Math 295/395: Complex analysis
Fall 2020

The course website is `https://www.uvm.edu/~cvincen1/math295.html`. All course information is on our course website and/or in our Microsoft Team space.

Logistical Information: This course counts for 3 credit hours, and meets on MWF 9:40am-10:30am on Teams (remote synchronous). Please see your UVM email or Teams/Outlook calendar for meeting links.

Instructor Information: Professor Christelle Vincent, available on Teams.

For content (i.e. mathematical) questions, please post your question to Coursewire at `https://campuswire.com/c/GE9C5005B`. For personal matters, please reach me by email at christelle.vincent@uvm.edu.

Textbook: The main textbook we will follow is *A First Course in Complex Analysis* by Beck, Marchesi, Pixton, and Sabalka, which is available free on our course website under Learning Resources. A good pair of paper books to get are *Elements of the Theory of Functions* and *Theory of Functions Parts I and II*, both by Knopp and available pretty inexpensively online. Finally, for a student who prefers to work through the material as they read, I recommend *Complex Variables* by Bowman.

Course Description and Goals: In Math 295/395 we will study the basics of complex analysis, including introducing complex numbers and the complex plane. We will study holomorphic functions and the Cauchy-Riemann equations, examples of holomorphic functions, integration in the complex plane, Cauchy's Theorem and Cauchy's Integral Formula, representations of complex functions as power series, and singularities of complex functions, as time permits. Please see the course website for precise topics covered each week. The goal of the course is to acquaint the student with the definitions, theorems, and ideas of complex analysis, as well as strengthen their proof-writing skills.

Office Hours: I am available to meet on Teams on **Monday from noon to 1pm and on Wednesday from 3pm to 5pm**. At those times, you can just send me a chat on Teams, and we can arrange to meet over video right then and there, or within a few minutes. If you would like to plan in advance, you can also send me a Teams meeting request during these times which I will accept.

If you would like to meet at any other time, please send me a Teams chat to discuss, or send me a meeting request through Teams. You can also contact me by email for scheduling.

Attendance: You are expected to attend every lecture. If for whatever reason you cannot attend lecture, you are responsible for watching the recording. There is no penalty for missing any in-class activity.

Religious accommodations: Students have the right to practice the religion of their choice. If you believe you might need accommodations to take part in religious celebrations, please submit

in writing to me by the end of the second full week of classes your religious holiday schedule for the semester. Together we will work on arranging a way to make up any work you might miss. For all homework and quizzes, you will be expected to turn in your work on time, or in advance, as necessary, except in very special circumstances.

SAS: In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Student Accessibility Services (previously ACCESS). Once you have your accommodation letter from them, I will be available to meet with you privately to discuss the accommodations you plan to use in this course.

Grading: Your grade for this class will be based on your performance on warm ups and metacognition (both graded on completion only; see details below) as well as on course objectives (which are scored; see details below). Your final grade will be the least of the three grades you have earned on warm ups, metacognition, and objectives, with a small boost of a "+" if you earn a "+" on objectives.

For example, if you earn an A on warm ups, a B on metacognition and a B on objectives, you will earn a B in the class (the least of the three grades you have). However, if you earn an A on warm ups, a B on metacognition and a B+ on objectives, you will earn a B+ in the class (the least of the three grades you have, with the "+" boost from earning a B+ on objectives).

There are no exams in this class.

Warm ups: Every week (except on redo weeks) on Monday and Wednesday, you will have the opportunity to turn in your warm up problems to Gradescope. Your problems must be scanned to **one high-quality** pdf (please see instructions online). Warm ups should be done before attending class, but can be turned in until 11:59pm on the day of class.

Your grade on warm ups will be:

A if you submit 12 out of 20 warm ups
B if you submit 8 out of 20 warm ups
C if you submit 4 out of 20 warm ups
D if you submit 1 out of 20 warm ups

Warm ups will typically not be graded for correctness, although I may write comments on selected problems from time to time. If you would like comments on a warm up problem, please let me know and I will do my best to accommodate.

Metacognition: Every week (including redo weeks), you will have the opportunity to turn in a metacognition reflection to Gradescope. You may type your reflection in Word (in which case you should save as a pdf for upload to Gradescope) or in LaTeX, or write it up by hand (then scan it, please see instructions online). Your metacognition reflection can be turned in until 11:59pm every Friday.

Your grade on metacognition will be:

A if you submit 8 out of 12 metacognition reflections
B if you submit 6 out of 12 metacognition reflections
C if you submit 3 out of 12 metacognition reflections
D if you submit 1 out of 12 metacognition reflections

Learning objectives: The material in this class is divided into learning objectives. For each attempted learning objective, students will earn a score of 1, 2, 3, 4, or 5. Their final score on a given learning objective will be the greatest score they have achieved on this objective during the course of the semester.

Scores will be assigned as follows:

5: perfect work – arithmetic mistakes only
4: shows understanding of the concepts
3: engages with the ideas of the objective
2: engages with the ideas of the objective, but shows fundamental misunderstandings
1: the objective was attempted

A student can access their current scores on objectives by going into our Teams space, General channel, then Class Notebook tab at the top. In there, in your private student space, you should be able to open a read-only Excel spreadsheet with your scores so far. Please let me know if you have any trouble with this as it is an experimental feature.

Your objectives grade will be determined from your objective scores as follows:

A+: mostly fives, at most 10 fours
A: mostly fours, at most 5 threes
A-: mostly fours, at most 10 threes
B+: half fours, half threes, roughly
B: mostly threes, at most 10 twos
B-: half threes, half twos, roughly
C+: mostly twos, at most 5 ones
C: mostly twos, at most 10 ones
C-: half twos, half ones, roughly
D: all objectives attempted

Please note that a score of two on any objective means that you will earn a grade of B+ or lower; a score of one on any objective means that you will earn a grade of C+ or lower.

Redo weeks and Final week: During the weeks of October 12-16 and November 30-December 4, extra problems covering objectives already covered in class will be assigned to offer students an opportunity to improve their objective scores. If a student is happy with their objective scores, they do not need to turn in any work (except if they are graduate students; see below). During Final week (December 7-11), extra problems covering the objectives of the class will be assigned to offer students a third opportunity to improve their objective scores. Once again, if a student is happy with their objective scores, they do not need to turn in any work (except if they are graduate students; see below).

Graduate credit: To obtain graduate credit in this class, in addition to the activities listed above, students must attempt all assigned problems, except as marked during redo weeks and final week. There will also be graduate objectives which must be attempted and will count as normal objectives for graduate students.

Statement on diversity: Mathematics can be learned and enjoyed by everyone, regardless of gender, age, race, sexual orientation, or other personal characteristics. As a group we will work to

create a space where we all feel welcomed and encouraged, and any actions or speech that detract from this atmosphere will not be tolerated.

In particular, we will be mindful of encouraging others to let us know if they do not already know something and do everything to support them in their learning. We will not say that things are "trivial." We will offer corrections gently and with the intention of helping the other, as opposed to making ourselves feel good.

Recording of class time: Our class sessions will be audiovisually recorded for students in the class to refer back to, and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and use a profile image which you are comfortable with having on a recording. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The recordings will only be available to the instructor and other students via Teams.

Course evaluations: All students are expected to complete an evaluation of the course at its conclusion. These will be anonymous and confidential, and the constructive criticism offered will be used to improve subsequent versions of the course.

Intellectual property statement: Students are prohibited from publicly sharing or selling academic materials that they did not author (for example: class syllabus, outlines or class presentations authored by the professor, practice questions, text from the textbook or other copyrighted class materials, etc.); and students are prohibited from sharing assessments (for example homework or a take-home examination). Violations will be handled under UVM's Intellectual Property policy and Code of Academic Integrity.

COVID-19 policies: The University of Vermont reserves the right to make changes in the course offerings, mode of delivery, degree requirements, charges, regulations, and procedures contained herein as educational, financial, and health, safety, and welfare considerations require, or as necessary to be compliant with governmental, accreditation, or public health directives.

The Green and Gold Promise clearly articulates the expectations that UVM has for students, faculty, and staff to remain compliant with all COVID-19 recommendations from the federal CDC, the State of Vermont, and the City of Burlington. The Code of Student Conduct outlines policies related to violations of the Green and Gold Promise. Sanctions for violations include fines, educational sanctions, parent notification, probation, and suspension.

Statement about academic integrity: The University strives to provide an environment that encourages all students (undergraduate, medical, graduate, and continuing education) to learn, create, and share knowledge responsibly. As society entrusts our students and faculty to pursue knowledge and report their discoveries truthfully, any deliberate falsehood or misrepresentation undermines the stature of the University. The following standards of academic integrity are deemed necessary for fulfilling the University's mission, as well as its motto: Studiis et Re-

bus Honestis ("For honorable studies and pursuits"). These standards are also necessary for evaluating the quality of student work in a fair manner. For further information, please visit `https://www.uvm.edu/sites/default/files/UVM-Policies/policies/acadintegrity.pdf`.

Statement on alcohol and cannabis in the academic environment: As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. In addition, alcohol and cannabis can:

- Cause issues with attention, memory and concentration
- Negatively impact the quality of how information is processed and ultimately stored
- Affect sleep patterns, which interferes with long-term memory formation

It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course.

Statement on Student Athletes: In order to be excused from classes, student athletes should submit appropriate documentation to the Professor in advance of all scheduling conflicts within the first two weeks of class. Those missing class are expected to submit make-up assignments within a reasonable time period.