

# Course Description

## Vv116 Calculus II

### Integration, Sequences, Series, ODEs



JOINT INSTITUTE

交大密西根学院

**Prerequisites:** Vv115 or permission of instructor.

**Intended Audience:** ME and ECE undergraduate students.

**Description:** Together with Vv115, this course gives an introduction to the basic concepts of single-variable calculus. The emphasis is on understanding fundamental ideas and on applications, rather than on formal proofs. The course discusses integration, sequences and series (including Taylor series) as well as giving an introduction to ordinary differential equations.

**Textbooks:**

- J. Stewart, *Calculus*, 7<sup>th</sup> Edition.

**Syllabus:** (Each lecture is  $3 \times 45$  minutes long)

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Lecture	Lecture Subject
1	The Darboux and Riemann integrals
2	The fundamental theorem of calculus
3	Integration in practice
4	Integration in practice
5	The improper integral with applications (Euler Gamma function, Fourier transform)
6	More applications of integration (surfaces of revolution, curves, curve length, polar curves)
7	More applications of integration (moments, center of mass, probability theory)
8	Infinite sequences (convergence, recursive, bounded, monotonic sequences)
9	Infinite sequences (Cauchy sequences, criteria for convergence and applications)
10	<b>Midterm Exam</b>
11	Infinite series (concept, geometric series, p-series)
12	Infinite series (absolute convergence, convergence tests, alternating series)
13	Power series (radius of convergence, Taylor series)
14	Taylor's theorem and Applications (Lagrange remainder, summing series)
15	Introduction to ordinary differential equations (seperable equations, modelling, radioactivity)
16	Introduction to ordinary differential equations (linear equations, Poisson distribution)
17	Introduction to ordinary differential equations (transforming equations, non-dimensionalisation)
18	Introduction to ordinary differential equations (applications)
19	Final exam review
20	<b>Final Exam</b>

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- The exact location of the exam classes may vary according to the term schedule. The exams in the list above are placed so that the exam topics are precisely those of the preceding lectures.

## Course Grade Components:

- Midterm exam: 30%
- Final exam: 40%
- Course work: 30%

## Honor Code Policy:

### Use of External Sources

When faced with a particularly difficult homework problem, you may want to refer to other textbooks or online sources such as Wikipedia. Here are a few guidelines:

- Outside sources may treat a similar sounding subject matter at a much more advanced or a much simpler level than this course. This means that explanations you find are much more complicated or far too simple to help you. For example, when looking up the “induction axiom” you may find many high-school level explanations that are not sufficient for our problems; on the other hand, wikipedia contains a lot of information relating to formal logic that is far beyond what we are discussing here.
- If you do use any outside sources to help you solve a homework problem, *you are not allowed to just copy the solution*; this is considered a violation of the Honor Code.
- The correct way of using outside sources is to understand the contents of your source and then to write in your own words and without referring back to the source the solution of the problem. Your solution should differ in style significantly from the published solution. *If you are not sure whether you are incorporating too much material from your source in your solutions, then you must cite the source that you used.*

### Collaboration with other students

The rules for collaboration on course work (weekly assignment) problems in this course are quite simple: you must never show any other student your written work. You are not allowed to write down formulas for another student, or to let them see your homework, or to demonstrate something to them on a blackboard or use any other type of written communication.

You are allowed to talk about the course work, but may not communicate in writing. For example, it is OK to tell another student “I solved this equation by applying l’Hopital’s rule.” It is not OK to actually show another student the written calculations of how you did this.

The following actions are examples of violations of the Honor Code:

- Showing another student your written solution to a problem.
- Sending a screenshot of your solution via QQ, email or other means to another student.
- Showing another student the written solution of a third student; distributing some student’s solution to other students.
- Viewing another student’s written solution.
- Copying your solution in electronic form (L<sup>A</sup>T<sub>E</sub>X source, PDF, JPG image etc.) to the computer hardware (flash drive, hard disk etc.) of another student. Having another student’s solution in electronic form on your computer hardware.

Of course, during exams, no communication of any kind (verbal or written) is allowed!

If you have any questions regarding the application of the Honor Code, please contact me or any of the TAs.