

### Master Course Syllabus

#### MATH 2420 Differential Equations (2701016119)

#### \*\*\*\*\*NOTE TO STUDENT\*\*\*\*\*

*Student success is our number one priority at Coastal Bend College and we realize that prompt, effective communication 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. If you ever have any problems contacting your instructor, or do not receive a prompt response to your inquiries, please contact the Assistant Dean of Academics, or the Dean of Academics, as soon as possible. Their contact information is provided below:*

<p>Zachary Suarez, Dean of Academics (361) 354-2722 <a href="mailto:zsuares@coastalbend.edu">zsuares@coastalbend.edu</a></p>	<p>Kayla D. Jones, Assistant Dean of Academics (361) 354-2532 <a href="mailto:kdjones@coastalbend.edu">kdjones@coastalbend.edu</a></p>
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*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 with students, course information with specific reading schedules, assignments, and testing information during the first week of class. Additionally, the course information will be posted to Blackboard (THECB 60x30TX compliance).*

**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 Hours Credit:** 4

**Lecture/Lab Hours:** 4-0

**Prerequisite:** Math 2414



**Textbook(s): (Required)** Differential Equations 2<sup>nd</sup> edition

**ISBN:** 9780131437388

**Student Learning Outcomes:**

Upon successful completion of this course, students will:

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 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.



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

**Technical Support:**

Email Support:	<a href="mailto:helpdesk@coastalbend.edu">helpdesk@coastalbend.edu</a> <a href="mailto:cabrigo@coastalbend.edu">cabrigo@coastalbend.edu</a> <a href="mailto:erica@coastalbend.edu">erica@coastalbend.edu</a> <a href="mailto:ryan@coastalbend.edu">ryan@coastalbend.edu</a>
Telephone Support:	<b>866-722-2838 ext. 2508 (Toll Free)</b> <b>361.354.2508 (Direct Line)</b>
<a href="#">Live Chat:</a>	<b>Fall/Spring Hours: Monday-Thursday 8 a.m. to 8 p.m.; Friday 8 a.m. to 5 p.m.</b> <b>Summer Hours: Monday-Thursday 7 a.m. to 6 p.m.</b>

**Tutoring Services:** Coastal Bend College offers free tutoring services to all CBC students who need academic assistance. Services include One-on-One, Group, and Online tutoring to all current CBC students. The Tutoring Coordinator’s office is at CBC-Beeville in the Student Success Center (SSC), Room 140 which is in the R.W. Dirks building. The SSC’s hours of operation are Monday -Thursday from 8 am – 8 pm. Tutoring services are also available at all the CBC site locations and students can visit the site’s SSC. For questions regarding tutoring services, please contact the CBC Tutoring Coordinator at (361) 354-2838 ext. 2578 or visit us at our website at: <http://coastalbend.edu/tutoring/>.

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 - Thursday 8:00 a.m. - 6:00 p.m.; Friday 8:00 a.m.- 5:00 p.m.



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

Resource Center (Library): <http://lrc.coastalbend.edu/about>

Online Catalog : <http://lrc.coastalbend.edu/catalog>

Library Website: <http://lrc.coastalbend.edu/about>

Hours and Locations: <http://lrc.coastalbend.edu/hours>

Pleasanton Public Library: <https://pleasanton.biblionix.com/>

115 N. Main St., Pleasanton, TX 78064

Monday – Friday 9:00 a.m. – 6:00 p.m.

Saturday 9:00 a.m. – 1:00 p.m.

**Financial Aid:** Resources are available for students for financial aid, work study, and veteran benefits. For additional information, visit our website at [www.coastalbend.edu/finaid](http://www.coastalbend.edu/finaid) or contact us at 361-354-2238. Office hours: Monday-Thursday 7-6 and Friday 8-5 (*THECB 60x30TX compliance.*)

**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 Student Services so the most appropriate accommodations can be determined. Specialized services are available through the Office of Disability Services (SSB 4.104, 471-6259). For more information contact (361) 354-2300.

**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.

**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. CBC email format: last name with last four digits of social security number

[@study.coastalbend.edu](mailto:@study.coastalbend.edu) and password is your student ID  
(ex. [cougar1234@study.coastalbend.edu](mailto:cougar1234@study.coastalbend.edu)).

**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](mailto:library@coastalbend.edu) or the Office of Marketing and Public Relations at: [socialmedia@coastalbend.edu](mailto: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 Library Services at: [library@coastalbend.edu](mailto:library@coastalbend.edu).

**NOTE:** The College website ([www.coastalbend.edu](http://www.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. **Revised 8-22-18**