

# MTH 421-001 Analysis II, Spring 2018 Course Syllabus

<b>Instructor:</b>	Leonid Chekhov
<b>Lectures:</b>	MWF 11:30 a.m. - 12:20 p.m. in A336 WH
<b>Instructor's Office:</b>	D-203 WH
<b>Instructor's Office Hours:</b>	Mon: 3pm - 4pm, Tue: 1pm - 2pm, and by appointment
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## Required Course Materials

- Textbook: *An Introduction to Analysis* (4th Edition), William R. Wade, Pearson, ISBN: 978-0-13-229638-0

## Prerequisites and Topics

This course is the continuation of MTH320 (Analysis I)

The course will cover Secs. 5.1-5.4, 7.1-7.4 (and partially 7.5 (Thm7.60)), 8.1-8.4, 9.1-9.5 (and partially 9.6: statements 9.41–9.43 and Thm 9.51), 11.1-11.6 (and partially 11.7—Lagrange multipliers), and elements from 12.3-12.5 (iterated integrals, change of variables—polar and spherical coordinates, Gamma function and volumes) of the textbook, including the Riemann integral, recalling power series from Analysis I, multidimensional theory: Euclidean spaces, topological properties, convergence of sequences and sequences of functions, continuous functions, metric spaces, and differentiation in  $\mathbb{R}^n$ .

## Attendance

Students are expected to attend all class meetings and are responsible for all of the material covered in class and in the homework. Any changes in this syllabus or in the scheduling of exams, etc. will be announced during class meetings (usually at the beginning of class so please don't be tardy).

## Class Expectations

1. You are expected to come to every class.
2. You are expected to own the book.
3. You are expected to pay attention and participate in class.
4. You are expected to spend at least 2 hours between each lecture working on your homework, reading the book, lecture notes and supplementary materials.

## Exams and Other Important Dates

Last day to drop the class with tuition refund	Friday, February 2
Midterm Exam I	Friday, February 9
Last day to drop the class with no grade reported	Wednesday, February 28
Spring Break March 5–9	
Midterm Exam II	Friday, March 23
Midterm Exam III	Friday, April 20
Final Exam	Thursday, May 3, 12:45pm - 2:45pm in A336 Wells Hall.

## Evaluation

There will be three in-class exams (15% each), graded homework (20%), and a final exam (35%). The grading scale will be no worse than what is shown below:

Graded Components		Grading Scale ( $x$ is your percent score)	
Homework	20%	4.0	$90 \leq x$
		3.5	$85 \leq x < 90$
Midterm Exams	$3 \times 15\%$	3.0	$80 \leq x < 85$
Final Exam	35%	2.5	$75 \leq x < 80$
		2.0	$70 \leq x < 75$
Total grade out of	100%	1.5	$65 \leq x < 70$
		1.0	$60 \leq x < 65$
		0.0	$x < 60$

## Grading Criteria

All of your work in the course will be graded according to three criteria.

1. Does your work **effectively communicate** your reasoning and methods?
2. Does your work **completely answer** the question posed?
3. Does your work **correctly answer** the question posed?

Solutions which ineffectively communicate your ideas, which omit or incompletely address the questions posed, or which include inaccuracies or errors will be penalized.

**Exams** Your lowest midterm exam percentage will be replaced with your final exam percentage if doing so raises your grade. There are NO make-up exams, a missed exam, for any reason, will be counted as your lowest. You should not miss more than one exam. The university does not permit early final exams for any reason. The final is cumulative. No student should miss the final.

## Homework

Homework will be assigned weekly and collected each Wednesday in class, unless stated otherwise. Your lowest two homeworks will be dropped. No late homework is accepted. Each homework assignment is worth 20 points. Not every homework problem will be graded; but using those which are graded a score from 0 to 20 will be determined. The homework must be written in a clear manner to make the argument readily understandable. If a grader cannot easily follow your work, you will lose points. You are free to discuss homework problems with peers and use additional resources, but your submitted homework should be your own work, written in your own words and you need to cite all used resources. There will be three **special** homeworks preceding three in-class tests; they will be collected at the beginning of the Wednesday class preceding a Friday test and they will be graded the same way as tests that follow; solutions to these homeworks will be reviewed the same day, on a Wednesday class.

If you have any questions regarding the homework, be sure to come to office hours or communicate by email.

## Ungraded Work

You will not be successful in this course if you only complete the graded assignments. You must, in addition, regularly test your understanding by attempting exercises in the textbook and by attempting problems which we work on as a class during lecture and recitation. If you have not mastered the material, then you should not expect to achieve a high exam score.

## Students with Disabilities:

MSU has a Resource Center For Persons with Disabilities (RCPD): <http://www.rcpd.msu.edu/> Please contact the RCPD if you require special accommodations, and then schedule an appointment to meet with your instructor and accommodations can be provided.

## Academic Honesty

Cheating in any form will not be tolerated. You will receive a zero on any assignment in which there is a case of cheating. This includes, but is not limited to, plagiarism, failure to give proper citations, and copying another's work.

If you are preparing an assignment and have a question about whether you are adhering to this policy, please ask your instructor. If you work on an assignment with other students, you must give credit to your collaborators. MSU's policy on academic integrity can be found at the following URL:  
<https://www.msu.edu/~ombud/academic-integrity/index.html>.

## Student Responsibilities

**Attend class & arrive prepared.** Regular attendance is required. Before attending the lecture, read the current textbook section. At minimum, attempt to work through the first several examples in each current section, and write down any questions you have. Work through the textbook exercises for the current sections and keep a notebook to record your progress.

**Read outside of class.** You should always have paper and pencil readily available when reading a mathematical text. Work through the examples by writing the steps out yourself until it is clear to you that the solution in the textbook is correct. Once a topic has been introduced in lecture, you should re-read the corresponding sections from the text. You should work on the exercises at the end of these sections until you are proficient. I encourage you to work with other students and to help one another succeed in the course. However, when you turn in your work, **your solution should be your own**, written independently in your own words.

**Participate in class.** Be attentive and stay alert. Work with your classmates, especially those adjacent to your seat. Take careful notes on those topics which are unfamiliar. Ask questions! Don't be shy: we all are here to learn!

**Complete the homework assignments.** Start homework assignments early and discuss these with your classmates. Write your attempts to solve the homework on scratch paper. You must re-write—carefully and neatly—your solutions according to the requested format. When your homework is returned with a grade, if points were deducted, make sure you understand why.

**Work through the textbook exercises.** Attempt these problems and test your understanding. Ask questions about these exercises. Ask your classmates, your instructor, your roommate, etc. Part of the fun of mathematics is that you can discuss mathematical problems with others and together you can discover a solution.

**Use office hours.** Please consider bringing your questions to office hours. Office hours are times set aside specifically as an opportunity for you to get additional help. If your schedule conflicts with the scheduled office hours, please make an appointment by sending a request by e-mail.

Please do not think of this as an inconvenience to your instructor; additional help is available if you seek it out. However, it is your responsibility to come to office hours only after first making a sincere effort to answer questions on your own. Learning is difficult: work hard, try new ideas, and ask questions. If you do this, you will see definite progress.

## Homework

(Week 1) HW1: (Due Wed Jan 17): 5.1.0(b)(c), 5.1.2(c)[ $(\alpha)(\gamma)$ ], 5.1.8(a)(b), 5.1.10\*, 5.2.0(d), 5.2.2, 5.2.5, 5.2.6(b), 5.2.9.

(Week 2) HW2: (Due Wed Jan 24): 5.3.2, 5.3.5, 5.3.7(a)–(d),(e)\*, 5.3.9, 5.3.12\*, 5.4.2(a)(b)(c)(d), 5.4.7[sketch the function in question], 5.4.8, 5.4.9\*

(Week 3) HW3: (Due Wed Jan 31): Sec.7.1 (5(a), 6), Sec. 7.2 (2, 3, 5, 9\*), Sec. 7.3 (2(a)(b)(c),(d)\*, 3(a)(b), 7(b)\*(d)\*), Sec. 7.4 (1(a),(d), 2(a),(d)\*).

(Week 4): (Due Wed Feb 7) Preparation to the first midterm, special homework

(Week 5) HW4: (Due Wed Feb 14): Sec.8.1 (1(c)(d)(e)(f), 2(b), 5 [we can interpret **triangle sides** as **vectors** with  $\mathbf{a} + \mathbf{b} + \mathbf{c} = \mathbf{0}$  for properly chosen directions], 6(a)(b), 10\*) Sec 8.2 (1(a), 2(a), 5(a)(b), 6\*, 8,9).

(Week 6) HW5: (Due Fri Feb 23): Sec.8.3 [1(b)(c), 2, 7(a)(c)(d), 9], Sec. 8.4 [1(a)(b)(c)(d), 3, 4(a)(b), 7, 10(c)(d)].

(Week 7) HW6: (Due Fri Mar 2): Sec. 9.1 [1(a)(b), 2(a), 3(a)(b), 4, 7(a)\*], Sec.9.2 [4,6,8].

(Week 8): spring break

(Week 9) HW7: (Due Fri Mar 16) : Sec.9.3 [1(c), 2(a)(b), 6(a), 6(b)\*], Sec.9.4 [1(b), 2(a), 4 [hint: use complements], 7(a)\*(b)\*, 8]

(Week 10): (Due Wed Mar 21) Preparation to the second midterm, special homework

(Week 11) HW8: (Due Wed Mar 28): 9.5.2 (only part  $A \cup B$ ), 9.6.8(a)(b)\*, Sec.11.1 [1(a)(c), 2(a), 5(a)(b), 7(b)\* [Use Integration by parts to evaluate integrals of the form  $\int e^{-\alpha x} \sin(\beta x) dx$ ], 9(c)(d)].

(Week 12-13) HW9: (Due Wed Apr 11): Sec.11.2 [1, 5 [solve only for  $\alpha = 1$ ], 8], Sec. 11.3 [ 1(a)(d), 2(b), 8(a)(b)], Sec. 11.4 [5, 7\*].

(Week 14): (Due Wed Apr 18) Preparation to the third midterm, special homework

(Week 15) HW10: (Due Wed Apr 25):

[problems with an asterisk are bonus problems; it is not necessary to solve them, but, if solved, such a problem adds 2 point on top of your score out of 20 point (and if your total score is 20, you'll get 22 out of 20!)]