

University Of California, Berkeley
Department of Mechanical Engineering

E 117: Methods of Engineering Analysis (3 units)

Elective Course

Syllabus

CATALOG DESCRIPTION

Methods of theoretical engineering analysis; techniques for analyzing partial differential equations and the use of special functions related to engineering systems. Sponsoring Department: Mechanical Engineering.

COURSE PREREQUISITES

Mathematics 53, 54.

TEXTBOOK(S) AND/OR OTHER REQUIRED MATERIAL

Interest in solving engineering problems by mathematical analysis. Knowledge of calculus, basic linear algebra, vector analysis. Textbook to be assigned by instructor.

COURSE OBJECTIVES

To acquire facility with basic methods of analysis relevant to physics and engineering and to prepare students for more advanced study. To understand and use tools of linear analysis needed in quantitative engineering.

DESIRED COURSE OUTCOMES

Ability to apply basic techniques of applied mathematics to problems in engineering and the physical sciences. Development of familiarity with methods of analysis essential to quantitative work in engineering.

TOPICS COVERED

Fourier series, various types of differential equations encountered in physical systems (wave, heat and Laplace equations), separation of variables, solution by Fourier and Laplace transforms, basic complex variables, introduction to relevant numerical methods.

CLASS/LABORATORY SCHEDULE

Three hours of lecture and one hour of discussion per week.

CONTRIBUTION OF THE COURSE TO MEETING THE PROFESSIONAL COMPONENT

Equips students with an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

RELATIONSHIP OF THE COURSE TO ABET PROGRAM OUTCOMES

Enables students to apply knowledge of applied mathematics to analyze problems in science and engineering. An ability to apply knowledge of mathematics, science, and engineering. An ability to identify, formulate, and solve engineering problems. The broad education necessary to understand the impact of engineering solutions in a global and societal context. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

ASSESSMENT OF STUDENT PROGRESS TOWARD COURSE OBJECTIVES

Grades on assigned homework (including computer projects), midterm and final.

PERSON(S) WHO PREPARED THIS DESCRIPTION: [David Steigmann](#) Feb. 26, 2006