Syllabus of Linear Algebra

1. Linear combination of vectors: geometric and coordinate representation
2. Scalar and cross product
3. Linear transformations of vectors and matrices
4. Transpose of a matrix and symmetric matrices
5. Determinant and inverse matrices
6. Eigenvalues and eigenvectors of matrices
7. Orthogonal matrices
8. Representations of rotations of a rigid body: Euler angles and quaternions

Syllabus of Dynamical Systems

1. Derivatives of a function f(x)
2. Geometrical interpretation of df/dx
3. Differential equations and some examples with analytic solutions
4. Systems of differential equations
5. Linear differential equations: homogeneous and forced
6. Complex numbers
7. Laplace transform
8. Solution of differential equations by Laplace transform
9. The transfer function and transfer matrix of linear systems

Matlab Programming

Matlab code will be applied to the subjects covered by Linear Systems and Dynamical Systems, with examples and exercises.