*Approved: JUNE 2018 Effective: FALL 2018*

|  |  |  |
| --- | --- | --- |
| **MATERIAL TO BE COVERED** | **SECTIONS FROM TEXT** | **TIME LINE** |
| Introduction to Differential Equations: definition and terminology, initial value problems, differential equations as mathematical models | 1.1-1.3 | 2 hours |
| First Order Differential Equations: direction fields, autonomous first order DEs, Separable, linear, exact differential equations solutions by substitutions, a numerical method | 2.1-2.6 | 12 Hours |
| Modeling With First Order Differential Equations: linear models, nonlinear models | 3.1 – 3.2 | 4 Hours |
| Higher Order Differential Equations: linear equations, reduction of order, homogeneous linear equations with constant coefficients, the method of undetermined coefficients: superposition approach, the method of undetermined coefficients with annihilators, variation of parameters, Cauchy-Euler Equations. | 4.1-4.7 | 12 Hours |
| Modeling With Higher Order Differential Equations : spring –mass systems: free undamped motion, driven motion, series circuit analogue | 5.1 | 4 Hours |
| Series Solutions of Linear Equations : solutions about ordinary points | 6.2 | 2 Hours |
| The Laplace Transform: definition, inverse transform, transform of derivatives, translation on the s-Axis, translation on the t-Axis | 7.1-7.3 | 10 Hours |
| Systems of Linear First-Order Differential Equations: linear systems, homogeneous linear systems: distinct real eigenvalues, repeated eigenvalues, complex eigenvalues | 8.1-8.2 | 4 Hours |
| Numerical Solutions of Ordinary Differential Equations: Euler methods and error analysis, Runge-Kutta methods | 9.1-9.2 | 2 Hours |

### 4-unit class: hours total 57.5 (15 x 3 hours 50 minutes) – hours for exams + 2.5 hour final

This outline allows for 4 hours of exams.

Submitted by: Beydler, Griffith, Guth, Khoddam, Kojima, Nguyen, Pop, Sholars, Tamayo, Tran

Math Department Policy can be found at: <https://www.mtsac.edu/math/departmentpolicy.html>