# Math 483/583: Complex Variables

Spring 2020

(Section 1, CRN 54806/54807)

**Course Credits**: 3
**Lectures:** 9:00 - 9:50 AM on Monday, Wednesday, Friday (through Zoom).
**Instructor:** Tuan Pham
**Email:** phamt3@oregonstate.edu
**Couse website:**
http://people.oregonstate.edu/~phamt3/Courses/S20-Math-483-583/S20-Math-483-583.html
Materials will also be posted on Canvas.
**Office Hours:** Monday, Wednesday, Friday 10:00 - 11:30 AM (through Zoom).

**Textbooks**: We will use the following books as reference. Our lectures will not strictly follow the order of topics in the textbooks (see the tentative schedule).

- *A First Course in Complex Analysis* by M. Beck, G. Marchesi, D. Picton, L. Sabalka. It is free and downloadable at: http://math.sfsu.edu/beck/papers/complex.pdf.
- *Complex Variables with Applications* by S. Ponnusamy and H. Silverman. It is free and downloadable at: https://link-springer-com.ezproxy.proxy.library.oregonstate.edu/content/pdf/10.1007%2F978-0-8176-4513-7.pdf.

**Course Description:** this is an introduction to differential and integral calculus of functions of complex variable. Students should already be familiar with calculus of functions of real variable (Math 251, 252). The course focuses more on computation and visualization than rigorous proofs. Basic topics introduced include: Cauchy's theorem and formula, the residue calculus, Taylor series and Laurent series, harmonic functions, conformal mapping, and some applications.

**Math 483/583 Learning Outcomes**: A successful student in MTH 483/583 will be able to:

1. Perform elementary operations on complex numbers: algebraic operations, taking exponentiation, logarithm, powers, roots, etc.
2. Identify geometric mapping properties of some simple complex functions.
3. Determine differentiability based on Cauchy-Riemann equations.
4. Compute line integrals directly, or through Cauchy's theorem, or residue theorem.
5. Compute certain types of integrals over real variable using residue calculus.

**Topics covered:** See the tentative calendar.

**Grading**:
Worksheets: 10%
Homework: 30%
Midterm: 30%
Final Exam: 30%

**General rules adapted to online class mode:** All assignments are to be turned in as pdf or picture files through Gradescope. Grading will be done there. The Canvas site will inform you of the deadlines and keep record of your performance in the course. Specific rules are listed below.

**Worksheets:** there will be worksheets given during online lectures. You can work on your own sheet of paper, then take a picture (make sure the your name is readable) and upload it on Gradescope. If you have a laptop or tablet that allows you to write digitally on the pdf file, then you can upload this annotated pdf file. The due time is 11:59 PM on the same day the worksheet is given. The lowest two worksheet scores will be dropped. Each worksheet will be graded on the scale of 2. Zero point is given if worksheet is not submitted online. One point is given if worksheet shows hardly any meaningful work. Two points if there is a reasonable amount of work shown. *You do not have to finish the entire worksheet to turn in. More often than not, you will get 2 points if you turn in on time.* You can discuss with your classmates or ask the instructor for help.

**Homework**: due at 11:59 PM on Gradescope every Wednesday, except for the first week and the week of the midterm exam.
**Policy:** You will upload your homework on Gradescope as either pdf or legible picture file(s). You are responsible for the quality of the file you upload. After you upload, Gradescope will guide you to map pages to each problem they correspond to. Please do not skip this step. It will ease the grading task. Although students can collaborate to work on homework problems. However, homework must be written individually in your own words and reflect your own understanding. Almost identical homework submissions may receive 0 point. To stimulate the learning of LaTeX, a mathematical typesetting program, students will receive 4 bonus points on any homework generated with LaTeX. Typing your homework using a different software will give you 2 bonus points. There will be a bonus problem in most homework sets. Late homework will not be accepted. Turn in whatever you have completed by the due date. Only a few selected problems will be graded in detail. The rest will be given credit based on completion. The worst homework score will be dropped.
**Requirements for written work:** this course requires the written communication of mathematical ideas. To obtain full credit for your work, you must write coherently, in complete sentences, with attention to your audience.

**Mathematical software:** Although lab is not a component of this course, you will need a mathematical software called Mathematica to do some homework problems. You can download Mathematica with OSU's license to your personal computer from here: https://is.oregonstate.edu/service/software/mathematica. See installation instructions on a document uploaded on the course website. Alternatively, you can also use online version of Mathematica at https://www.wolfram.com/mathematica/online/ after you create Wolfram Alpha account using your ONID email.

**Midterm Exam: 9 - 9:50 AM on Monday May 4.**
**Policy:** You are allowed to use calculator (Mathematica is counted as calculator) and a one-sided note sheet of A4 size. On this note sheet, you are allowed to write (or type) up to 10 statements. A theorem or definition, no matter how long it is, is counted as one statement. The note sheet should contain no tips nor worked-out examples. This note sheet has to be turned in together with your exam. Violation to the rules mentioned above may cause you to lose points. Any regrading request must be addressed within one week after the work being returned. There will be no make-up exam except for exceptional reasons.

**Final exam: 12:00 - 1:50 PM on Tuesday June 9**.
**Policy:** Final exam only covers the second half of the term. The policy is the same as the midterm exam, except that you can write (or type) up to 15 statements on your note sheet. Any requests for special accommodation (make-up exam, etc) must be addressed to instructor prior to the day of the Final exam. Skipping Final exam will automatically result in a grade of F.

**Grade lines:** the course grades will not be harder than: A 100-90%, B 89-80%, C 79-70%, D 69-60%, and F 59% and under. Scores on Canvas are raw scores. The running total that Canvas provides may not be accurate since it does not take into account the percentage of homework/exams as indicated above. Instructor will calculate total course scores at the end of the term.

**Academic Honesty**
Students are expected to obey OSU's Student Conduct Code http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/code_of_student_conduct.pdf
Accordingly, academic dishonesty is defined as an intentional act of deception in one of the following areas:
Cheating – use or attempted use of unauthorized materials, information, or study aids.
Fabrication – falsification or invention of any information.
Assissting – helping another commit an act of academic dishonesty.
Tampering – altering or interfering with evaluation instruments and documents.
Plagiarism – representing the words or ideas of another person as one's own.

**Statement Regarding Students with Disabilities**
Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at

http://ds.oregonstate.edu

DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.