Calculus II

MATH1220 402

Course Description

Topics include applications and techniques of integration; parametric equations and polar coordinates; Taylor and power series, and 3-dimensional analytical geometry and vectors. Course may be taught with a Community-Engaged Learning component.

Prereq: Within the last year, MATH 1210 w/C grade or better.

Semester: All

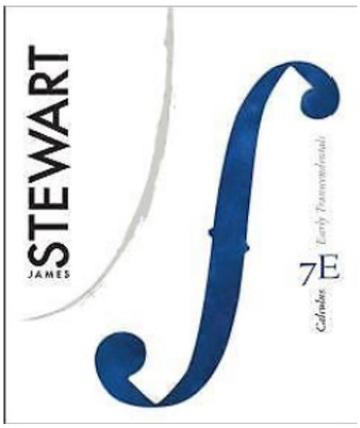
Math 1220 (Calculus II) is a second course in Calculus continuing the study of topics introduced in Calculus I including additional integration methods and applications of integration, differential equations, solutions to differential equations using separation of variables and the integrating factor method, qualitative behavior of solutions using direction fields, and applications of differential equations. We also look at infinite sequences and series, convergence tests, power series, Taylor polynomials, vectors, dot product, cross product and parametric equations of lines and planes in 3-space.

Course Prerequisites

Within the last year, you must have completed a Calculus I course, i.e. Math 1210, with a C or above.

Required Text

The textbook for our Math 1220 class is 'Calculus, Early Transcendentals', 7th , 8th or 9th editions by James Stewart. Cengage (publisher). We have been using this textbook for several semesters now so you should be able to find one new or used online for a great price. Here is a picture of the front of both of the books that are available so you can make sure you get the correct book:



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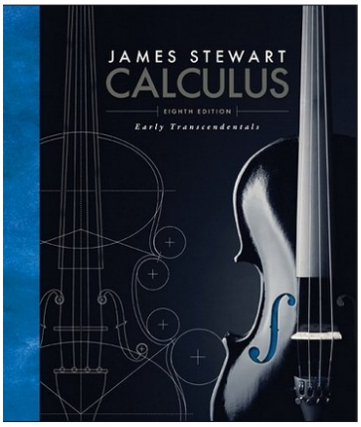

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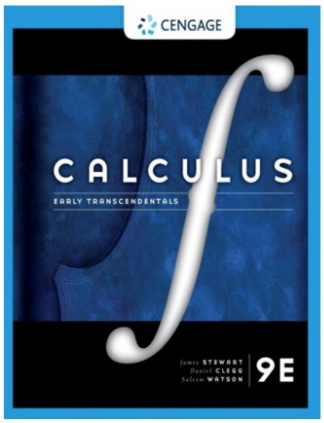

7th edition | 8th edition | 9th edition

Guided Lecture Notes

We will use these Guided Lecture Notes to facilitate lectures for our Math 1220 class. The Guided Lecture Notes contain definitions, theory and examples to practice the concepts of the course. You should print the Guided Lecture Notes at the start of the course and organize them in a binder to use throughout the course. You could also choose to use the electronic versions and fill in the notes using a tablet and stylus. These will be an essential part of your course learning and will save valuable class time from copying theorems, pictures, and examples from the board.

I will updating/creating the Guided Lectures as we progress through the semester and place them here for your reference.

Homework and Engagement Submissions

Homework: Each section covered will have a homework assignment. Homework will come in a variety of forms including exercises from the book, projects, and analysis. Paper homework is due by the unit test. You will be able to submit homework in CANVAS using CamScanner or other scanning software. CamScanner is a free app you can download on your Smartphone that will take pictures of your homework and combine them into a SINGLE PDF file. Information about CamScanner and a link to download it

on your Smartphone are in the Orientation Module. Sloppy or irritating papers will not receive credit. There are two aspects to a good paper: content and presentation. This course emphasizes both since they are equally important. I may return an assignment to be “polished” if I feel it needs help with presentation or accuracy. To do well in this course you must complete the homework. Learn the why’s of your homework, not just the how’s !!

Specifics on how homework is to be presented:

- All homework is to be done in pencil.
- Not Accepted after unit test
- Sloppy work will not be accepted.
- Organized your approach to each problem
- Clearly separate problems and identify your answer, sometimes a box is appropriate. Present papers with pride—content and presentation are equally important.

Technology: There will be technology use required to complete assigned homework. All relevant software is accessible through our CANVAS course, or free online.

Engagement in Class Sessions: 3% of your class grade will come from participation during our class meetings. Engagement may include activities such as quizzes given during our meetings, participating in discussions, or completing various assignments with your peers. If you do not attend our class sessions, you will not be able to complete the engagement assignments. Engagement submission will be due by 11:59 on the day of our class.

Communication Plan

Example language:

- I will respond to email within [insert your timeline]. I will offer feedback on major assignments within [insert your timeline]. The best way to contact me is via the Canvas Inbox, as I will prioritize this email over other modes of communication.
- In this course I will be posting interactive announcements which will offer specific opportunities for class questions and extra credit every other week.

- Additionally, I will be participating in the discussion forums with you to share my perspective within the discipline and to offer some nuances of interpretation that may not be present in your textbook.
- Lastly, we'll be holding small group Q & A sessions, where we can learn from our peers (and faculty) on some of the more difficult units within the course.

Succeeding in Math 1220

Math 1220 is a challenging course, however, there are many things you can do and resources available to help us succeed. Consider the following as a starting point to create your success.

- PUT IN THE TIME, STAY ON SCHEDULE! It is very important in this class that you set aside time each day to work on the course so that you can remain on schedule. You can do a better job at both understanding and retaining the material if you learn at an even pace. Trying to "cram" too much in one sitting will result in frustration and lower retention of the material. Recognize that you need time both to learn the material and time to complete your homework, etc. It will take a significant investment of time each day to be successful in this course. It is important that you have the course calendar readily available and refer to it frequently.
- Come to class early. This may not happen every day because things happen, but coming to class late regularly does not lead to success. Arriving late creates anxiety, a feeling of being rushed and a diminished attention.
- Ask lots of questions in class. I love teaching and have never entered the class hoping people are silent and don't interact. We should ask question, discuss topics that might not be clear, and use our class time to get as familiar with this topic as we can.

Grading Scale

Grade Weights:

Your grade will be weighted according to the following:

- Homework – 22%
- Engagement – 3%
- 3 Proctored Midterm Exams – 50%
- Cumulative Final Exam – 25%

Notice that the 3 proctored exams and the cumulative final exam add up to 75% of your overall grade. This is important to understand and ensure adequate preparation for these exams.

Letter Grade:

Your weighted percent in the class will be converted to a letter grade via this scale:

A 100 - 93%	B- 82 - 80%	D+ 69 - 67%
A- 92 - 90%	C+ 79 - 77%	D 66 - 63%
B+ 89 - 87%	C 76 - 73%	D- 62 - 60%
B 86 - 83%	C- 72 - 70%	E below 60%

Midterm Exams and Final Exam

We will have 3 proctored mid-term exams and a proctored comprehensive final. Exams will be taken in the SLCC Testing Center on the Redwood Campus following our course calendar. We will need to make an appointment for each of these exams.

Testing Center Reservation

It is a SLCC Math Department rule that a student attaining a score of less than 60% on the final shall receive a grade no higher than “D” for the course.

STEM Tutoring

Math 1220 is a challenging course, however, there are many things you can do and resources available to help us succeed. Consider the following as a starting point to create your success.

- LEARN HOW TO LEARN AND WHERE TO GET HELP As with any math course, you need to find the best way for you to learn the concepts and skills. There are

many options, including reading the textbook, taking notes, listening to an audio lecture, watching a video lecture, and many others. It is also crucial that you seek help when you need it. At the very beginning of the course, you should spend time familiarizing yourself with available resources.

- The STEM Learning Resources department works in collaboration with the mathematics department to provide free tutoring.

  Free in-person tutoring: Monday - Friday 9:00 am to 9:00 pm (SLCC STEM Tutoring Center)

  Free ONLINE tutoring is available through Tutor.com as a student at SLCC. Students will be given 8 hours of tutoring per month for a total of 32 hours for the semester. If a student needs more, they can contact eLearning for additional hours. The following video will guide us on how to utilize this resource

Calculator Rule

Programmable calculators, graphing calculators, and any calculators capable of algebraic manipulations, are not allowed on in-class quizzes, regular exams, or the final exam.

Prohibited calculators include all the various makes of the following base models: TI36, TI83, TI84, TI86, TI89, TI92, TI-Nspire, HP48, as well as other similar models and brands. **An example of an acceptable standard, scientific, non-graphing calculator is the TI30**, which is relatively inexpensive. Your instructor can verify if a calculator is acceptable for use during quizzes or exams. How to use graphing software or how to program will not be taught in Math 1050, but it will also not be assessed.

Occasionally, a standard scientific calculator, say, a TI30, is required for basic approximation of radicals, logarithmic expressions, and the like, even on exams, like the final exam. It is advised that students always have a basic calculator with them for quizzes and exams just in case that one is allowed or needed. Note that it is the instructor's prerogative to give quizzes, tests, or portions of tests that do not allow any

calculator. Not having a calculator does not excuse a student from being responsible for taking a quiz or exam at the assigned time or completing problems.

Students are expected to be able to perform basic calculations such as fractional arithmetic, finding exact simplified root values, manipulating algebraic expressions at the course level, etc., without a calculator. While a few homework problems and applications may require the use of a graphing calculator or online app, e.g., Desmos, questions on in-person quizzes or exams will only test basic facts that must be demonstrated by students without aid beyond blank scratch paper and a standard, scientific, non-graphing calculator. A student's performance will be measured primarily on their understanding of the concepts and their competency in performing symbolic operations rather than a mere ability to use technology (pushing buttons) to get answers. Full credit will only be awarded on exam questions when answers are justified by a legible and valid argument.

Course Student Learning Outcomes

- Integrate using the following methods: substitution, integration by parts, trigonometric integrals, trigonometric substitution, partial fraction, tables, improper integrals, polar integration.
- Integrate and differentiate hyperbolic functions.
- Apply integration to the following application(s) and methods: Volumes (disk and shell), arc length and work.
- Identify separable vs nonseparable ODE, solve separable IVP ODE, identify and construct directionfields.
- Identify infinite sequences and series, perform and interpret the following concepts and convergence tests: harmonic series, p-series, geometric series, integral test, divergence test, ratio test, root test, comparison tests, alternating series test, and absolute convergence.
- Construct, determine convergence, calculate limits, derivatives, integrals and radius/interval of convergence for power series, Taylor series, and Maclaurin series.
- Perform basic vector manipulation and vector applications including, magnitude, unit vectors, direction, projections, dot product, orthogonality, and work, cross product, torque and area/volume of parallelogram/ parallelepiped.

- Construct parametric equations of lines and planes.
- Organize and communicate quantitative and mathematical information in writing, including proofs of mathematical theorems.
- Model/solve real world problems using ODE's and integrals.
- Obtain mathematical knowledge and understanding of calculus including notation and theorems for use in upper division courses.

Contingency Remote Workday/Learning Plan

Under Utah legislation, the governor can now call a "Remote Workday" given certain circumstances. These remote workdays can be due to inclement weather, pollution, or natural disasters.

1. Each math instructor (full or part-time) will **check-in/communicate** with the Math AD, say, with an email that acknowledges the remote workday and their relative plan for it.
2. The Math AD will verify whether a class will still meet on a campus if something happens at the campus, etc.
3. Each instructor will make a **Canvas class announcement and communicate with students**, informing them of the remote learning day and what their relative plan is for the day's class. Announcements will include pertinent info for the remote day and/or any adjustments to the next class:

- What are the assigned readings, video lectures to watch, practice problems to work?
- Is the instructor holding a Zoom meeting in lieu of the in-person class? The Zoom meeting must be optional and should be conducted at the same time as the regularly scheduled class, if possible. Moving to livestream modality is only an option, not required of the instructor or students. The Zoom meeting could simply be to answer student questions.
- Any test that was scheduled on a remote learning day will be postponed, either to the next class or possibly later scheduled through the Testing Center. Instructors will let students know that the exam has been postponed in their Canvas announcement.

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, please visit the Institutional Syllabus under the Tutoring and Learning Support tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, please visit the Institutional Syllabus under the Advising and Counseling Support Services tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

General Learning Support & Tutoring Services

General Learning Support & Tutoring Services provide support for SLCC students enrolled in any class at the College. You may also ask your instructor about discipline-specific learning support and tutoring services. The following resources are provided free-of-charge.

- In your Canvas course, there is a (blue) tab, “Online Tutoring,” in the left column of tabs. This literally provides free online tutoring during hours of operation.
- For in-person Redwood campus help in math, the next resource is highly recommended: **STEM Center** in SI building, which offers free STEM tutoring.

STEM Center Hours (may vary by semester): Monday-Thursday, 10:00 a.m.-9:00 p.m. Friday and Saturday, 10:00 a.m.-5:00 p.m.

Tutoring: This is an index of tutoring resources.

STEM Learning Centers: Provides free assistance in Math, Science, Accounting, CSIS and Allied Health Classes at 6 campus locations.

Student Writing Center: Provides in-person and online feedback on all writing assignments.

Library Services: Provides research help, print and online resources, computers and study space.

ePortfolio Lab: Provides drop-in assistance for all ePortfolio questions.

eLearning Support: Provides support for navigating online and hybrid classes.

Accessibility and Disability Services: If you have a disability and want an accommodation, please contact:

- Phone: 801-957-4659
- Email: ADS@slcc.edu
- Website: ADS

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

You can access the document by clicking on the following link:
https://slcc.instructure.com/courses/530981/pages/institutional-syllabus

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar

Student Conduct

Students are expected to follow the SLCC Student Code of Conduct at Student Code of Conduct.

Classroom Deportment: Each student is responsible for their own behavior. Any student who shows a pattern of disrespect for others, or who at any time displays egregious disrespect for others, will be subject to penalties as per the student code of conduct.

Attendance: Class attendance and/or participation, whether in-person, broadcast, or online, are expected. They are typically essential to achieve satisfactory results. It is the student's responsibility to be aware of all material covered, in-class announcements, tests dates, assignment due dates, etc.

Electronic Devices in the Classroom: Absolutely no video or audio recording in the classroom is allowed without prior written authorization from the instructor. Cell phones and other electronic devices should be in silence mode during classes, tests, and final exams. Moreover, such devices should not be on desks during lectures, tests, and the final exam unless they are part of the class' participation activities.

Cell phones and tech in-class: In case of emergency, or otherwise, students should exit the classroom before they e-mail, text, or use their cell phones. If students

choose to use a computer or electronic device in class to take notes, they may do so without distracting their classmates. Computer activities that are not directly related to the class should not be done in-class, e.g., watching YouTube or the like. Students who text, scroll on their phones, talk on their cell phone, or use their computers to do activities not directly related to the class will be asked to leave the classroom.

Cheating Rule: Cheating on any assignment or exam will minimally result in a failing grade of 0% for that assignment without any possibility for that work to be made up, resubmitted, or for the failing grade to be substituted by any other work's grade. Moreover, cheating on a single assignment or exam can result in a failing grade for the entire class; this is typically the prerogative of the individual instructor. Cheating is not tolerated, so, take heed and do honest work to learn and develop intellectually. For more details about academic dishonesty, consult the Student Code of Conduct, where this topic is addressed in section C (see below too):

Policies and Student Affairs.

Sanctions for Academic Misconduct (taken from the Student Code of Conduct): Faculty, program directors, associate deans, deans, and the provost for Academic Affairs are authorized to impose any one or a combination of the following sanctions after finding a student responsible for acts of academic misconduct. The possible sanctions include, but are not limited to

- verbal warning and reprimand,
- restriction of privileges, such as access to lab facilities, library facilities, or testing centers,
- failure of the exam, quiz, project, or other assessment,
- failure for the course,
- withdrawal from the course, or
- withdrawal from the academic program.

Upon the circumstance of catching a student cheating, even if the infraction seems minor or the student is remorseful, instructors are expected to fill out the following form (the Dean of Students uses these forms to establish patterns of behavior):

Academic Misconduct Violation Reporting Form.

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	11.10/ 11.11 Engagement Submission	Assignment	3
	Afternoon Study Group?	Discussion	0
	Section 7.3	Discussion	0
	Solutions for Ch 10-17	Discussion	0
	Study Group/Problems	Discussion	0
8/20	Chapter 6.1 Areas Between Curves	Assignment	10
8/20	Orientation: Important CANVAS Settings	Quiz	5
8/20	Orientation: Introduce Yourself	Discussion	10
8/20	Orientation: Practice Submitting an Assignment using CamScanner	Assignment	5
8/20	Orientation/6.1 Engagement Submission	Assignment	3
8/22	6.2 Engagement Submission	Assignment	3

Due Date	Assignment Name	Assignment Type	Points
8/22	Chapter 6.2 Volumes of Rotation	Assignment	10
8/27	6.3 Engagement Submission	Assignment	3
8/27	Chapter 6.3 Cylindrical Shell Method	Assignment	10
8/29	6.4/6.5 Engagement Submission	Assignment	3
8/29	Chapter 6.4 Applications of Integration	Assignment	10
8/29	Chapter 6.5 Average Value of Function	Assignment	10
9/3	8.1 Engagement Submission	Assignment	3
9/3	Chapter 8.1 Arc Length	Assignment	10
9/5	8.2 Engagement Submission	Assignment	3
9/5	Chapter 8.2 Surface Area	Assignment	10
9/10	Midterm Exam #1 Applications of Integration	Assignment	100
9/12	7.1 Engagement Submission	Assignment	3
9/12	Chapter 7.1 Integration by Parts	Assignment	10

Due Date	Assignment Name	Assignment Type	Points
9/17	7.2 Engagement Submission	Assignment	3
9/17	Chapter 7.2 Trigonometric Integrals	Assignment	10
9/19	7.3 Engagement Submission	Assignment	3
9/19	Chapter 7.3 Trigonometric Substitutions	Assignment	10
9/24	7.4 Engagement Submission	Assignment	3
9/24	Chapter 7.4 Partial Fraction Decomposition	Assignment	10
9/26	Chapter 7.8 Improper Integrals	Assignment	10
9/26	7.8 Engagement Submission	Assignment	3
10/1	10/1 Engagement Submission	Assignment	3
10/1	Chapter 9.1 Differential Equations	Assignment	10
10/1	Chapter 9.2 Direction Fields	Assignment	10
10/3	Chapter 9.3 Separable DE's	Assignment	0
10/3	Chapter 9.5 Linear Differential Equations	Assignment	0

Due Date	Assignment Name	Assignment Type	Points
10/8	Midterm Exam #2 Techniques of Integration and Differential Equations	Assignment	100
10/10	Chapter 11.1 Sequences	Assignment	10
10/10	Chapter 11.2 Series	Assignment	10
10/15	Chapter 11.3 Integral Test and p-series	Assignment	10
10/15	Chapter 11.4 The Comparison Tests	Assignment	10
10/22	Chapter 11.5 Alternating Series	Assignment	10
10/24	11.6 Engagement Submission	Assignment	3
10/24	Chapter 11.6 Absolute Convergence & Ratio Test	Assignment	10
10/29	11.7 Engagement Submission	Assignment	3
10/29	Chapter 11.7 Strategy for testing Convergence	Assignment	10
10/31	11.8 Engagement Submission	Assignment	3
10/31	Chapter 11.8 Power Series	Assignment	10
11/5	11.9 Engagement Submission	Assignment	3

Due Date	Assignment Name	Assignment Type	Points
11/5	Chapter 11.9 Represent Functions as Power Series	Assignment	10
11/7	11.1/11.2 Engagement Submission	Assignment	3
11/7	Chapter 11.10 Taylor and McCauarin Series	Assignment	10
11/7	Chapter 11.11 Taylor Polynomials	Assignment	10
11/12	Midterm Exam #3 Infinite Sequences and Series	Assignment	100
11/14	12.1/12.2 Engagement Submission	Assignment	3
11/14	Chapter 12.1 3D Coordinate System	Assignment	10
11/14	Chapter 12.2 Vectors	Assignment	10
11/19	12.3 Engagement Submission	Assignment	3
11/19	Chapter 12.3 The Dot Product	Assignment	10
11/21	12.4 Engagement Submission	Assignment	3
11/21	Chapter 12.4 The Cross Product	Assignment	10
11/26	12.5 Engagement Submission	Assignment	3

Due Date	Assignment Name	Assignment Type	Points
11/26	Chapter 12.5 Equations of Lines and Planes in 3D	Assignment	10
12/9	Cumulative Final Exam	Assignment	100

READ:

Welcome to Calculus II! This syllabus has a lot of information. Please take time to read through it and re-read relevant parts when questions about the course arise later. This will help you be familiar with the course. Ask your instructor questions you have that are not directly addressed in the syllabus; frequent communication with your instructor is highly recommended. Ignorance regarding information in the syllabus, the course's due dates, assignments, exams, etc., is not accepted nor excused. Be aware and be prepared. Work well and work hard. If you do, then you will learn a lot in this course, and consequently, you will develop mathematically and intellectually, which is part of its many purposes. Have a great semester!