



## Curriculum Description for St. Francis Baccalaureate

### **MATHEMATICS 321 – DIFFERENTIAL EQUATIONS**

**Course Description:** Solution methods for ordinary differential equations, including series techniques and Laplace transforms, with applications. Credit 3 hours.

**Prerequisite:** MATH 224 *Calculus 3*

#### **Outcomes**

- Knowledge of the techniques used to solve a variety of ordinary (non-partial) differential equations
- Ability to use differential equations to analyze applied problems from a variety of disciplines

#### **Objectives**

Upon successful completion of this course, students will be able to:

- solve separable, first-order differential equations using the technique of direct integration
- solve linear, first-order differential equations using integrating factors
- solve homogeneous and Bernoulli, first-order differential equations using substitutions
- identify and solve exact, first-order differential equations
- solve constant-coefficient homogeneous differential equations of second and higher order and state the principle of superposition for the solutions of homogeneous equations
- define the linear independence of two functions and state how the Wronskian can be used to determine the linear dependence or independence of the solutions of a homogeneous differential equation
- solve constant-coefficient nonhomogeneous differential equations of second and higher order using the method of undetermined multipliers
- identify and solve elementary boundary value and eigenvalue problems
- use series techniques to solve differential equations that have variable coefficients
- solve differential equations using Laplace transform methods
- construct appropriate mathematical models which represent or describe practical problems from the natural sciences, social sciences, and business; solve the mathematical models with appropriate techniques; and interpret the solutions with reference to the original practical problems

**Instructional Methodologies:** Classes will consist of lecture/discussion. Homework will be assigned on a regular basis.

**Textbook:**

**[Required]** *Elementary Differential Equations with Boundary Value Problems*, Fifth Edition, by C. Henry Edwards and David E. Penney. Pearson Prentice Hall, Inc., Upper Saddle River, New Jersey (2004).

**Course Content:**

- Chapter 1: First-Order Differential Equations
- Chapter 2: Linear Equations of Higher Order
- Chapter 3: Power Series Methods
- Chapter 4: Laplace Transform Methods

**Course Requirements:**

**Attendance:** Class attendance is strongly recommended and vigorously encouraged.

Students who are absent will be responsible for both the material missed in class and any announcements made in class.

**Homework:** Since homework is an integral part of the course, assignments will be made on a regular basis. Students are encouraged to work together on the homework assignments, but simply copying another student's homework is strongly discouraged (negative consequences of this academic strategy are usually experienced during tests and the final examination).

**Tests:** All tests will be closed-book and closed-note. If necessary, a formula sheet will be provided. Graphing calculators will not be allowed during the tests. Tests will be loosely based on the assigned homework. A total of four tests will be given during the semester. See the attached sheet for a tentative listing of test dates. Each student's lowest test score will be dropped at the end of the semester. Students who cannot take a test at the scheduled time (due to emergency or school activity) should notify the instructor prior to the test.

**Final Exam:** The final exam will be closed-book and closed-note. A formula sheet will be provided. Graphing calculators will not be allowed during the final exam. THE FINAL EXAM WILL BE COMPREHENSIVE. The final exam time will not be changed except in cases of verifiable emergencies. Students who cannot take the final exam at the scheduled time (due to emergency) should notify the instructor prior to the exam.

**Evaluation:**

Course grades will be based on: three quizzes (100 pts. each), and the final exam (120 pts.) for a total of 420 points. Course grades will be assigned as follows:

A: 100%-93%	A-: 92%-90%	
B+: 89%-87%	B: 86%-83%	B-: 82%-80%
C+: 79%-77%	C: 76%-73%	C-: 72%-70%
D+: 69%-67%	D: 66%-63%	D-: 62%-60%
F: 59%-0%		

**Policy Regarding Academic Integrity:** Academic honesty according to the Academic Integrity Policy is expected in this class for all work submitted for a grade and will be strictly followed. Students are responsible for understanding and following this policy.

**THIS DOCUMENT IS SUBJECT TO ANNOUNCED CHANGES**