

## **Web Based Precalculus**

by

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### **ABSTRACT**

In the precalculus course that is discussed, students have the option of accessing interactive web based materials in lieu of attending lectures. Students are required to take their daily quizzes over the web as well as a couple of major tests. Strategies used to develop the initial materials, as well as some observations concerning students work associated with on line testing are discussed.

### **Pedagogy**

Precalculus is a freshman mathematics course which includes topics such as trigonometry from the point of view of functions, polar coordinates, vectors, and conic sections. Good understanding of the concepts is crucial for building students' mathematical understanding, confidence and success in all subsequent mathematics courses. This course serves as a prerequisite to the calculus sequence. It provides the necessary background for math majors, computer science majors and natural science majors.

### **Course Design**

#### Technology

In this course, the goal is an innovative approach to using the Web to accommodate more students and teachers as well as to utilize technology. This graphical user interface is available through the use of WebCT. Rather than total class lectures, class material are available on web pages that could be uploaded to WebCT. Students have the option of going to these files for the information, lecture material and for practice.

#### Organization

The precalculus course consists of 35 Lessons, 4 class tests, 5 review sessions, 1 final comprehensive exam, daily worksheets and daily on-line quizzes. This content is designed for one semester, which consists of approximately 30 class sessions. Each class session provides the student with the lecture material and daily worksheets.

#### Worksheets

The use of worksheets to present material to individual or small groups of students provides several benefits. Students work at their own rate. Students are engaged in the material through interaction with others in their group. Students stay on task exploring questions that occur to them, rather than questions they are not prepared for, have moved beyond, or are otherwise not interested in. The instructor may move among the groups acting as a facilitator/mentor. Students are active in the material, which enables them to build models, and encourages conceptual learning rather than the rote use of formulas and algorithm.

### Class Lessons

The textbook used for this course is 'Precalculus- lecture notes and activities' by Dr. Jean Bevis. Students are required to purchase the textbook/materials . The book contains the lecture notes as well as activities for the students to take part in. From fill in the blank to graphing activities, the book serves as a workbook. Lessons are 3-5 pages long with practice exercises at the end. In order to complete all the lessons during the semester, several class sessions require the instructor to complete a couple of lessons for that day. At the end of each class lesson, the instructor provides students with worksheets for the opportunity to practice and discuss the trigonometric concepts.

### WebCT

In general, WebCT displays web pages that contain the lecture notes, syllabus, text book readings, homework assignments, quizzes tests, and recommended web sites . Students have the opportunity for on-line access of the same lecture notes that is in the text book. Lessons contain interactive popup windows, provides hints and suggestions to solutions, as well as solutions to check answers. WebCT also provides chat rooms / web communications. Its not only a means for communication between the instructor and the student but between students themselves. Communication and interchange of ideas among students is central to the community of learners. Furthermore, WebCT provides the instructor the ability to manage student identity and work records.

### Quizzes

Every class session will require students to complete an on-line quiz about that day's lecture material. Students have 25 minutes to complete the quiz in a 24 hours time frame. There are 4 versions of the quiz for randomization. Students are not allowed to discuss or work with other students on the quiz but they are allowed to use their notes. The quizzes are administered as multiple choice, matching or short numeric answer questions.

### Class Tests

During the semester, students are responsible to complete 4 tests. The first and third test are administered in-class, while the second is a web base anytime any place test and the fourth is a proctored web base test. This set up provides students the opportunity of traditional style testing as well as computerized testing.

#### Observation

The use of a web based supported course to deliver materials at individual rates and to provide customized interaction are key elements of this course plan. The results indicate positive outcomes, but a more research in this area can ascertain the further implications of what this research has accomplished. The overall conclusion to be drawn from the results of this research is that the use of web base technology provides a positive experience for students. It is an instructional tool for students thereby enhancing the learning process and providing a new way to think about and do their own mathematics. The students expressed more positive attitudes about learning mathematics. Hence, the results can be viewed as a step toward a more mature body of knowledge about the applications of web technology in the process of teaching and learning.