

Week	Topic	Sec	Homework
Week 1 March 30 & April 1	Diff. Eqns. and Mathematical Models Integrals as General and Particular Solns. Slope Fields and Solution Curves Separable Eqns. and Applications.	1.1 1.2 1.3 1.4	3, 5, 11, 14, 17, 19, 20, 37, 41 2, 3, 6, 10, 13, 38 5, 6, 13, 14, 21, 24 (for 5, 6, and 24 use GeoGebra (or other technology)) 2, 3, 19, 21, 22
Week 2 April 6 & 8	Linear First-Order Eqns. Substitution Methods and Exact Eqns. Population Models Equilibrium Solns. and Stability	1.5 1.6 2.1 2.2	12, 13, 18, 19, 23, 41 (41 ... ask for help?) 6, 9, 10 1,4,7,9,10 2,5,7,10
Week 3 April 13 & 15	Acceleration-Velocity Models Numerical Approx.: Euler's Method Intro: Second-Order Linear Eqns. General Solution of Linear Eqns. Homogeneous Eqns. w/ Const. Coefficients	2.3 2.4 3.1 3.2 3.3	2, Problem A: "solve (4) on page 101 to get the solution (5)" 4, 12 (for 4 find Euler's solution by hand, for 12 find Euler's solution with GeoGebra, but find exact solution by hand) 2, 6, 24, 33, 34, 35, 40, 43 21,22 2,3,5,6,7,8,9,22,27
Week 4 April 20 & 21	Mechanical Vibrations Nonhomogenous Eqns. & Undetermined Coefficients Thursday: Exam 1 Covers Sections 1.1-3.3	3.4 3.5	15, 17, 18 (For these, just solve & determine if the motion is over, under, or critically damped) 3, 4, 9, 11, 13, 17, 31, 34, 37, 39
Week 5 April 27 & 29	No Class Tuesday – In Service Forced Oscillations and Resonance Electrical Circuits	3.6 3.7	Problem B: "solve the undamped mass-spring system eq. (4): $m=2$, $k=10$, $F_0=2$, $w=\sqrt{5}$, $x(0) = x'(0) = 0$ " Problem C: "solve the undamped mass-spring system eq. (4) : $m=3$, $k=48$, $F_0=3$, $w=4$, $x(0) = x'(0) = 0$ " 9 (note: $m=3.125$, $1 \text{ in} = 1/12 \text{ ft.}$) 17,19
Week 6 May 4 & 6	First-Order Systems and Applications Elimination Method Matrices and Linear Systems	4.1 4.2 5.1	1, 2, 6, 19, 20, 27 3, 4, 6, 31 22, 26, 31, 35
Week 7 May 11 & 13	Eigenvalue Method for Homogeneous Systems Multiple Eigenvalue Solutions	5.2 5.4	3, 5, 6, 9, 10, 42 (for 3 - 5 you don't need to graph slope fields, for 42 use GeoGebra) 2,3
Week 8 May 18 & 20	Stability and the Phase Plane Ecological Models: Predators & Competitors Thursday: Exam 2 Covers Secs 3.4-5.4	6.1 6.3	3, 4, 6, 8 (note: some answers in the sol. manual may not refer to the correct Figure) tba
Week 9 May 25 & 27	Laplace Transforms and Inverse Transforms Transformation of Initial Value Problems Translations and Partial Fractions	7.1 7.2 7.3	4, 7, 8, 13, 16, 18, 23, 26, 28, 29 1, 3, 4, 10, 19 27, 28, 29
Week 10 Jun 1 & 3	Project Presentations posted in D2L, Final Exam Review Derivatives, Integrals, & Products of Transforms Impulses and Delta Functions	7.5 7.6	In class In class
Finals Tuesday, June 11 9am (not 9:30!)	Cumulative Final Exam, 9am-10:50am Tuesday, June 8 Note: Final Exam begins early at 9am. No class Thursday. Final Exam will be online.		

Portland Community College / Rock Creek Campus
17705 NW Springville Rd,
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Regarding Covid-19 and campus closure: While campus is closed, and even after it is open, I will remain flexible to your specific needs as best I can, and I acknowledge that some students have small children at home, unpredictable schedules, unreliable internet, various levels of technology, ... Steps will be taken to best ensure all students can access what they need to be successful in this course. Please contact the Instructor if you have concerns or specific requests. Patience and flexibility on everyone's part will help us all achieve the best outcomes possible.

- Term/Course:** Spring 20210 Math 256 CRN#20254 – Differential Equations; 5.0 credits.
- Class meets:** Tuesday and Thursday 9:30am–11:50pm remotely
- Instructor:** Jeff Pettit
- Office:** Rock Creek Campus, Building 2, Room 244, office phone: 971-722-7681
- Office Hours:** Tuesday/Thursday noon-2:30pm virtually; when campus opens – beginning in my office until 1:30pm then in the Student Learning Center from around 1:30-2:30 (or by appointment)
- Tutoring Center:** Virtual tutoring by Rock Creek tutors begins March 29 for math: <https://www.pcc.edu/tutoring/rock-creek/> Andrew and others are well-versed in Differential Equations.
- Contact phone:** 503-867-2455 Please leave a detailed text or message including enough details (or images) that I would not need to reference the textbook. I return calls and emails as soon as I can, and usually return texts faster. I cannot share private information (including acknowledgement that you are a PCC student) except through PCC email.
- E-mail:** jeffrey.pettit@pcc.edu
- Text:** Differential Equations, Edwards and Penney 5th edition (4th is acceptable, but pages do not align). Some students stated “[Paul’s Notes](#)” make a good facsimile for a textbook: <http://tutorial.math.lamar.edu/Classes/DE/DE.aspx>
- Important Dates:**
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|---|-----------------------|
| Last day to add the class | Tue, Apr 6 |
| Lat day to drop the class with full refund: | Tue, April 6 |
| No class SAC In-Service | Tues, April 27 |
| Last day to drop the class and receive a W (withdraw) | Sat, April 5 |
| Final Exam 9am-10:50 | Tues, June 8 |
| Final grades recorded no later than: | Mon, June 14 |
- Course Content:** Includes a variety of differential equations and their solutions, with emphasis on applied problems in engineering, physics and spread of population/information/disease. Differential equations software will be used. Students communicate results in oral and written form. Graphing calculator required. TI-89 Titanium or Casio Classpad 330 recommended. Prerequisites: (MTH 252 and MTH 261) and (WR 115 and RD 115) or IRW 115 or equivalent placement. Recommended MTH 254. Audit Available.
<http://www.pcc.edu/ccog/default.cfm?fa=ccog&subject=MTH&course=256>
- Calculator:** A **graphing calculator** is required. I am well-versed in the TI89 and can help instruct in its use. However, for demonstrations I will be using GeoGebra and other online free graphing utilities. Many students find they do not need their graphing calculator for this course, but already own one and are happy to have it.
- In-Class Software:** Maple – any version; GeoGebra is a reasonable facsimile

Prerequisite: (MTH 252 and MTH261) and (WR 115 and RD 115) or IRW 115 or equivalent placement. Recommended MTH 254.

Web Page: Most documents used in this course will be posted on our class's course website, Desire2Learn. Access Desire2Learn by logging on to my.pcc.edu and selecting the Desire2Learn link about half-way down on the left side of the main web page.

Course Assessment: Grades will be based on the following:

Exam 1 (20% of final grade)
Exam 2 (20% of final grade) Take Home Exam
Homework/in-class participation/group work (15% of final grade)
Project Presentation (20% of final grade)
Final Exam (25% of final grade)

Final Course Grade: Grades will be regularly updated on Desire2Learn, and official overall grades are posted on MyPCC no later than the Monday following the Final Exam. PCC does not use "+" or "-" for final grades:

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

Two alternative grading options (instead of a letter grade A – F):

1. You may opt for a grade of **Pass/No Pass (P/NP)** for this course. Students opting for Pass/No Pass must do so on-line before 80% of the course is complete. You must receive a final percentage of 70% or better (C grade) to receive a Pass. Percentages under 70% will result in a No Pass. In general, P/NP courses count towards prerequisites. There are restrictions surrounding the number of courses a student can take P/NP, and restrictions on the number of P/NP courses that will transfer to four-year universities (which varies from university to university.) Consult an advisor for more details.

2. An **Audit (AU)** is allowed if you attend at least two-thirds of the class meetings. Students opting for an Audit must submit a Registration and Change form signed by the instructor by the second week of the term. Requests will be granted at the instructor's discretion based on class enrollment. Financial aid does not pay for audited courses. An audited course does not count toward prerequisites.

Note: If you are considering either of these grading options consult your academic advisor to determine if either the Pass/NoPass or Audit option is recommended for your degree/certification/transfer/etc.

An **Incomplete (I)** may be given when the quality of work is satisfactory (C or better), but for some minor, yet essential requirement, the course has not been completed. An Incomplete is reserved for emergency situations only. Requests for an Incomplete shall be made in a signed and dated letter stating the reasons why an Incomplete would be appropriate. The letter should also contain the conditions needed for completion of the work. In addition, an "Incomplete Grade Completion Procedures" form needs to be filled out by both the student and instructor. This form will then be filed in the Mathematics, Aviation and Industrial Tech Division office. Requests will be granted at the instructor's discretion. If a face-to-face meeting is logistically difficult, an email from the student can suffice for an official request for an Incomplete.

Withdrawal from a Course: It is the student's responsibility to drop the course if they are no longer planning on attending. In order to drop you must use TRAIL (phone), MyPCC, or file an Add/Drop

form with the registration office. You may receive a full refund if you drop the course by the first Friday of the term (or drop on line by Saturday). If you do not properly withdraw from a course, you may receive an F for the course. If you withdraw by the first week, a “W” grade will not appear on your transcript. After 80% of the course has passed, you cannot withdraw from the course. The following links have additional information:

<http://www.pcc.edu/enroll/registration/dropping.html>

<http://www.pcc.edu/resources/academic/standards-practices/AcademicStandardsandPractices-GradingGuidelines.html>

Homework and Attendance: Textbook problems are assigned after completion of each text section and discussed at the beginning of the following class. Your homework sets will be submitted on exam days and will be based on completion (2 – at least 90% complete, 1 – between 50% and 90% complete, 0 – less than 50% complete). If for any reason you discover that you will miss a significant number of classes, please contact the instructor as soon as you find this out to discuss options that will insure your understanding of the material

The first part of class time will be used to go over homework questions. I encourage everyone to ask questions, offer alternate techniques, and discuss methods, so please come prepared. If you do not get all of your questions answered, then please see me after class, during break, during my office hours, get help in the Learning Center, or ask other students.

Exams: See tentative schedule. Show your work on exams for full credit. Exams will be returned with each problem marked with a check mark (correct, full credit), a “1/2” mark (at least one step was correct, at least one step was incorrect, half credit), an “X” (no steps were correct, no credit) or occasionally an “OK” (full credit given, but a minor aspect merits attention and should not be repeated in the future).

Projects: Projects entail each student organizing a group (please see instructor for assistance with this if necessary). Groups decide on a subject related to course topics, define the problem in terms of a solution to a differential equation, or a differential equation. Presentations will demonstrate how the group took the differential equation and found the solution, or the solution and found out the differential equation. Details and examples will be provided later in the term.

Exam Corrections: If you completed at least 90% of the associated homework set, you are eligible to do corrections for an Exam, excluding the Final Exam. For problems on an exam that were given partial or no credit, you have the option to submit corrections for any or all of the incorrect problems. The reason for this option is that you will learn more fully and more deeply if you correct an incorrect problem than if you were to get the problem correct on your first attempt. For this reason, corrections should be made soon after the test is returned, though I will accept corrections up until the class before the final exam. For my benefit and yours, again, please submit corrections at your earliest convenience.

Guidelines for submitting test corrections:

- Do not erase your original answer or work
- ***Write sentence(s) describing what you did incorrectly and what you did to correct the problem.***
- On a separate page or (preferably) on the same page in a different color, do the problem correctly.
- You may use any available resources to do corrections (course text, tutor, peer help, etc.). However, your work should be your own, and not a regurgitation of another’s work.
- Submit corrections to the instructor with your original work and original answer.

- You will receive 50% of the points missed for correct answers that show clear and correct steps and accurate sentence descriptions.

Extra help: The Student Learning Center offers free tutoring. The Center is located in Bldg. 7 on the second floor with evening hours as well as day hours. Schedules are available showing which tutors are familiar with differential equations. Additional office hours are available by request. Also, free on-line tutoring is available. Please see <http://www.pcc.edu/tutoring> for login information. Also, feel free to contact me via email, text or telephone for additional help.

Additional Community-Based Education: Community-Based Education is a method of education requiring volunteer work in the community with extensive written reflection on the part of the volunteer. Community-based learning for this class could consist of arranging a 1-hour per week tutoring session with a local grade school or middle school (or other tutoring resource that does offer a salary) for the duration of the term. At the end of the term, students submit a daily journal and summary along with final paperwork outlining hours spent. If you wish to participate, please see the Instructor during the first week of class for details and the appropriate forms (available at <http://www.pcc.edu/sl>) Do not begin your project without meeting with the Instructor first. Tutoring location needs to be arranged no later than the second week of class, barring any special circumstances, and the contact information sheet needs to be submitted before that date, or soon thereafter. Successful completion of the Community-Based Learning component will count for 10% of your Final Exam grade. For example, if you successfully complete the Service Learning option (i.e. you earn a 100%, which is almost always the case) and you earn 75% on your Final Exam, your score would be raised to 85%

Other Community-Based Educational opportunities are available. Our course deals with stability populations and invading species, so, for example, removing ivy from Forest Park with reflection relating to course topics would also be appropriate. Please see instructor before beginning a project. There is also a standing opportunity to work with English-as-a-second-language learners in ESOL classes. Please see the Instructor for details.

Cell Phones/Computers, etc.: If you need to reference your phone during class for emergency reasons, please let the Instructor know. Be aware that using electronic devices (including classroom computers) during lecture can be distracting to the Instructor and to classmates, so for non-emergencies, please wait until breaks or after class.

Student Rights/Code of Conduct/Academic Integrity: For your convenience, feel free to use the following links for a description of your student rights, code of student conduct and expectations for academic integrity: <http://www.pcc.edu/about/policy/student-rights/student-rights.pdf>
<http://www.pcc.edu/about/policy/student-rights/student-rights.pdf-code-of-student>
<http://www.pcc.edu/about/policy/student-rights/student-rights.pdf-academic-integrity>

Title IX Statement: Portland Community College is committed to creating and fostering a learning and working environment based on open communication and mutual respect. If you believe you have encountered sexual harassment, sexual misconduct, sexual assault, or discrimination based on race, color, religion, age, national origin, veteran status, sex, sexual orientation, gender identity, or disability please contact the Office of Equity and Inclusion at (971) 722-5840 or equity.inclusion@pcc.edu

Sanctuary Statement: PCC promotes the success, dignity, and worth of each individual by providing a safe environment where the examination of divergent ideas, experiences and systems of inequality adds

depth to the learning experience. PCC strives to provide opportunity to all students and the appropriate level of support services to ensure the highest level of success. For more information and resources, see <https://www.pcc.edu/resources/undocumented-students/>.

ADA Statement: Students who experience disability-related barriers should contact Disability Services <http://www.pcc.edu/resources/disability/>. If students elect to use approved academic adjustments, they must provide in advance formal notification from Disability Services to the instructor.