



Coastal Bend COLLEGE

Administrative Master Syllabus Cover Sheet

Purpose: The Administrative Master Syllabus provides a general course description, defines the required elements of the course, and establishes a faculty-driven foundation for course assessment to ensure continuous improvement in student learning, irrespective of the course timeframe, or mode of course delivery.

Course Title: **Differential Equations**

Course Prefix and Number: **MATH 2420**

THECB Approval Number (10 digit): **2701016419**

Department: **Mathematics** Division: **Math, Science, Kinesiology**

Course Type: (check only one)

- Academic General Education Course (From ACGM but not a CBC Core Course)
- Academic CBC Core Course
- WECM Course (Special Topics or Unique Needs Course: Y or N)

Weekly Contact Hours (Lecture – Lab – External): **4** - **0** - **0**

Course Catalog Description:

Ordinary differential equations, including linear equations, systems of equations, equations with variable coefficients, existence and uniqueness of solutions, series solutions, singular points, transform methods, and boundary value problems; application of differential equations to real-world problems.

Prerequisites/Co-requisites:

C or better in MATH 2414
TSI Math required

Approval: The contents of this document have been reviewed and are found to be accurate.

Prepared by (Content Expert): **Mike Wang** Digitally signed by Mike Wang
Date: 2022.10.12 13:54:33 -05'00'

Reviewed by Director or Coordinator: **Richard Cowart** Digitally signed by Richard Cowart
Date: 2022.10.18 16:35:05 -05'00'

Approved by Dean of CTE or NAH or TGE: **Mark L. Secord** Digitally signed by Mark L. Secord
Date: 2022.10.20 13:57:27 -05'00'



Coastal Bend COLLEGE

Master Course Syllabus

Course Name: MATH 2420 Differential Equations

Course Description: Ordinary differential equations, including linear equations, systems of equations, equations with variable coefficients, existence and uniqueness of solutions, series solutions, singular points, transform methods, and boundary value problems; application of differential equations to real-world problems.

Semester Hour Credit: 4

Lecture Hrs. per Week/Lab Hrs. per Week/External Hrs. per Week 4-0-0

Curriculum Capacity:

- Face-to-Face Lab
- Online Lab
- Face-to-Face Lecture
- Online
- Virtual Face-to-Face
- Interactive video (multi-locations)
- Hybrid
- Clinical

Recommended enrollment threshold:

- Face-to-Face Lab
- Online Lab
- Face-to-Face Lecture
- Online
- Virtual Face-to-Face
- Interactive video (multi-locations)
- Hybrid
- Clinical

Textbook and/or other major required readings:

Title: Differential Equations MyMathLab
Author: John Polking, Al Boggess, and David Arnold
Publisher: Pearson
Edition: 2nd Edition
ISBN: 9780131437388 (Textbook)

Revised 2021-2022

ISBN: 9780321199911 (MyLab Math)

The Student Learning Outcomes for the course are the same regardless of modality or location.

1. Identify homogeneous equations, homogeneous equations with constant coefficients, and exact and linear differential equations.
2. Solve ordinary differential equations and systems of equations using: a) Direct integration b) Separation of variables c) Reduction of order d) Methods of undetermined coefficients and variation of parameters e) Series solutions f) Operator methods for finding particular solutions g) Laplace transform methods.
3. Determine particular solutions to differential equations with given boundary conditions or initial conditions.
4. Analyze real-world problems in fields such as Biology, Chemistry, Economics, Engineering, and Physics, including problems related to population dynamics, mixtures, growth and decay, heating and cooling, electronic circuits, and Newtonian mechanics.

Course Outcomes (WECM or LDACGM)

The following general education course competencies (TGE) or Marketable SCAN Skills (CTE/NAH) are addressed in this course: General education course competencies (TGE) or Marketable SCAN Skills (CTE/NAH) assessed are indicated with an asterisk *.

Not a core class.

The following program student learning outcome are assessed for this course:

Not a core class.

Evaluation Methods:

Homework 10%
Quizzes (Practice Exams) 10%
Tests (Regular Exams) 30%
Final Exam (Major Assessment) 50%

Course Grading: Please see individualized instructor policies for course evaluation methods. Students will be assessed on the same measure across each discipline as per CBC guidelines.

Major Course Assignments and/or exams counting for at least 10% of a final course grade:

Homework 10%
Quizzes (Practice Exams) 10%
Tests (Regular Exams) 30%
Final Exam (Major Assessment) 50%

Grade Scale:

A = 90-100%	B = 80-89%
C = 70-79%	
D = 60-69 %	
F = Below 60%	

Course Subject Matter Outline:

Unit 1: Overview, Definition of a differential equation. First order differential equations, separable, linear, exact equations, homogeneous equations, integrating factors, reduction in order. Applications of first order equations.
Unit 2: Second order linear equations, undetermined coefficients, variation in parameters. Applications of second order equations. Power series solutions and special functions.
Unit 3: Fourier series. Partial differential equations and boundary value problems.
Unit 4: Laplace transforms, inverse Laplace transforms and applications to ODEs.
Unit 5: Numerical methods. Euler's method. Runge-Kutta methods.
Unit 6: Systems of linear equations, non-linear systems of equations.

Additional Course Requirements:

Required: Students must have access to a desktop or laptop computer with webcam and microphone and be able to accept and install necessary downloads for Pearson MML and remote proctoring applications and lockdown browsers in a given semester. No Chromebooks, tablets, or other mobile devices permitted as they are not fully compatible. If the computer is a school issued device, then the student is responsible for having their school IT provide them with one that satisfies these requirements on the first day of the semester.

Required: Internet Access

Required: TI-83/84 Plus Scientific Graphing Calculator. (Other scientific calculators may be allowed but must be approved by the instructor in advance as a comparable equivalent but not higher functioning than the TI-83/84 series calculator.)

Class Attendance and Classroom Conduct Policies

Attendance Policy: Please see individualized instructor policies for attendance, which is pursuant to any related policy as outlined by the college handbook, financial aid agreements, or any other college related understanding (e.g., athletics, organizations).

Telephone Support: Toll Free: 866-722-2838 or Direct Line: 361-354-2508

I.T. Support Blackboard

<http://coastalbend.edu/it/>

IT Help Desk 1-361-354-2508

helpdesk@coastalbend.edu

Live Chat: Fall/Spring Hours: Monday - Thursday from 8 a.m. to 5 p.m. Summer Hours: Monday – Thursday from 7 a.m. to 6 p.m.

Tutoring Services: Coastal Bend College is committed to the academic success of all students enrolled at the college. A variety of services, including academic support, individual tutoring sessions, group tutoring sessions, and online tutoring, are available to students depending on the availability of tutors for the subject matter requested. All tutoring is provided at no cost to current CBC students who are currently enrolled at CBC. On-demand tutoring services are accessible 24 hours a day, seven days a week through the TutorMe platform, which may be accessed through your Blackboard account. To request a tutor, please complete the online tutor request form found at <http://www.coastalbend.edu/tutoring/> to submit

your request. If you have any questions about tutoring programs, you can contact to tutoring@coastalbend.edu.

Beeville	Alice	Kingsville	Pleasanton
3800 Charco Road Beeville, TX 78102 1-866-722-2838	704 Coyote Trail Alice, TX 78332 1-866-891-2981	1814 Brahma Blvd. Kingsville, TX 78363 1-866-262-1615	1411 Bensdale Pleasanton, TX 78064 1-866-361-4222

Grady C. Hogue Learning Resource Center (Library): Located on the Beeville campus, the operation hours are Monday - Friday from 8:00 a.m. to 5:00 p.m.

(Summer semesters will observe the CBC campus operation hours) For locations and hours of the CBC library in Alice, Kingsville, and Pleasanton sites please visit the library web page link below.

Grady C. Hogue Learning Resource Center (Library): <http://lrc.coastalbend.edu/about>

Financial Aid: Resources are available for students for financial aid, work study, and veteran benefits. For additional information, visit our website at <http://coastalbend.edu/finaid> or contact us at 361-354-2238. Office hours: Monday - Friday from 8:00 a.m. to 5:00 p.m.

ADA Statement: No qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the College District, or be subjected to discrimination by the College District. Nor shall the College District exclude or otherwise deny equal services, programs, or activities to an individual because of the known disability of an individual with whom the individual is known to have a relationship or association. 42 U.S.C. 12132; 28 CFR 35.130(g). See at: [GA \(Legal\)](#)

Students with Disabilities: Please notify your instructor of any modification/adaptation you may require to accommodate a disability-related need. You will need to provide documentation to the Director of Accessibility Services so the most appropriate accommodations can be determined. Specialized services are available through the Office of Accessibility Services (OAS) (SSB 4.104, 471-6259). For more information, please email oas@coastalbend.edu.

Scholastic Dishonesty: Each student is charged with notice and knowledge of the contents and provisions of Coastal Bend College's rules and regulations concerning student conduct. All students shall obey the law, show respect for properly constituted authority, and observe correct standards of conduct. Scholastic dishonesty shall constitute a violation of these rules and regulations and is punishable as prescribed by Coastal Bend College Policies FLB (Local) and FM (Local). Scholastic dishonesty shall include, but not be limited to, cheating on a test, plagiarism, and collusion. See at: [FLB \(Local\)](#) and [FM \(Local\)](#).

Use of E-mail for Official Correspondence to Students: All students should be familiar with the college's official email student notification policy. Students are expected to check their CBC email on a frequent

and regular basis to stay current with college-related communications, recognizing that certain communications may be time-critical.

Copyright Law and Intellectual Property Rights Policy: Copyright is the right of an author, artist, composer or other creator of a work of authorship to control the use of his or her work by others. Protection extends to literary works, musical works, dramatic works, pantomimes and choreographic works, pictorial and graphic works, sculpture, motion pictures and other audiovisual works, sound recordings and architectural works. Generally speaking, a copyrighted work may not be reproduced by others without the copyright owner's permission. The public display or performance of copyrighted works is similarly restricted. Generally, the unauthorized reproduction, performance or distribution of a copyrighted work is copyright infringement and may subject the infringer to civil and criminal penalties. The Fair Use Doctrine outlines exceptions to this Law and is outlined in Coastal Bend College Policy, [CT \(Legal\)](#).

Coastal Bend College, its faculty, students and employees must comply with Copyright Law. Detailed information on Copyright Law and Intellectual Property Rights is available in Coastal Bend College Policy [CT \(Legal\)](#) and [CT \(Local\)](#).

Questions regarding this information should be directed to the Director of Library Services at: library@coastalbend.edu or the Office of Marketing and Public Relations at: socialmedia@coastalbend.edu.

Intellectual Property: Student /Third Party Works: Rights to copyrightable or patentable works created by a student or a third party, that is, not a College District employee, shall reside with the author/ creator. Detailed information on Copyright Law and Intellectual Property Rights is available in Coastal Bend College Policy [CT \(Legal\)](#) and [CT \(Local\)](#).

Questions regarding this information should be directed to the Director of Library Services at: library@coastalbend.edu or the Office of Marketing and Public Relations at: socialmedia@coastalbend.edu.

NOTE: The College website (<http://coastalbend.edu>) serves as the main source with the most current version of the Coastal Bend College Board Policies and the Coastal Bend College Catalog.

Student success is our number one priority at Coastal Bend College and we realize that prompt, effective communication (such as emails, assignment feedback, discussion boards and announcements) plays a significant role in achieving that goal. It is vitally important that you have the proper contact information for your instructor. This should include their phone number, email address, and if applicable, their office number, and office hours. **Faculty schedules can be located online at <http://coastalbend.edu/hb2504/>**

If you have any problems contacting your instructor, or do not receive a prompt response to your inquiries, please contact the Dean or Division Coordinator/Program Director as soon as possible. Their contact information is provided below:

Mark L. Secord, Dean Transfer and General Education Revised 2021-2022	Richard E. Cowart, EdD., Coordinator Math, Science, Kinesiology
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361-354-2408
secordm@coastalbend.edu

361-592-1615 ext. 4024
recowart@coastalbend.edu

We wish you all the best in your education and encourage you to contact us if you have any questions or concerns.

Keeping student success in sight, faculty in each of the courses will review the course information, including specific reading schedules, assignments, and testing information, with students during the first week of class.

Additionally, the course information will be posted to Blackboard.

This master syllabus is subject to change due to unforeseen circumstances.