. L. (February 2004). *Implementing digital cameras into mathematics education courses and the k-12 classroom.* Session to be presented at the annual meeting of the Association of Mathematics Teacher Educators, San Diego, CA.

Garofalo, J. and Sharp, B. D. (September, 2003). *Digital imagery in mathematics instruction.* Session presented at the Fifth Annual National Technology Leadership Summit, Washington, D. C.

Garofalo, J., Sharp, B. D., Cory, B., and Manizade, A. (February 2003). *Using flash-based applications to promote rational number concepts.* Session presented at the annual meeting of the Association of Mathematics Teacher Educators, Atlanta, GA.

Sharp, B. D. and Schirack, S. O. (January 2002). *Difficulties pre-service teachers face when implementing technology into the secondary mathematics classroom.* Session presented at the annual meeting of the Association of Mathematics Teacher Educators, San Antonio, TX.

Regional

Sharp, B. D. and Sharp, D. L. (November 2003). *Kids and Cookies: Investigating fractions through sharing.* Session presented at the southern regional meeting of the National Council of Teachers of Mathematics, Charleston, SC.

State

Sharp, B. (Accepted, October 05). *Making mathematics meaningful with digital images.* Pennsylvania Council of Teachers of Mathematics, Harrisburg, PA.

Sharp, B. (September, 2005). *Mathematics instruction and classroom management in a computer lab setting.* IUP Mathematics Department Colloquium, Indiana, PA.

Sharp, B. D. (October 2004) *Kids and Cookies: Investigating fractions through sharing.* Session presented at the annual meeting of the Pennsylvania Council of Teachers of Mathematics, Erie, PA.

Sharp, B. D. (March 2003) *Teaching integer operations with technology.* Session presented at the annual meeting of the Virginia Council of Teachers of Mathematics, Chester, VA.

Sharp, B. D. (March 2000). *Interactive explorations*. Session presented at the annual meeting of the Virginia Council of Teachers of Mathematics, Harrisonburg, VA.

Sharp, B. D. (March 2000). *Web-based mathematics activities*. Session presented at the annual meeting of the Virginia Society for Technology in Education, Norfolk, VA.

Workshops

IUP Visiting Scientist/Mathematician Program Fall 2005 - Present
Member of a group of faculty members who prepare and present science and mathematics demonstrations to k-12 audiences.

IUP CETP-PA Program Fall 2005 - Present
Member of a group of faculty members who conduct teacher in-service workshops k-12 teachers.

Integrating Technology in Middle and Secondary School Mathematics Fall 2000 – Spring 2004
A continuing professional development project with teachers as part of the XL Education Initiative, Hamilton, Bermuda.

Mathematics and Handheld Devices Winter 2003
A demonstration of a variety of handheld devices (within different platforms), equipped with graphing calculators, word processing programs, spreadsheets, printing programs, and other educational software.

Teaching with Technology Summer 1998
A one-week institute presented by Dabney S. Lancaster Community College for the Bath County School System.

Mathematics and the Internet Fall 1996
A professional development project with teachers as part of the National Security Agency's Mathematics Institute.

Professional Organization Memberships

Association for Mathematics Teacher Educators
National Council of Teachers of Mathematics
Pennsylvania Council of Teachers of Mathematics
International Society for Technology in Education

University and Departmental Committee Membership

Liberal Studies Learning Goals Committee
Elementary Mathematics Education Committee
Secondary Mathematics Education Committee
Mathematics Summer School Committee-Chair
Mathematics Service Course Committee
Mathematics Promotion Committee
PCTM Annual Conference Exhibits and Vendors Committee- Co-chair