

MATH 2B Course Outline as of Fall 2008

CATALOG INFORMATION

Dept and Nbr: MATH 2B      Title: CALCULUS 4  
Full Title: Calculus, Fourth Course-Differential Equations  
Last Reviewed: 11/28/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable  
Grading: Grade Only  
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:

**Catalog Description:**  
First and second order differential equations with applications, series solutions, numerical methods, introduction to Laplace transforms, systems of differential equations with applications.

**Prerequisites/Corequisites:**  
Math 2A.

**Recommended Preparation:**

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: First and second order differential equations with applications, series solutions, numerical methods, introduction to Laplace transforms, systems of differential equations with applications. (Grade Only)  
Prerequisites/Corequisites: Math 2A.  
Recommended:  
Limits on Enrollment:  
Transfer Credit: CSU;UC. (CAN MATH24)

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>		<b>Effective:</b>	<b>Inactive:</b>
	B	Communication and Analytical Thinking	Fall 1981	
<b>CSU GE:</b>	<b>MC</b>	Math Competency		
	<b>Transfer Area</b>		<b>Effective:</b>	<b>Inactive:</b>
<b>IGETC:</b>	<b>Transfer Area</b>		<b>Effective:</b>	<b>Inactive:</b>
<b>CSU Transfer:</b>	Transferable	<b>Effective:</b>	Fall 1981	<b>Inactive:</b>
<b>UC Transfer:</b>	Transferable	<b>Effective:</b>	Fall 1981	<b>Inactive:</b>

### **CID:**

CID Descriptor: MATH 240 Ordinary Differential Equations  
SRJC Equivalent Course(s): MATH2

### **Certificate/Major Applicable:**

Major Applicable Course

## **COURSE CONTENT**

### **Outcomes and Objectives:**

Upon completion of the course, students will be able to:

1. Identify differential equations as to order, type, and kind.
2. Solve elementary differential equations, including separable and linear differential equations.
3. Model and solve applied problems involving ordinary differential equations.
4. Use numerical techniques to approximate solutions to differential equations.
5. Solve initial value problems using Laplace Transforms with tables.
6. Apply Taylor series to solve differential equations.
7. Solve systems of differential equations.

### **Topics and Scope:**

- I. Ordinary Differential Equations
  - A. Linear differential equations with applications
  - B. Slope fields
  - C. Numerical methods including 4th order Runge-Kutta
- II. Introduction to Laplace Transforms
  - A. Laplace transform and inverse
  - B. Use of tables
  - C. Application to linear differential equations
- III. Series Solutions to Differential Equations  
Taylor series solutions to differential equations
- IV. Systems of Differential Equations
  - A. Analysis of phase portraits

- B. Solution by matrices
- C. The operator method or Laplace transforms
- D. Use of systems to solve higher order linear ordinary differential equations
- E. Applications
  - 1. coupled spring-mass systems
  - 2. compartment analysis
  - 3. other applications

### Assignment:

1. Daily reading outside of class (approximately 20-50 pages per week).
2. Problem set assignments from required text(s) or supplementary materials chosen by the instructor (approximately 1-6 per week).
3. Quizzes (approximately 0-4 per week).
4. Exams (approximately 3-8 per term).
5. Projects (for example, computer explorations or modeling activities, approximately 0-10 per term).

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems

Problem solving  
5 - 20%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Multiple choice and free response exams; quizzes

Exams  
70 - 95%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Projects

Other Category  
0 - 10%

**Representative Textbooks and Materials:**

Differential Equations (3rd). Blanchard, Devaney, Hall. Thomson: 2006.