*Approved: JUNE 2018 Effective: FALL 2018*

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| **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.

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