

Syllabus for Math 195

This course is intended for students in the honor program who are oriented towards the humanities or biology. The goal of the course is to expose the students to some exciting, nontrivial mathematics. The topics covered vary from year to year. Compared to Math 119 there is less emphasis on developing computation skill, and fewer topics are covered. Moreover, in Math 195 students are assigned fewer drill problems, but more "hard" problems.

In the Fall of 1996 the text was Hahn, *Learning Basic Calculus: From Archimedes to Newton to its Role in Science*. Chapters 1-6 and 8 were covered. The following is from the web page for the book.

From Archimedes to Newton, attempts to teach elementary calculus, as well as the necessary trigonometry and analytic geometry, from within its historical flow". The flow is historical, but the emphasis is on doing the mathematics in a pedagogically effective way. This means that the material is developed from within the relevant context: that of the Greek thinkers, that of Copernicus, Galileo, Kepler and Descartes, or that of Newton and Leibniz. But, it also means that the notation is modern and that the material is selected so as to cover the basics of the subject. Parts of the text, for example the section on Newton's Principia, stay close to the spirit of the original arguments, but expand and clarify them considerably so as to make them understandable. Other discussions, such as that on analytic geometry, leave the original efforts out altogether. Calculus is developed by fusing essential insights of both Leibniz and Newton together into a complete "short calculus". This starts from scratch, is free of most theoretical "baggage", and concentrates on the intuitive grasp of the basic elements. What will have emerged is a basic mathematics course "as it can be learned from the masters." It is surrounded by the important scientific concerns of the times, and includes, at times on the periphery and at times interwoven within it, very important segments of our scientific and cultural story."