MATH 74 Intro to Proofs. Course Syllabus

with Professor Zvezdelina Stankova

MWF 10:00 - 11:00am, online

Updated 8/15/2020

CONTENTS

1. Instructor and General Information

- **Instructor:** Professor Zvezdelina Stankova (Zvezda)

- **Tentative office hours** (to be finalized by the end of the first two weeks of classes):
  - MWF 11:10am-11:40am, MW 1:10pm-2:30pm, F 1:10-2:00pm.
  - There are no individual appointments.
  - Questions will be answered on a first-come-first-serve basis.
  - Administrative questions will take priority during the first 10 minutes of each office hours.
  - If you have an urgent question, you must make time to come in office hours. The common excuse: "I couldn't make it to your office hours because of reason X, and hence I am writing to you an email." will **not** be accepted. If your issue is important, you will make time to come to office hours. Anything that can be resolved in office hours must be resolved in office hours; **not** on email!

- **Email:** stankova@math.berkeley.edu; ONLY FOR EMERGENCIES!

- **Webpage for ∀ TBA:**
  - bCourses at https://bcourses.berkeley.edu/
  - (occasionally) http://www.math.berkeley.edu/∼stankova/

2. Enrollment, Section Switching, bCourse Access

2.1. **For enrollment questions,** contact:
- **Jennifer Sixt**: at enrollment@math.berkeley.edu
  or by booking a Google Hangouts appt with her through jenucbmath.youcanbook.me/

(1) Use e-mail only for *quick* advising questions.
- **Thomas Brown:** Last Name "A-L" students, thomasbrown@berkeley.edu.
- **Marsha Snow:** Last Name "M-Z" students, snow@math.berkeley.edu.

(2) For in-depth advising, make an appt M-F 10AM–12Noon & 1–4PM via Google Hangouts:
- Current UCB students: schedule an appt via Cal Central's "My Academics" tab.
- Pospective UCB students: email directly your adviser above (by your last name).

2.2. **To switch discussion sections,** students must go to CalCentral at

(1) https://calcentral.berkeley.edu
- The switch will be possible only if there is room in the section.

(2) **No access to enrollment:** Do **not** ask the instructor or GSIs to switch you to another section or to enroll you in the class. We have no control over enrollment in the class/sections.

2.3. **bCourse Access:** is granted only to officially registered students in the class.
Students **on the wait list** will **not** be added to the bCourse site. Until registered, you need to:
- Ask a classmate to share with you any other materials on bCourses.
- The GSIs and I will NOT be sharing course materials with individual students who are not officially registered for the class, join late, miss part of the class, lose materials, etc.

Follow these instructions precisely, and keep emails to me and the GSIs only for real emergencies.

3. Prerequisites

3.1. **Required:** Completion of Math 10B *or* Completion of Math 1B and completion of or concurrently enrolled in Math 53 or 54, or 55.

4. Attendance: Lectures and Discussion Sections

4.1. **Enrollment in sections:** Each student must sign up for discussion sections on Tue and Thur.

4.2. **Attendance Checks:** Lectures and discussion sections are mandatory and must be attended synchronously by all students.

(1) Lecture and section attendance will be taken in class, synchronously, via polls.
(2) Students with severe time differences will be identified before the semester starts and directed to alternative lecture attendance quiz on WebWork btw 9:45-10:00pm that day.
(3) Sections must be attended synchronously by all students and no alternative section attendance check will be possible. Thus, sign up for a section that you can attend synchronously.

5. Textbooks

5.1. **Required:** *"A Decade of the Berkeley Math Circle,"* volumes I and II, edited by Stankova and Rike, MSRI/AMS, for learning proofs and problem-solving techniques.

6. Homework

6.1. **Assigned/Due:** HW will be posted on bCourses usually right during and after each lecture and section. During a full week of 3 lectures and 2 sections, $3 + 2 + 3 + 2 + 2 = 12$ number of problems will be typically assigned per week. HWs must be submitted to Gradescope by 11:59PM the following Monday.

6.2. **Graded:** On average, 2 HW problems per week will be selected by the instructor to be fully graded on correctness, completeness, and clarity, for a total of $10 + 10 = 20$ points. Students will not know ahead of time which problems are selected, and hence all HW problems must be carefully written and submitted by the deadline. The remaining 10 problems will be each graded as follows: 1 pts for complete or almost complete solution, 0.5 pts for solutions that is at least half complete but not complete, and 0 pts for solutions that are less than half done. Thus, the HW for a full week of classes will be graded out of 30 points. Shorter weeks will have fewer HW problems.

6.3. **If missed class:** If you miss lecture or discussion section: do NOT e-mail instructor or GSI to ask for missed handouts and announcements. Instead, check bCourses and ask your classmates.

6.4. **Homework solutions:**

• **Posted:** on **bCourses** ordinarily after HWs have been graded. Do **not** ask for solutions to be posted earlier: you must attempt to do your homework without help from posted solutions.

• **Taken down:** the web in a week or so after being posted; hence make sure that you download them and read them on time. No HW solution files will be sent to students at any time: please, do **not** request them; ask instead your classmates for any missed HW solution files.

7. Reading Assignments

It is the students' responsibility to read carefully and thoroughly the assigned textbook section(s), extra handouts or videos, and review their class notes after each class. If you missed a lecture or a discussion section do **not** ask the instructor or the GSI for their notes: ask your classmates.

8. Quizzes

8.1. **Total number of quizzes:** There will be about 7 quizzes given 6:30PM-7:15PM on Wednesdays, roughly once in two weeks: Sep 2 (practice), Sep 9, 23, Oct 7, 21, Nov 4, 18, Dec 2. Everyone must take the quizzes during this time. There will be no alternative option for quizzes.

8.2. **Number of quiz scores in final grade:** Only the top 5 quiz scores will be taken into account when determining a student's final grade.

8.3. **No make-up quizzes:** If you miss the time when your quiz is given, you cannot retake the quiz at another time, and your quiz score will be 0. Thus, when you miss to take your quiz (for whatever reasons, including being sick, having a family emergency, etc.), keep in mind that exactly **the top five** quiz scores will be counted, regardless of your reasons. **No** exceptions will be made to this policy: please, do not send me or to your TA notes to be excused from quizzes. The quizzes will be based on the current or previous HW and class/section problems.

8.4. **Purpose of the "Top 5 quizzes":** Keep the few times when you might miss quizzes only for true emergencies. The quizzes to be dropped are not intended as a back-up for slacking off, lagging behind the material, or catching up due to unsatisfactory academic performance on previous quizzes. The quizzes that will be dropped are meant to help you in case of an emergency. No further quiz scores will be dropped.

8.5. **Joining the course late and quizzes:** Again, 5 quiz scores will be used towards the final grade, including some possible 0s if fewer than 5 quizzes have been taken.

8.6. **Content of Quizzes:** Ordinarily, each quiz will consist of two written problems (30 min + 10 min tech, submitted on gradescope) and several True/False or Multiple Choice questions (5 min on WebWork). One of the T/F or M/C questions on each quiz may be on administrative matters. Thus, you must read the syllabus and be updated on any administrative announcements and discussions from lecture and class.

8.7. **Cheat Sheet on Quizzes:** Two page (two sides of a regular sheet of paper), hand-written by the students. No copying and pasting of typed text from anywhere, unless the student has a registered disability that allows for typed or other specially prepared texts.

9. Exams

9.1. Times of the two exams:

- **Midterm:** Wed, Oct 14, 6:15PM-7:35PM. The midterm will consist of several written problems (50 min + 10 min tech, submitted on gradescope) and several T/F or M/C (15 min on WebWork). Everyone must take the midterm during this time. There is no alternative option.

- **Final exam:** Mon, Dec. 14. The final will consist of several written problems (80 min + 10 min tech, submitted on gradescope) and several T/F or M/C (25 min on WebWork).
    - regular time for written problems: 8:00AM-9:30AM;
    - "overseas" time for written problems: 10PM-11:30PM.
    - everyone takes T/F or M/C part for 25 min., starting anytime between 6PM-9PM.

9.2. No make-up quizzes, midterm or final exam: Every student must take the quizzes, midterm, and final exam on the announced dates and times as there are no other options.

9.3. Scheduling or avoiding conflicts with exams?

- Do **not** buy tickets to travel and do **not** schedule other events during the days of quizzes and exams: you must take the quizzes and exams at the announced times.

- Do **not** ask for different dates or times for the final exam due to flight reservations or other reasons: the final exams times are assigned campus-wide and there will be no personal exceptions.

- Do **not** take this class if you have a conflict with any of this exam schedule.

9.4. Exam Content. A substantial part of the exams will be based on versions of problems from:
- **Homework:** problems, both regular and bonus.
- **Class:** problems, theory, and ideas discussed in lecture and sections.
- **Quizzes:** random quiz problems.

9.5. Are the exams comprehensive?

- **Midterm:** The topics for the midterm exam will be based on the first half of the exam.

- **The final exam is comprehensive:** Although the final will concentrate on the material after Midterm 1, anything covered in the course is fair game on the final exam.

10. Final Grade Components

10.1. Grading scheme. Grades will be computed by taking:

(1) 20% homework. There will be $\approx$ 14-15 HWs, graded as explained earlier.
(2) 20% quizzes, using only the top 5 quiz scores out of $\approx$ 7 quizzes (about once in 2 weeks).
(3) 12% lecture attendance. There will be 2 polls in lecture or alternative late evening quiz for "overseas" and DSP students with lecture accommodations. Each poll is out of 2 pts:
    - answer the two polls any way during the given time: 1 pt;
    - answer at least one poll correctly: 1 pt.
    The top 30 (out of $\approx$ 38) lecture attendances will count towards the final grade.
(4) 8% discussion attendance. There will be 2 polls in discussion (no alternative options for section polls). Each poll is out of 2 pts:
    - answer the two polls any way during the given time: 1 pt;
    - answer at least one poll correctly: 1 pt.
    The top 20 (out of $\approx$ 28) section attendances will count towards the final grade.
(5) 15% midterm.
(6) 25% final exam.

10.2. **Letter Grades.** The final letter grades will be **not** be based on a curve, but rather on the instructor's understanding of how well the students have mastered the material. There are no pre-determined % of letter grades to be assigned, and no pre-determined % of threshold scores that have to achieved for a particular grade. (Class statistics on the midterms and the final exam will be posted on bCourses, but they should be viewed only as a way to see where a student's performance is withtin the class and they will not be used as a basis for determining the final grade.)

10.3. **Missing the midterm:** will likely result in a low grade of the course. No option of an incomplete grade here, as missing the midterm will not qualify a student for an incomplete grade. There is no make-up midterm exam.

10.4. **Missing the final exam:** will result in automatic failure of the course, unless valid reasons are provided for requesting an incomplete grade (see below). However, the course is new and it is unclear when it will be taught next. It will NOT be offered in the spring of 2021, so an incomplete grade (if approved) can be completed the earliest in a year when the course might be offered again.
- It is the student's responsibility to learn the missed material due to any absences.

11. Special Accommodations

11.1. **Special Arrangements for Disabled Student Program (DSP) students.**
- If you are a student with **a disability registered by the DSP** on UCB campus and require special arrangements during exams and quizzes, I must be sent the official DSP accommodation by the DSP office at least **14 days (2 weeks)** in advance. We will **not** be able to accommodate anyone in less than 14 days and the student will have to take the exam (or quiz) along with everyone else under the regular conditions provided for the class. The earlier we are informed about your DSP status, the easier it is to provide appropriate accommodations for you.
- Do NOT ask to be given special accommodations while promising that in the future you will provide a DSP note. Observe this policy: no exceptions will be made.

12. Drop Deadline

The results of the first midterm will likely be known **after** the drop deadline. Do not ask me or the GSIs if I think you are more likely to get, say, B^- instead of C^+: we will not know. The decision to drop the course will be entirely yours and you will have to make it based on your first several quizzes and HW scores up to that point.

13. Incomplete Grades

13.1. **University policies:** Please, consult the university policies regarding incomplete grades.

13.2. **Reasons for Incomplete:** An Incomplete "I" grade is rarely given.
The only justifications for an I grade are:
- **documented serious medical problem,** or
- **a genuine personal/family emergency.**

13.3. **Conditions for giving an incomplete.** When requesting an incomplete, the student must:
- have a passing grade (C^- or above) up to that point in the class.
- have completed at least 2/3 of the course work up to that point.
- present a formal document regarding the nature of emergency or the medical problem.

13.4. **Invalid reasons for requesting an incomplete.**

- Falling behind in this course or a heavy work load in other courses are not acceptable reasons for requesting an incomplete.

- If you miss the midterm (for whatever reasons), you will very likely **not** qualify for an incomplete, as your grade before the final exam will include a 0 on that midterm, which will not have been "resurrected" by the final at the time of requesting the incomplete grade.

14. ACADEMIC INTEGRITY

The Mathematics Department, and in particular, the instructor and the GSIs in this course, expect that students in mathematics courses will not engage in cheating or plagiarism.

- Due to the online format of this course, **Specific Honor Code and Exam Instructions** for the exams and quizzes for this course will be provided in due time.

The following is adapted from the Math Department web page to our course. Read it for general understanding of cheating and honor code and adapt it to the present circumstances by following the Specific Honor Code and Exam Instructions that will be provided by the instructor.

14.1. **What does cheating mean?** Broadly speaking, cheating means violating the policies of a course or of the university in order to gain an unfair advantage over fellow students. A particular kind of cheating is plagiarism, which means taking credit for someone else's work. Cheating and plagiarism hurt your fellow students in the short term, they hurt the cheater in the long term, and they will not be tolerated. On exams, the most basic type of cheating is copying off of someone else's paper. Graders easily spot when two exam papers look unusually similar, or have similar (wrong or correct) answers, calculations, ideas, or thought structure, even if written in different words or order of words. Even glancing at someone else's paper to check your answer is cheating. If you write the correct answer to a computational problem without any justification or with a bogus justification leading to that answer, this raises strong suspicions that you cheated, on top of not receiving any credit anyways due to the lack of correct justification.

14.2. **Electronic devices on exams/quizzes.** Electronic devices such as phones, calculators (electronic, mechanical, or any other type), and other devices* are also not allowed on exams/quizzes not even to tell the time. There are too many ways to cheat using software and the Internet. Exams are not intended to test your ability to find the answer by any means necessary. The questions might be too easy for that! Rather, exams/quizzes are supposed to test your understanding of the course material, which you will need in order to use math correctly in subsequent courses and in the real world.

14.3. **Expectations on exams, quizzes, and HW.** Exams and quiz papers are expected to be your own work. In this class we encourage collaboration on homework, as it will be graded for "completeness" only; but you are carrying your personal responsibility to learn how to do the HW problems independently so as to be able to solve similar problems on exams and quizzes by yourself. When allowed, if you use proofs or calculations from textbooks or class notes, you need to cite these sources, even if you have rewritten the material in your own words; otherwise it is plagiarism.

14.4. **How to avoid cheating?** It is your responsibility to take reasonable precautions to prevent cheating. In exams, you should sit as far away from other students as the room permits, and hold your exam papers in such a way that they are not easily visible to other students.

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*Tablets/ipads for writing will be allowed in MATH 74, with certain restrictions.

14.5. **What to do in a case of cheating?** If you suspect that other students are cheating, you should immediately inform the instructor and/or your GSIs. Students may be cheating in ways that the instructor/GSI has never even heard of (unlikely, but possible). Even if you don't mention any names, the sooner you inform the instructor/GSI what is going on, the sooner they can take measures to put a stop to it. You can further report any cheating at:

<div align="center">http://sa.berkeley.edu/conduct/reporting/academic</div>

14.6. **Resolution to cheating.** If you are suspected of cheating, the instructor may pursue a variety of actions depending on the particular nature of the incident. If you accept responsibility for academic miscondict, the matter can often be resolved between you and the instructor with possible academic sanctions ranging from losing points on an exam/quiz to failing the class, and a report will be sent to the Mathematics Department and/or Center for Student Conduct. It is not necessary for the instructor to determine whether the student(s) has a passing knowledge of the relevant factual material. It is understood that any student who knowingly aids in cheating is as guilty as the cheating student.

In serious incidents, or if you maintain that you are not responsible for academic misconduct, the instructor has the freedom and responsibility to impose any academic sanctions within the course that she deems appropriate, and the case will very likely be forwarded to the Center for Student Conduct. In such a case, more stringent actions (e.g., dismissing the student from the university) can be initiated by the Office of Student Conduct.

14.7. **Conclusion.** We hope that the above clarifications will help prevent cheating. If you have any questions about the rules or expectations, you should not hesitate to ask the instructor/GSI, or the vice chair for undergraduate affairs in the Mathematics Department.

15. Conduct Sanctions and Grade Deductions for Illegal Postings

This section concerns what will happen when a student pirates course materials and posts them on-line, including but not limited to coursehero.com, or assists someone else in doing that. Apparently, the problem is pervasive, it encourages plagiarism, and in the long-run it hurts everyone by undermining and jeopardizing their learning process.

Here are the relevant sections from the **University-wide Code of Conduct** and this is what **UCB Student Conduct Committee** will use to apply sanctions to students who have posted course materials on-line or elsewhere without explicit permission from the corresponding instructors:

- **102.23 Course Materials - Selling, preparing, or distributing for any commercial purpose course lecture notes or video or audio recordings of any course unless authorized by the University in advance and explicitly permitted by the course instructor in writing. The unauthorized sale or commercial distribution of course notes or recordings by a student is a violation of this Code whether or not it was the student or someone else who prepared the notes or recordings.**

    Copying for any commercial purpose handouts, readers or other course materials provided by an instructor as part of a University of California course unless authorized by the University in advance and explicitly permitted by the course instructor or the copyright holder in writing (if the instructor is not the copyright holder).

As in other classes on campus, any unauthorized by me postings of any course materials, including but not limited to any handouts, syllabus, bCourse pages, quizzes, discussion worksheets, midterm reviews, exams, presentations, lecture notes, pictures, video, etc., will be:

- **Subject to a letter grade deduction of the final course grade, left entirely to the instructor's discretion, AND**
- **Formally reported to the University Student Conduct Committee.**

I had never felt the need to impose such strict rules until I was given the opportunity to see the damage that such mis-conduct causes to all students in classes on campus and elsewhere.

In case of doubt, before posting any materials related to the course, ask me or your GSIs. As a rule of thumb, anything that I or the GSIs have prepared for the course, anything on the bCourses site, etc., CANNOT be posted on-line. Be advised that there is a simple way to track down who has posted materials.

Finally, no one in the classes can take audio or video, or pictures of the boards or anyone in class, without my explicit permission and without the corresponding DSP accommodation presented to me in advance. Such audio, video, or picture materials are subject to the same rules of non-posting and usage strictly by the corresponding DSP student.

15.1. **Piazza Site for MATH 74.** The instructor will not moderate piazza.

- One GSI will be assigned to loosely monitor the piazza site. Other GSIs may occasionally check but are not obligated nor should be expected to verify or moderate the content of the posts on piazza.
- The piazza site is open only to students enrolled in the course, and the topics discussed are restricted only to the content or logistics of the course.
- While we will disable the ability for students to post anonymously to instructors, we do not wish that to dissuade you from feeling comfortable asking any honest and relevant question.
- Any posting of links or references on how to obtain unauthorized or pirated copies of the textbook or other copyrighted materials directly violates the course syllabus about plagiarism. Posting such content is illegal, and any student who does so faces academic and other sanctions.

16. Tentative Topics and Quiz/Exam Schedule

(1) Intro to Proofs: Aug. 26 – Sep. 1
  - Quiz 0: Sep 2, for practice
(2) Combinatorics: Sep. 2–11
  - Quiz 1: Sep 9, on Intro/Comb
(3) Geometry, Sep. 14–17
(4) Number Theory, Sep. 18–28
  - Quiz 2: Sep 23, on Geo/NT
(5) Induction: Sep. 29 – Oct. 6
(6) Invariants/Monovariants: Oct. 7–19
  - Quiz 3: Oct 7, on NT/Induction
  - Midterm: Oct. 14

(7) Complex Numbers: Oct. 20–23
  - Quiz 4: Oct 21, on Invariants/Mono
(8) Inversion in the Plane: Oct. 26 – Nov. 4
  - Quiz 5: Nov 4, on Complex/Inversion
(9) Real Analysis: Nov. 5–13
(10) Action Groups: Nov. 16–20
  - Quiz 6: Nov 18, on Real/Groups
(11) Inequalities: Nov. 23 – Dec 4
  - Quiz 7: Dec 2, on Inequalities
(12) RRR: Dec. 7–11
  - Final Exam: Dec. 14

17. Questions

17.1. Whom to Ask? Please, refer to the following list for who to contact when you have questions regarding the course. Contacting the wrong people will simply result in redirecting you to the appropriate contact person, and thus, will waste your and our time. GSIs are instructed **not** to answer any questions outside of their realm of expertise as listed below.

#	Type of Questions	Person to Ask	When and How
1	enrollment and section placement	Jennifer Sixt Thomas Brown, Marsha Snow	email or appointment M-F 10am-12pm, 1-4pm
2	quiz and exam scores	the student's GSI	office hours
3	missed handouts and announcements	bCourses, piazza, classmates	anytime
4	emergencies, administrative questions not addressed elsewhere	professor	office hours
5	math questions	GSIs, professor	sections, office hours
6	true emergencies that are not caused by you and cannot be resolved in office hours	professor	e-mail, phone

17.2. Email is only for emergencies! The professor will not answer any math or grading policy questions on e-mail: **professor's e-mail is only for emergencies!**

- "Emergencies" are urgent and important situations that are **not** caused by a student's procrastination, negligence, or disorganization.
- An "emergency" email is **no longer than 5 lines**! If you are in an emergency, you cannot write long emails!
- No attachments can be emailed to the professor, unless a prior agreement between professor and student has been reached after discussing the issue and the professor has requested more information in the form of an attachment.

18. GSIs Contact Information

#	Name	Email	Office Hours
1	Dun Tang	dun_tang@berkeley.edu	on bCourses
2	Roy Zhao	rhzhao@berkeley.edu	on bCourses

- Any student is **welcome to visit** any GSI with math questions. The GSI's and instructor's office hours do not overlap, and hence there are lots of office hours during the week when one can get answers to questions. You do **not** have to come to the instructor's office hours with math questions: all GSIs are qualified to answer math questions related to the course.
- Direct admin. questions (not answered in class) **in person** to your GSI or the instructor.
- **Reserve email for emergencies only!** "Emergencies" are urgent and important situations that are **not** caused by a student's procrastination, negligence, or disorganization. Yes, this is repeated, as a number of students ignore this and send all sorts of routine or non-emergency emails that can be resolved in office hours.
- **No repeats.** Administrative questions that are addressed in this handout or answered in lectures or sessions will not be answered on e-mail or otherwise.
- **Missed information.** For any missed information: ask your classmates.
- **Be organized, responsible, and hard-working:** these traits will take you half of the way to performing well and getting a lot out of this course.