

## **ECE298-JA: Concepts in Engineering Math**

In the present engineering curriculum, the study of mathematics is necessarily stretched out over several years, since it must be broken down into digestible chunks, each one semester: Calculus I, II, III, differential equations, linear algebra, real and complex analysis, etc. Due to this six semester span, it is difficult to integrate the mathematics and its engineering applications.

This course provides a broad overview of the development of classical mathematical theories as used in contemporary engineering. This includes the historical discovery and development of the mathematics of linear algebra, complex analysis (e.g., frequency domain methods, impedance) and partial differential equations. This course emphasizes engineering insight and intuition building (rather than proofs). Intuitive insights into the fundamental theorems of mathematics will be presented, to help the students expand their natural creative skills. The specific mathematical contributions of Newton, Euler, Riemann, Cauchy, Gauss, Maxwell, and others, are discussed. Problem sets will be based on engineering problems, and how they relate to classical mathematics.

Following are a few comments from students:

-Thank you for teaching us 298! I have been exposed to a bigger world of engineering maths and learned a lot in the course, which is really helpful.

-Thank you for teaching 298: It felt like “Whoa!”

-I took your ECE 298, receiving an A, and enjoyed the class immensely. I’m using it to keep up with friends at Harvard, taking the infamous Math 55.

-Introducing the mathematical tools used to do physics and engineering, while simultaneously presenting the historical and scientific context . . . seems to be such an intuitive (obvious?) way of presenting mathematics. I have to wonder why it isn’t the standard way of teaching mathematics to engineers.

-Fourier series and Laplace transforms and distributions are now understandable, almost easy. Learning complex analysis makes math less magical.

-Helped with: Math 415, 286, 481; ECE 330, 210, 110; Phys 214 easier due to solid understanding of complex analysis.