

McLennan C O M M U N I T Y C O L L E G E

WACO, TEXAS

COURSE SYLLABUS AND INSTRUCTOR PLAN

Differential Equations

MATH 2320.15

Peter Blaskiewicz

NOTE: This is a 16-week course.

NOTE: This is a Blended/Hybrid course.

COVID 19 Notice:

McLennan Community College is committed to providing you with every resource you need to reach your academic goals. We are also concerned for your safety. We are working through COVID-19 guidelines to make sure we offer a safe environment for you and our faculty. This will include smaller class sizes to manage social distancing and proper cleaning techniques. You will have the advantage of a physical classroom experience but may also need to work part of the time online as we adjust to limited classroom capacity. This will also allow us the flexibility to move online if so directed by federal, state and/or local COVID 19 guidelines. Faculty and staff are preparing now to ensure that you have the best experience in the midst of these uncertain times.

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Course Description:

Topics include methods of solving ordinary differential equations of the first order, theorems on existence and uniqueness of solutions, and solving linear differential equations of higher order, including systems of equations, equations with variable coefficients, solutions in series and singular points, solutions using Laplace transforms, boundary value problems, and applications of these concepts in solving real-world problems.

Prerequisites and/or Corequisites:

MATH 2414 (Calculus II) with a minimum grade of C, as a prerequisite.

Course Notes and Instructor Recommendations:

Many/most of our class sessions will be held in Zoom. They will be at the announced regular class time each week, MW, from 1:15 till 2:35 p.m. The URL with the Meeting ID will be posted in this course's Brightspace shell. I strongly encourage you to attend in Zoom and be an interactive class, for several reasons. For one thing, it will help make the material more immediate and relevant, and you can get your questions resolved right away if you are there 'as it happens.' Also, I will be able to tailor the lessons to your level of understanding if I have an audience to 'read.'

The Zoom sessions will be recorded, and links to each video will be posted in Brightspace soon after the class meeting is over (hopefully within 15 minutes or so, but in any case by mid-afternoon). If you miss a class meeting, it is expected that you will watch the video later that day and try your hand at the homework assignment, so that you are ready for the next lesson and don't get behind. (The material does build on itself.)

In Zoom class meetings, please attend with your microphone and webcam. Your active participation in those meetings is expected, just as they would be in a face-to-face class meeting.

Some of our class meetings will be in the classroom, Science B 107. More information and details about them will be given later in Brightspace and in our Zoom class meetings.

I will be available for individual Zoom chat sessions / 'office hour' by arrangement, especially if you cannot come to one of the regular class sessions. I request that you first watch the video over the missed class, so that we are not reinventing the wheel. The best way to arrange a Zoom meeting outside my regular office hour is by emailing me with a suggestion of a time or two that would work for you; if you call me, a voice message would go to my email box anyway.

Instructor Information:

Instructor Name:	Peter Blaskiewicz
MCC E-mail:	pblaskiewicz@mclennan.edu
Office Phone Number:	(254) 299-8869
Office Location:	MATH 213
Office/Teacher Conference Hours:	MW 9:45 – 10:45 a.m.; TTh 1:30 – 2:30 p.m.; other times by arrangement

Required Text & Materials:

Title: Elementary Differential Equations with Boundary Value Problems
Author: William F. Trench
Edition: Free Edition 1.01 (December 2013)
Publisher: self-published
ISBN: n/a. Free download at

<https://digitalcommons.trinity.edu/mono/9/>

If a physical copy for this out-of-print book is desired, search for ISBN 0-534-26328-3

A student solution manual may be downloaded for free at

http://scholarcommons.usf.edu/oa_textbooks/7/

If a physical copy for this out-of-print book is desired, search for ISBN 9780534360849 (less expensive) or 0-534-36090-4 (more expensive; includes chapters we won't cover anyway)

A graphing calculator. The TI-84, TI-89, and TI N-Spire are the models of choice for this course.

MCC Bookstore Website: <http://www.mclennan.edu/bookstore/>

Methods of Teaching and Learning:

Lecture online using Zoom with student participation in example problems; recorded videos; written homework notebook; written tests and final exam.

Course Objectives and/or Competencies:

Upon successful completion of this course, students will:

1. Identify homogeneous equations, homogeneous equations with constant coefficients, and exact and linear differential equations. (Chapters 2 and 5)
2. Solve ordinary differential equations and systems of equations using:
 - a) Direct integration (Chapter 2)
 - b) Separation of variables (Chapter 2)
 - c) Reduction of order (Chapter 5)
 - d) Methods of undetermined coefficients and variation of parameters (Chapter 5)
 - e) Series solutions (Chapter 7)
 - f) Operator methods for finding particular solutions (Chapter 5)
 - g) Laplace transform methods (Chapter 8)
3. Determine particular solutions to differential equations with given boundary conditions or initial conditions. (All chapters)
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. (Chapters 4 and 6)

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Course Outline or Schedule:

The schedule is subject to change. Should a change become necessary, students will be notified about changes verbally, during class. In the event unforeseen circumstances prevent a class from occurring as scheduled, either make-up lecture material will be posted in Brightspace or the calendar schedule will be adjusted and announced. If something on the school's end prevents a test from taking place as scheduled, the test window will be moved forward to the next available day.

Week	Section	Topic
1	1.1-3; 2.1	Applications leading to DEs; First-order Eqs, include FOLDEs
2	2.2-2.4	Separable Equations; Transforming non-linear DEs into separable
3	2.5-2.6	Exact eqs; Integrating factors
4	4.1-4.3	Applications of FOLDEs: Growth/decay; cooling, mixing, mechanics
5	5.1	TEST 1 – Chapters 1 – 2, 4; Intro to higher order DEs
6	5.2-5.3	Homogeneous eqs; Constant coefficient DEs
7	5.4-5.7	Undetermined coefficients; Variation of parameters
8	6.1-6.3	Modeling: Springs, circuits
9	7.1	TEST 2 – Chapters 5 – 6; Review of power series
10	7.2 -7.4	Series solutions: ordinary points and singular points
11	8.1-8.2	Laplace Transforms: definition, inverse, transforms of derivatives
12	8.3-8.4	Laplace Transforms: operational properties
13	8.5-8.8	Laplace Transforms: Forcing functions, Dirac Delta fcn
14	9.1-9.2	TEST 3 – Chapters 7 – 8; Higher-order linear DEs
15	10.1-10.4	Systems of Linear DEs
16		Final Exam -- cumulative

Course Grading Information:

Your course grade will be based on homework, classwork, chapter tests, and a cumulative exam. The relative weights of each of these factors is as follows:

Homework, Class board work and group problems	20%
Tests (projected 3@ 15% -- if other, the weights will total 60%)	60%
Final Exam	20%

Some of our class time will be spent on working problems together. You will be graded on this class participation. In order to be able to earn a decent score on this portion of your course grade, it is imperative that you prepare for class.

Homework will be assigned from the text. The complete list of problems for the semester is in a separate document given to you in class and also posted in Brightspace. Homework will be written out and submitted electronically. Many of the problems may be checked in the student solution manual, but to benefit from the work, you must discipline yourself to getting the

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solutions and all of their necessary details yourself. The deadline for each set of homework will be the scheduled time of the test over the sections covered by the homework. It will be spot-checked for completion and correctness.

There will be a test after each two or three chapters; some of them may possibly be part take-home tests. If you must miss one test for one of the reasons given in MCC's General Catalog, and you have provided a documented excuse for doing so, the exam will also count as your make-up test for that chapter. If it is necessary for you to miss more than one test, you should discuss the situation with me. Unexcused absences from tests will not be made up.

The final exam will be cumulative. It is scheduled for Wednesday, May 5, from 1:15 to 3:15 p.m. Your percentage grade on the final may also count in place of your one lowest test grade, if that is to your advantage.

The letter grade received in this course will be based on the customary 90-80-70-60 scale.

Late Work, Attendance, and Make Up Work Policies:

Homework over a unit (group of chapters) is due the day of the test over those chapters. Since one of the primary purposes of the homework is to prepare you for the test, late homework will not be accepted.

If you have to miss one test for one of the reasons given in MCC's General Catalog, and you have provided a documented excuse for doing so, the exam will also count as your make-up test for that unit. If it is necessary for you to miss more than one test, you should discuss the situation with me. Unexcused absences from tests will not be made up.

If you are absent from 25% of the scheduled class meetings by the deadline for student-initiated drops (March 26, 2021), you will be dropped from the class. If this limit is reached after that date, you will be kept on the roll, and the grade that you earn for the semester is the grade you will receive.

Student Behavioral Expectations or Conduct Policy:

Students are expected to maintain classroom decorum that includes respect for other students and the instructor. Students should demonstrate an attitude that seeks to take full advantage of the education opportunity. For more details of College Conduct Policy, see the [Highlander Student Guide](#)

Students are expected to be courteous and respectful of their classmates and of instructors at all times. This includes, but is not limited to, the following.

Whether we meet in Zoom or in a classroom:

- Familiarize yourself with Zoom's features
- Please do participate in the class meetings. It's fine to have your mic on and ready for interaction, but mute yourself if the dog or children or other background noise would disrupt us.

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- Please use your webcam if you have one. Let me, as well as your fellow classmates, know who is in this course with us. But be mindful of your surroundings when your webcam is on. If necessary or desirable, use a non-distracting virtual background; Zoom provides that option.
 - Dress appropriately for class.
 - Once the lecture gets going, stick to the topic at hand. Avoid doing other tasks, checking email, being on the phone, or the like.
 - Do not use coarse or foul or offensive language, nor offensive or questionable imagery. Violation of this would be grounds for disciplinary action, including (but not limited to) being dropped from the course.
 - Remember that the session is being recorded.

For any class meetings on campus, the following conduct is also required:

- Face coverings **must** be worn at all times in the classroom and in all buildings (from the time you leave your vehicle till you get back in it). Both your mouth and your nose must be covered or shielded (mask, bandana, face shield). If you come without a mask or approved face covering, you will be required to leave right away.
- If you are at all sick, or think you might be, **stay home**. (The lessons will be recorded and posted in Brightspace; catch up there.) If you feel like you are coming down with something while on campus, please leave right away if you can safely do so, or else go to one of the designated quarantine rooms on campus until arrangements can be to get you home.

[* Click Here for the MCC Academic Integrity Statement](http://www.mclennan.edu/academic-integrity)

(www.mclennan.edu/academic-integrity)

The link above will provide you with information about academic integrity, dishonesty, and cheating.

Collaboration on out-of-class homework or projects is encouraged, but at no time should work belonging to one student be in the possession of another student. Likewise, students are not to engage in cheating in any form during or in preparation for tests or the final exam. All students involved in a cheating incident, whether in providing or receiving assistance, will receive grades of 0 for that assignment, be reported to Student Development, and find their names placed in the MCC database for cheating incidents. If there is a second incident, all students involved will be given grades of F for the course and listed as repeat offenders in the database.

[* Click Here for the MCC Attendance/Absences Policy](https://www.mclennan.edu/highlander-guide/policies.html)

(<https://www.mclennan.edu/highlander-guide/policies.html>)

Click on the link above for the college policies on attendance and absences. Your instructor may have additional guidelines specific to this course.

Regular and punctual attendance is expected of all students, and each instructor will maintain a complete record of attendance for the entire length of each course, including online and hybrid courses. Students will be counted absent from class meetings missed, beginning with the first

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official day of classes. Students, whether present or absent, are responsible for all material presented or assigned for a course and will be held accountable for such materials in the determination of course grades.

** You will need to access each link separately through your Web browser (for example: Mozilla Firefox, Chrome, Microsoft Edge or Safari) to print each link's information.*

McLennan

C O M M U N I T Y

COLLEGE

ACADEMIC RESOURCES/POLICIES

Student Support/Resources:

MCC provides a variety of services to support student success in the classroom and in your academic pursuits to include counseling, tutors, technology help desk, advising, financial aid, etc. A listing of these and the many other services available to our students is available at <http://www.mclennan.edu/campus-resource-guide/>

College personnel recognize that food, housing, and transportation are essential for student success. If you are having trouble securing these resources or want to explore strategies for balancing life and school, we encourage you to contact a success coach by calling (254) 299-8226. Students can visit the Completion Center Monday-Friday from 8 a.m.-5 p.m. to schedule a meeting with a success coach and receive additional resources and support to help reach academic and personal goals. Paulanne's Pantry (MCC's food pantry) provides free food by appointment to students, faculty and staff based on household size. Text (254) 870-7573 to schedule a pantry appointment. The Completion Center and pantry are located on the Second Floor of the Student Services Center (SSC).

MCC Foundation Emergency Grant Fund:

Unanticipated expenses, such as car repairs, medical bills, housing, or job loss can affect us all. Should an unexpected expense arise, the MCC Foundation has an emergency grant fund that may be able to assist you. Please go to <https://www.mclennan.edu/foundation/scholarships-and-resources/emergencygrant.html> to find out more about the emergency grant. The application can be found at https://www.mclennan.edu/foundation/docs/Emergency_Grant_Application.pdf.

Minimum Technical Skills:

Students should have basic computer skills, knowledge of word processing software, and a basic understanding of how to use search engines and common web browsers.

Backup Plan for Technology:

In the event MCC's technology systems are down, you will be contacted/notified through your MCC student email address. Please note that all assignments and activities will be due on the date specified in the Instructor Plan, unless otherwise noted by the instructor.

* [Click Here for the Minimum System Requirements to Utilize MCC's D2L|Brightspace](https://www.mclennan.edu/center-for-teaching-and-learning/Faculty%20and%20Staff%20Commons/requirements.html)
(<https://www.mclennan.edu/center-for-teaching-and-learning/Faculty%20and%20Staff%20Commons/requirements.html>)

Click on the link above for information on the minimum system requirements needed to reliably access your courses in MCC's D2L|Brightspace learning management system.

Email Policy:

McLennan Community College would like to remind you of the policy (<http://www.mclennan.edu/employees/policy-manual/docs/E-XXXI-B.pdf>) regarding college email. All students, faculty, and staff are encouraged to use their McLennan email addresses when conducting college business.

A student's McLennan email address is the preferred email address that college employees should use for official college information or business. Students are expected to read and, if needed, respond in a timely manner to college emails.

Instructional Uses of Email:

Faculty members can determine classroom use of email or electronic communications. Faculty should expect and encourage students to check the college email on a regular basis. Faculty should inform students in the course syllabus if another communication method is to be used and of any special or unusual expectations for electronic communications.

If a faculty member prefers not to communicate by email with her/his students, it should be reflected in the course syllabus and information should be provided for the preferred form of communication.

Email on Mobile Devices:

The College recommends that you set up your mobile device to receive McLennan emails.

Forwarding Emails:

You may forward the emails that come to your McLennan address to alternate email addresses; however, the College will not be held responsible for emails forwarded to an alternate address that may become lost or placed in junk or spam filters.

Accommodations/ADA Statement

Any student who is a qualified individual with a disability may request reasonable accommodations to assist with providing equal access to educational opportunities. Students should contact the Accommodations Coordinator as soon as possible to provide documentation and make necessary arrangements. Once that process is completed, appropriate verification will be provided to the student and instructor. Please note that instructors are not required to provide classroom accommodations to students until appropriate verification has been provided by the Accommodations Coordinator. Instructors should not provide accommodations unless approved by the Accommodations Coordinator. For additional information, please visit mclennan.edu/disability.

Students with questions or who require assistance with disabilities involving physical, classroom, or testing accommodations should contact:

disabilities@mclennan.edu

254-299-8122

Room 319, Student Services Center

* [Click Here for more information about Title IX](http://www.mclennan.edu/titleix)
(www.mclennan.edu/titleix)

We care about your safety, and value an environment where students and instructors can successfully teach and learn together. If you or someone you know experiences unwelcomed behavior, we are here to help. Individuals who would like to report an incident of sexual misconduct are encouraged to immediately contact the Title IX Coordinator at

titleix@mclennan.edu or by calling Dr. Drew Canham (Chief of Staff for Equity & Inclusion/Title IX) at 299-8645. Individuals also may contact the MCC Police Department at 299-8911 or the MCC Student Counseling Center at MCC by calling 299-8210. The MCC Student Counseling Center is a confidential resource for students. Any student or employee may report sexual harassment anonymously by visiting the following website: <http://www.lighthouse-services.com/mclennan/>.

McLennan's Title IX webpage (<http://www.mclennan.edu/titleix/>) contains more information about definitions, reporting, confidentiality, resources, and what to do if you or someone you know is a victim of sexual misconduct, gender-based violence or the crimes of rape, acquaintance rape, sexual assault, sexual harassment, stalking, dating violence, or domestic violence.

** You will need to access each link separately through your web browser (for example Mozilla Firefox, Chrome, Microsoft Edge, or Safari) to print each link's information.*