MO 1901

Mathematics for Information Sciences, Systems, and Operations (ISSO)

COURSE OBJECTIVES

1. Functions

    a. Recognize whether or not a curve represents the graph of a function
    b. Evaluate: linear, quadratic, polynomial, exponential, natural log and trigonometric functions

2. Derivatives

    a. Understand the concept of the derivative
    b. Know and apply the rules for taking derivatives of the functions listed in 1b above.
    c. Apply the derivative rules for adding, subtracting and multiplying by a constant.
    d. Apply the product rule and quotient rules.
    e. Apply the power rule
    f. Be able to take the second derivatives.
    g. Use the first and second derivative tests to find the max (min) of a function

3. Integrals

    a. Understand the concept of the integral
    b. Apply the integral rules for adding, subtracting and multiplying by a constant.
    c. Apply integration by substitution
    d. Apply integration by parts

4. Series

    a. Understand the notion of a sequence and relate to functions
    b. Understand the limiting behavior of sequences
    c. Understand the concept and notation of a series
    d. Be able to recognize a geometric, p-, and harmonic series
    e. Understand the notion on convergence and divergence
    f. Understand the application to signal theory

5. Complex Numbers

    a. Understand the notion of a complex number
    b. Apply the algebra of complex numbers (add, subtract, multiply and divide)
    c. Understand the geometry of complex numbers
    d. Understand and use the complex conjugate
    e. Understand and compute the magnitude of a complex number
    f. Use the trigonometric form of complex numbers
    g. Apply De Moivre's Theorem
    h. Apply Euler's Identity

6. Fourier Series

    a. Understand and recognize periodic functions
    b. Understand the components of a Fourier series
    c. Understand the use of a Fourier series to approximate periodic functions
    d. Be able to construct Fourier series of simple periodic functions
    e. Be able to use the complex form of the Fourier series

7. Fourier transforms

    a. Understand the frequency spectrum
    b. Understand the definition of a Fourier transform
    c. Use and recognize a unit step function and impulse function
    d. Understand the properties of Fourier transforms
    e. Compute Fourier transforms of simple functions