

**Applied Mathematics 415**

**Mathematical Methods**

Mathematical analysis of linear systems. Fourier and Laplace transforms, applications and numerical methods. Functions of a complex variable and applications.

Course Hours: H(3-1T)

Prerequisite(s): One of [Applied Mathematics 311](#), [307](#), [Mathematics 331](#), [353](#), [381](#), or [Applied Mathematics 309](#).

Antirequisite(s): Credit for both [Applied Mathematics 415](#) and [433](#) will not be allowed for Applied Mathematics and General Mathematics programs.

*Syllabus*

<u>Topics</u>	<u>Number of Hours</u>
Complex numbers. Limits. Continuity. Differentiability. Analytic functions. Elementary functions. Real integrals of complex functions.	4
Trigonometric polynomials. Approximation by trigonometric polynomials. Fourier series. Discrete Fourier transform	8
Complex integrals. Cauchy's integral theorem. Cauchy's integral formula.	4
Series of real and complex functions. Convergence tests. Taylor, McLaurin, Laurent series. Properties of zeros and poles.	5
Sequence spaces. The z-transform and its inverse. Discrete linear systems and filters. Convolution. Frequency analysis. Special purpose filters.	7
Improper integrals. Continuous linear systems and filters. Integration by the method of residues. Laplace and Fourier transforms and their inverses. Frequency analysis. Special purpose filters.	8
<b>TOTAL HOURS</b>	<b>36</b>

\*\*\*\*\*