This syllabus provides pertinent information about class policies and expectations. You are responsible for reading it, understanding it, and following it.

Lecture: You are not required to attend the live lectures or recitation. This is a choice you make for yourself as a student. Each lecture will be recorded and posted to Canvas following the live session. The hope is that each person can choose their level of interaction in the course according to their learning needs. There will be a few days for which I will pre-record a lecture due to a conflict, and an announcement will be made if this is the case.

Office Hours and Interaction: I will be available by appointment this semester to help with course material. Do not hesitate to reach out to me at any time; I am here to help you be successful in this course. Please allow up to 24 hours for an e-mail response during a weekday, and until Monday morning for any e-mail sent over the weekend.

Use of Canvas: Please check Canvas every day for announcements and to access course material. It is your responsibility as a student to be aware of deadlines and to keep up with the material.

Discussion: There is not an official class participation grade, but there will be 2-3 times where your HW assignment will require you to post to the discussion board. The guidelines for these posts will be detailed in each discussion thread.

Prerequisites: Experience with thinking logically; familiarity with the language of formal logic will be useful, but will be covered ad hoc. Calculus 1.

Course Description: This course is an introduction to enumerative combinatorics and graph theory. It is intended to provide the student with knowledge of the theory of and applications for many types of combinatorial techniques. Students will solve common classes of combinatorial problems and articulate these solutions through clear and coherent proof writing techniques, as well as through the analysis, design and implementation of algorithms. There will be introductions to set theory and proof-writing.

Main References: Both texts for this class can be accessed online at no cost. It is expected that you complete the suggested readings from both. There will be several special topics for which I will provide references at a later time.


Homework: Written homework will be assigned on a weekly basis and posted to Canvas. These will be due on either Monday or Tuesday at 11:59 PM CT and are to be uploaded to Canvas. Put the problems in the order they were assigned. Late homework will not be accepted unless a student has a verified personal emergency. If you are unable to turn any assignment in due to a foreseeable conflict, notify the instructor as soon as possible to make accommodations. Your lowest homework score will be dropped if you turn in every assignment with evidence of concerted effort. Otherwise, missing assignments will stay a zero.

You are welcome to discuss HW with your classmates, and use other texts, but you should be writing your own solutions. If you collaborate with a classmate, please indicate this on your assignment. It is
obvious when a student has simply copied a proof from another source, so if it is suspected that your work is not your own, a meeting will be requested where you will explain solutions.

**Examinations:** There will be three exams during the semester. You will have several days to work on these. Your solutions will be uploaded to Canvas. It is encouraged to use the texts and notes, as well as possibly implementing a self-designed code if you are so inclined (this will never be required, but I will post a few videos with small examples). You should think of them as challenging HW assignments. **Exams should be completed individually, unless I specify that you can collaborate with each other. You are not allowed to use any “homework help” site, such as Chegg, to look up solutions, nor are you allowed to consult a tutor. There will be repercussions if I suspect that a student has gotten more help with an exam beyond what is acceptable.**

**Homework Help Resources:** In addition to setting up a meeting with me or talking with classmates, the mathematics department is offering online help session hours this summer. The following link contains the help room schedule and links to other KSU tutoring resources: [Math Help Page](#). The information for attending these help hours will be provided on Canvas. You are not permitted to use these resources for an exam.

**Grading Policy:** The following are the total number of points for each grade component, along with the weight given to each component. The cut-offs for letter grades will be standard unless I find a need for a curve.

- Homework (30 pts each, 180 pts total; 50%)
- Exam 1 (60 pts; 15%)
- Exam 2 (60 pts; 15%)
- Final (80 pts; 20%).

**Important Dates:**

- Exam 1 ......................... June 30-July 6
- Exam 2 ......................... July 16-22
- Final Exam ..................... July 24-31

**Technology:** K-State has technology recommendations including a computer buying guide for success in online learning. Canvas will work best in the Google Chrome browser. If you choose to use another browser, please make sure all course materials function within that system. You may need to confirm that your browser, java, flash, and pdf reader are all updated to the latest version. If you want to attend the live Zoom lectures, you need to have the latest version installed.

**Technical Difficulties:** As your instructor, my role is to guide you in learning course content, answer questions related to that content, and give you feedback on your work. Thus, I will not be able to help you with technical difficulties which arise. However, the K-State IT Help Desk is there to assist you with questions regarding the technology used for your course.

**Phone:** 785-532-7722 or toll free 1-800-865-6143

**Email:** helpdesk@k-state.edu.

If you have issues with your technology, please contact them first, they are the technology experts. If you miss a deadline due to technological difficulties, make sure it is documented through communication with the IT Help Desk, then exceptions may be made on a case-by-case basis.

**Tentative Schedule:** Anything labeled as a “special topic” will not be required material for HW or exams. They are mostly placeholders and will be removed if I get behind schedule.
<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>June 8th Logic and Writing Proofs</td>
<td>9th Set Theory; Basic Counting Principles</td>
<td>10th Permutations</td>
<td>11th Combinations</td>
<td>12th Problem Session</td>
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<td>15th Pigeonhole Principle HW 1 Due</td>
<td>16th More Set Theory</td>
<td>17th Binomial Coefficients (pre-recorded)</td>
<td>18th Multinomial Coefficients</td>
<td>19th Problem Session</td>
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<td>22nd Inclusion/Exclusion Method HW 2 Due</td>
<td>23rd Derangements</td>
<td>24th Sequences and Generating Functions</td>
<td>25th Generating Functions Cont.</td>
<td>26th Problem Session</td>
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<td>29th Recurrence Relations</td>
<td>30th Special Topic HW 3 Exam 1 released</td>
<td>July 1st Special Topic</td>
<td>2nd Special Topic</td>
<td>3rd Available for office hours</td>
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<td>6th Graph Theory Intro Exam 1 Due</td>
<td>7th Isomorphisms; Walks</td>
<td>8th Eulerian Trails</td>
<td>9th Hamiltonian Paths</td>
<td>10th Problem Session</td>
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<td>13th Bipartite Graphs; HW 4 Due</td>
<td>14th Trees - Intro</td>
<td>15th Spanning Trees and Algorithms</td>
<td>16th Weighted Trees; Applications Exam 2 released</td>
<td>17th Problem Session</td>
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<td>20th Chromatic Number and Chromatic Polynomial: HW 5 Due</td>
<td>21st Chromatic Polynomial Cont.</td>
<td>22nd Matchings; Hall’s Theorem Exam 2 Due</td>
<td>23rd Matchings Continued; Euler’s Formula</td>
<td>24th Problem Session; Final Exam Released</td>
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<td>27th Notions of Connectivity</td>
<td>28th Special Topic: Networks HW 6 Due</td>
<td>29th Special Topic: Other graph polynomials</td>
<td>30th Special Topic: Games on Graphs</td>
<td>31st Final Exam Due</td>
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Netiquette:
These rules of style or Netiquette (network etiquette) are expected to be followed by communicating through class e-mail, message boards and discussion rooms. These are the guidelines set forth by Kansas State University.

- Stick to the topic of discussion and its purpose
- Use the subject line to announce your topic. Often, busy people will only open messages that have creative subject lines.
- Use only one topic per message.
- Get to the point. A limit of one page (screen) per message is ideal.
- Don’t post advertisements (called spamming) or chain letters to the class discussion.
- Use courtesy and common sense in all electronic communications.
- Consider what you write, as it’s a permanent record and can be retrieved easily.
- Class discussions are confidential. Do not share or forward others’ email without permission.
- When responding to a message, don’t quote back an entire message. Delete the excess (snip) and make your comments at the very top before starting the quotes.
- DON’T TYPE IN ALL CAPS. This is hard to read and is considered shouting.
- Avoid sarcasm, as it is easily misunderstood.
- Avoid correcting others’ grammar, punctuation and spelling unless it is necessary to clarify discussion.
- Avoid flaming. A flame is an abusive, harassing or bigoted message that attacks an author of a message.
- Respect the opinions of others and be sensitive to the diverse nature of people in the class. Keep in mind that although you cannot see other members on the list, you can show respect for individual differences. Diversity issues may include the following and others: race, ethnicity, religion, disabilities, gender, sexual orientation, age, social class, marital status, urban vs. rural dwellers. (See K-State’s Notice of Nondiscrimination)

Statement Regarding Academic Honesty:
Kansas State University has an Honor and Integrity System based on personal integrity which is presumed to be sufficient assurance in academic matters one’s work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor and Integrity System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. A component vital to the Honor and Integrity System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: “On my honor, as a student, I have neither given nor received unauthorized aid on this academic work.” The default in this class is that ALL work will be accomplished individually, UNLESS my permission is given in advance of an assignment/quiz/exam/take-home exam/final. If you are in doubt, please ask. For more information, visit the Honor and Integrity System home web page.

Statement Regarding Students with Disabilities:
Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited
to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the Student Access Center at accesscenter@k-state.edu, 785-532-6441.

**Statement Defining Expectations for Classroom Conduct:**

All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Governing Association By Laws, Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.

**Copyright:** Copyright 2020 (Carrie Frizzell) as to this syllabus and all lectures. During this course students are prohibited from selling notes to or being paid for taking notes by any person or commercial firm without the express written permission of the professor teaching this course. In addition, students in this class are not authorized to provide class notes or other class-related materials to any other person or entity, other than sharing them directly with another student taking the class for purposes of studying, without prior written permission from the professor teaching this course.

Copyright is a form of legal protection that allows authors, photographers, composers, and other creators to control some reproduction and distribution of their work. Both student and professors are protected by copyright. Please review Copyright basics for more information.

**Academic Freedom:** Kansas State University is a community of students, faculty, and staff who work together to discover new knowledge, create new ideas, and share the results of their scholarly inquiry with the wider public. Although new ideas or research results may be controversial or challenge established views, the health and growth of any society requires frank intellectual exchange. Academic freedom protects this type of free exchange and is thus essential to any university’s mission.

Moreover, academic freedom supports collaborative work in the pursuit of truth and the dissemination of knowledge in an environment of inquiry, respectful debate, and professionalism. Academic freedom is not limited to the classroom or to scientific and scholarly research, but extends to the life of the university as well as to larger social and political questions. It is the right and responsibility of the university community to engage with such issues.