سرفصل درس معادلات دیفرانسیل عادی یک:

منابع:

Differential Equations and Dynamical Systems
Introduction to applied nonlinear dynamical systems and chaos
Lawrence Perko

First and second weeks: **Linear Systems**

1. Uncoupled Linear Systems
2. Diagonalization
3. Exponentials of Operators

Third and fourth and sixth weeks**: Linear Systems**

1. The Fundamental Theorem for Linear Systems
2. Linear Systems in R^2
3. Complex Eigenvalues
4. Multiple Eigenvalues

Seventh and eighth weeks: **Linear Systems**

1. Jordan Forms
2. Stability Theory

Ninth and tenth weeks: **Nonlinear Systems: Local Theory**

1. Some Preliminary Concepts and Definitions
2. The Fundamental Existence-Uniqueness Theorem

Eleventh and twelfth weeks: **Nonlinear Systems: Local Theory**

1. Dependence on Initial Conditions and Parameters
2. The Maximal Interval of Existence
3. The Flow Defined by a Differential Equation

Thirteenth and fourteenth weeks: **Nonlinear Systems: Local Theory**

1. Linearization
2. The Stable Manifold Theorem
3. The Hartman-Grobman Theorem
4. Stability and Liapunov Functions
5. Saddles, Nodes, Foci and Centers
6. Nonhyperbolic Critical Points in R^2

Sixteenth and seventeen and eighteenth weeks: **Nonlinear Systems: Global Theory**

1. Dynamical Systems and Global Existence Theorems
2. Limit Sets and Attractors
3. Periodic Orbits, Limit Cycles and Separatrix Cycles
4. The Poincare Map
5. The Stable Manifold Theorem for Periodic Orbits