



Los Angeles Community College District

COURSE OUTLINE

SECTION I: BASIC COURSE INFORMATION

- 1. COLLEGE: Pierce
2. SUBJECT (DISCIPLINE) NAME (40 characters, no abbreviations): Math
3. COURSE NUMBER: 275
4. COURSE TITLE: Ordinary Differential Equations
5. UNITS: 3.00
6. CATALOG COURSE DESCRIPTION -- Provide a description of the course, including an overview of the topics covered:

Includes an introduction to first, second and higher order linear differential equations, operator methods, series solutions, the gamma function, Laplace transform techniques, Boundary value problems, and numerical methods with an emphasis on applications.

- 7. CLASS SCHEDULE COURSE DESCRIPTION -- Provide a brief description of the course, including an overview of the topics covered:

Includes an introduction to first, second and higher order linear differential equations, operator methods, series solutions, the gamma function, Laplace transform techniques, Boundary value problems, and numerical methods with an emphasis on applications.

- 8. COLLEGE APPROVAL DATE:

- 9. UPDATES (check all applicable boxes):

- Content Last Update: Jan. 17, 2005
Objectives Last Update: Jan. 17, 2005
College Specific Course Attributes/Data Elements Last Update:
Districtwide Course Attributes/Data Elements Last Update:
Other (describe) Last Update:

Empty rectangular box for additional information.

- 10. CLASS HOURS:

Table with 4 columns: Activity, Hours per week (based on 18 weeks), Total Hours per term (hrs per week x 18), Units. Rows include Lecture, Lab/activity (w/ homework), Lab/activity (w/o homework), and Total.

1 Underlined course attributes are the same for the course throughout the LACCD; all other course attributes are college specific.

**Note:** The Carnegie Rule and Title 5, section 55002 sets forth the following minimum standards: 1 unit = 1 hour lecture per week, 2 hours homework per week; **OR** 2 hours per week of lab with homework; **OR** 3 hours of lab per week without homework. The hours per week are based on a standard 18-week calendar. Lecture also includes discussion and/or demonstration hours, laboratory includes activity and/or studio hours.

## 11. PREREQUISITES, COREQUISITES, ADVISORIES ON RECOMMENDED PREPARATION, and LIMITATION ON ENROLLMENT

**Note:** The LACCD's *Policy on Prerequisites, Corequisites and Advisories* requires that the curriculum committee take a separate action verifying that a course's prerequisite, corequisite or advisory is an "appropriate and rational measure of a student's readiness to enter the course or program" and that the prerequisite, corequisite or advisory meets the level of scrutiny delineated in the policy.

Prerequisites: **Yes** (If yes, complete information below)

Subject	Number	Course Title	Units	Validation Approval Date (for official use only)
Math	263	Calculus III	5	

Corequisite: **None** (If yes, complete information below)

Subject	Number	Course Title	Units	Validation Approval Date (for official use only)

Advisories: **None** (If yes, complete information below)

Subject	Number	Course Title	Units	Validation Approval Date (for official use only)

## 12. OTHER LIMITATIONS ON ENROLLMENT (see Title 5, section 58106 and Board Rule 6803 for policy on allowable limitations. Other appropriate statutory or regulatory requirements may also apply):

--

## SECTION II: COURSE CONTENT AND OBJECTIVES

### 1. COURSE CONTENT AND OBJECTIVES:

COURSE CONTENT AND SCOPE – <b>Lecture:</b> If applicable, outline the topics included in the lecture portion of the course ( <i>Outline reflects course description, all topics covered in class.</i> )	Hours per topic	COURSE OBJECTIVES - <b>Lecture</b> ( <i>If applicable:</i> upon successful completion of this course, the student will be able to... ( <i>Use action verbs – see Bloom’s Taxonomy below for “action verbs requiring cognitive outcomes.”</i> ))
1. First order ordinary differential equations 2. Systems of differential equations 3. Second and higher order linear differential equations 3. Series solutions 4. Laplace transform techniques 5. Numerical methods	11   11  11  11  10	Upon successful completion of this course, the student will be able to:  1. Calculate solutions of first order differential equations of various types such as linear, non-linear, separable, exact, homogeneous and non-homogenous 2. Illustrate the development of the integrating factors method and employ the method to solve linear first order differential equations 3. Recognize, interpret, and model applications of differential equations and formulate, calculate and solve problems involving these applications. 4. Calculate and interpret the solutions of second order linear differential equations, both homogeneous and non-homogenous, by reduction of order, the method of undetermined coefficients, and variation of parameters. 5. Analyze, model, and solve problems in mechanical vibrations, both free and forced, using linear differential equations 6. Calculate and interpret the series solutions of second order linear differential equations near ordinary points and near regular singular points 7. Illustrate the development of the Laplace transform and calculate the Laplace Transform of step functions, forcing functions, impulse functions, and employ the Laplace transform to solve initial value problems 8. Use numerical methods to estimate solutions to differential equations
<b>Total lecture hours*</b>	54	

\*Total lecture and laboratory hours (which includes the final examination) must equal totals on page 1.

**2. REQUIRED TEXTS:**

Provide a representative list of textbooks and other required reading; include author, title and date of publication:

Linear Algebra and Its Applications, David C. Lay

**3. SUPPLEMENTARY READINGS:**

Reading assignments may include, but are not limited to the following:

**4. WRITING ASSIGNMENTS:**

Title 5, section 55002 requires grades to be "based on demonstrated proficiency in subject matter and the ability to demonstrate that proficiency, at least in part, by means of essays or, in courses where the curriculum committee deems them to be appropriate, by problem solving exercises or skills demonstrations by students." Writing assignments in this course may include, but are not limited to the following:

Writing assignments in this course include, but are not limited to, problem solving exercises.

**5. REPRESENTATIVE OUTSIDE ASSIGNMENTS:**

Out of class assignments may include, but are not limited to the following:

**6. REPRESENTATIVE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING:**

Title 5, section 55002(a) requires that a degree applicable course have a level of rigor that includes "critical thinking and the understanding and application of concepts determined by the curriculum committee to be at college level". Critical thinking may include, but is not limited to analysis, synthesis, and evaluation. Provide examples of assignments that demonstrate critical thinking.

Writing assignments involve problem solving and analysis. For example: "Graph the transient behavior, and the steady state behavior, of an object in a forced mass-spring system governed by the equation  $y'' + 2y' + 2y = \sin(t) + 2\cos(t)$ , given that  $y(0) = 1$  and  $y'(0) = 1$ "

**7. METHODS OF EVALUATION:**

Title 5, section 55002 requires grades to be "based on demonstrated proficiency in subject matter and the ability to demonstrate that proficiency, at least in part, by means of essays, or, in courses where the curriculum committee deems them to be appropriate, by problem solving exercises or skills demonstrations by students." Methods of evaluation may include, but are not limited to the following (please note that evaluation should measure the outcomes detailed "Course Objectives" at the beginning of Section II):

Methods of evaluation may include, but are not limited to, quizzes and exams, including a final exam; homework; computer projects; portfolios or journals

**8. METHODS OF INSTRUCTION:**

Methods of instruction may include, but are not limited to the following:

- Lecture
- Discussion