Genetics is a fascinating subject! I hope that you will share my interest and passion for it. Students often consider BIO 41 to be a difficult class, but I am here to help you succeed! I aim to provide all students with a positive and intellectually engaging experience. I wish you a great semester and look forward to meeting you and thinking about Genetics together! 
– Dr. Kate Mirkin

**COURSE TIMES AND LOCATIONS**

**Lectures:** Attendance of lectures is **required**. You **must** attend the lecture section in which you are enrolled. Participation credit will only be given during the appropriate section.

Section 1: Tuesday, Thursday 1:30-2:45 PM (H+), Robinson 253
Section 2: Tuesday, Thursday 3:00-4:15 PM (J+), Robinson 253

**Recitations:** Recitations are **optional, but recommended**. You can attend **any recitation section, regardless of your enrollment in SIS**.

Rec-A: Wednesday 4:30PM – 5:20PM in Lane 100 
TA = Anastasia Rastokina
Anastasia.Rastokina@tufts.edu

Rec B: Thursday 4:30PM – 5:20PM in Eaton 206
TA = Mai Tran
Mai.Tran@tufts.edu

Rec-C: Friday 10:30AM – 11:20AM in Anderson 212
TA = Tokio Sano
Tokio.Sano@tufts.edu

*Each TA will also hold Q&A office hours immediately after their recitation. Locations will be posted on canvas later. Feel free to attend recitation, office hours or both!*
**COURSE INSTRUCTOR**

Course instructor:
Dr. Ekaterina “Kate” Mirkin
Email: kate.mirkin@tufts.edu
Office location: Robinson 367

**Office hours: Monday & Friday, 2:00 – 3:30 PM**

**Office hours policy:**
I welcome and encourage all students to attend my office hours! Office hours are intended for group discussion of questions related to course material, so feel free to come in and join the conversation, don’t wait until the previous student leaves. If you would like to discuss a private matter, please send me an email to set up an individual appointment.

**Email policy:**
I try to respond to all emails within 24 hours of receiving them. **Please communicate with me via your regular Tufts email:** do NOT send messages through Canvas or Learning Catalytics – those often get lost! Feel free to email me questions about logistics and content that require short answers. For questions that require long answers and/or drawing, please come to office hours.

**Diversity statement:**
I understand that students come from various backgrounds, have all kinds of different prior experiences and face unique challenges. Please know that **everyone** is equally welcome in my class! I want all students in my class to feel equally supported and included regardless of their race, gender, sexual orientation, socioeconomic status, disability, religion, county of origin, ethnicity, culture and anything else that sets them apart from their classmates!
This is a huge class, so while I try my best to remember as many names and pronouns as possible, occasionally I will make a mistake. Please correct me if I accidentally use a wrong name or pronoun!
I believe in open and honest communication and I always welcome your feedback!
GENERAL INFORMATION

Course Description:
Basic concepts of classical and molecular genetics, including: Mendelian genetics, prediction of genotypic and phenotypic ratios for complex crosses, genetic mapping, mitosis and meiosis; mechanisms of DNA replication, recombination, transcription and translation, and how mutations can alter the outcomes of these processes; the genetic code, regulation of gene expression, connection of genotype and phenotype, genetic engineering and genomics.

Course Prerequisite:
BIO 13 (Cells and Organisms) or equivalent. You are expected to have basic knowledge of mitosis, meiosis, Mendelian genetics and the central dogma of molecular biology (DNA, RNA, protein) from a college-level introductory biology course.

Course Objectives:
In this course, students will expand the basic knowledge of genetics they attained in introductory biology courses. This will involve learning new terminology and new core concepts, as well as making new connections between familiar concepts. Upon successful completion of the course students should be able to:

- Understand and explain the logic and core concepts of classical and molecular genetics.
- Appreciate the interconnectedness of genetics and biochemistry.
- Apply this knowledge to solving complex problems by utilizing critical thinking skills and analyzing and predicting experimental results.
- Think like a Geneticist.

Academic Honesty:
All students at Tufts University are expected to live up to the highest standards of academic honesty.
LOGISTICS AND RESOURCES

Lecture slides:
- **Pre-lecture slides** will be posted the night before each lecture on the course website. Students are encouraged to download them, print and bring to class to take notes.
- **Post-lecture slides** will be posted within 24 hours after each lecture. They will contain answers to in-lecture questions, as well as some additional notes. **Make sure to read notes in the post-lecture slides after each lecture!!**

Recitations:
- Recitations are optional, but recommended – especially if you don’t feel 100% comfortable with the material, want a designated time and place to practice applying information that you learned in lecture or look for classmates to study with.
- Students who regularly attend recitations report at the end of the semester that it was a very valuable resource and are highly satisfied with their experience.
- Students can attend any recitation section, not just the one they are enrolled in. Feel free to switch sections.
- Recitation handouts with problems will be provided in class.
- Recitation handouts with and without the answers will be posted on Canvas before each recitation (handout will be posted at 8 AM on Monday for recitations on Wednesday/Thursday/Friday). These handouts are not graded and do not need to be submitted. They are meant to reinforce material from lectures through problem-solving.
- You can work problems in recitation handouts by yourself or with a friend and check your answers. Alternatively, you can go to recitation and work those problems with your classmates, with the guidance of the TA. Do what works best for your learning style. **The important part is that you work those problems one way or the other. Do NOT just read the answers without first solving problems yourself! Trust me, it is not helpful at all!**
- Some students like to first look at the handout on Canvas and then decide if they will go to recitation that week.
- Each TA also holds office hours after the recitation, where you can ask questions about course material and go beyond the recitation handout.

ARC peer tutoring:
- Use ARC tutoring if you need help!! It’s a win-win arrangement: you get help and student tutors get paid. If you don’t have a study partner and just want to discuss course material with someone – ARC tutoring is a perfect resource for you!
- ARC offers one-on-one and drop-in hour tutoring for BIO 41. Tutoring services are free for all Tufts students. Students are limited to 1 hour of individual tutoring per week, but there is no limit on the number of drop-in sessions students attend. Tutoring sessions are booked through SIS (click on the Academics tab, then Tutor Finder).
Learning Catalytics:
- All students enrolled in BIO41 are required to sign up for a Learning Catalytics account.
- BIO41 students will be required to use Learning Catalytics, a “bring your own device” student engagement, assessment, and classroom intelligence system to complete in class questions (in class) and problem sets (outside of class).
- In-class questions are graded for participation.
- Problem sets are graded for correct answer.
- Please see Learning Catalytics Instructions on Canvas under Course Information for instructions on how to sign up.

In-class questions (via Learning Catalytics):
- Students must bring an appropriate web-enabled device to each lecture. If you do not have access to an appropriate device for in-class use, please contact me (kate.mirkin@tufts.edu) before the beginning of the semester so I can assist you.
- Participation (not correctness of the response) will contribute towards the grade.
- Answering 90% of the questions throughout the semester gets full 5% credit.
- There will be partial credit for answering less than 90% of the questions.
- Given that you only need to answer 90% of the questions, credit will not be given for absence due to illness or any other reason.
- Participation credit will only be given during the lecture section in which you are enrolled.

Problem sets (via Learning Catalytics):
- Problem sets will be posted on Learning Catalytics. Each week, problem set will open at 8 AM on Monday and close at 11:59 PM on Sunday.
- You can re-work your answers as many times as you wish until the deadline. You don’t need to submit your answers: answers are automatically submitted at the deadline.
- Collaboration with current BIO 41 classmates is allowed and encouraged!
- You are not allowed to ask the instructor or the TAs direct questions about problems in the problem sets.
- Answers and explanations will be available immediately after the deadline on Learning Catalytics. You will see the answer right away, but you must click on the question to read the explanation. Detailed explanations will be posted for difficult questions!! Read the explanations for questions that you answered wrong!!
- There will be 10 graded problem sets. The lowest problem set score will be dropped. The remaining 9 scores will count towards 15% of the final grade (each score will have equal weight).
- Because the answers are released immediately after the deadline, no extensions will be given for any reason. Failure to submit answers to a problem set before the deadline will result in a score of zero.
- If you get a low score on the problem set, don’t be upset. Each problem set only counts towards a small fraction of your final grade. The main purpose behind working on problem sets is to get ready for the exams.
- Use problem sets as a study tool: your goal is to understand how to solve all problems in problem sets without using your notes or any additional help.
Grading:
5% In class questions (via Learning Catalytics, graded for participation)
15% Problem sets* (via Learning Catalytics, graded for correctness)
25% Midterm 1
25% Midterm 2
30% Final exam

* There will be 10 graded problem sets; the lowest score will be dropped; the remaining 9 scores will have equal weight.

Assignment of Letter Grades:
• At the end of the semester, your total score will be calculated to the second decimal point using the formula above.
• Letter grade will be assigned based on your total score according to the grade scale below (for example: 82.61 = B- and 83.35 = B).

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>97%</td>
</tr>
<tr>
<td>A</td>
<td>93%</td>
</tr>
<tr>
<td>A-</td>
<td>90%</td>
</tr>
<tr>
<td>B+</td>
<td>87%</td>
</tr>
<tr>
<td>B</td>
<td>83%</td>
</tr>
<tr>
<td>B-</td>
<td>80%</td>
</tr>
<tr>
<td>C+</td>
<td>77%</td>
</tr>
<tr>
<td>C</td>
<td>73%</td>
</tr>
<tr>
<td>C-</td>
<td>70%</td>
</tr>
<tr>
<td>D+</td>
<td>67%</td>
</tr>
<tr>
<td>D</td>
<td>63%</td>
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<tr>
<td>D-</td>
<td>60%</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60%</td>
</tr>
</tbody>
</table>

Exams:
• **Exams will be based on:** lecture slides, problem sets, recitation handouts and exam practice problems.
• **How to tell if you are well prepared for an exam?**
  o You should be able to solve all problems in problem sets, recitation handouts and exam practice problems without using your notes or anyone’s help.
• There will be two in class midterm exams and a final exam.
• All exams are closed book.
• The exam questions will be similar in difficulty and content to the questions in problem sets, recitation handouts and exam practice problems.
• Exam practice problems with answers will be posted on Canvas one week before each exam.
• All exams will be in the multiple choice format.
• No electronic device more complex than a simple calculator can be used during an exam. Please bring your own calculator, students will not be allowed to share one. No wireless device can be used during an exam.
• **There will be no make-up exams given.** If an exam is missed due to documented illness or family emergency, your remaining scores will determine your grade (their relative weights will remain the same). Illness must be verified in writing by Health Services; family emergency must be verified in writing by the Dean. Exams missed for other reasons will be assigned a score of 0.

Accommodations:
• If you are requesting an accommodation for a documented disability, you must provide a letter from the Accessibility Services Office no later than two weeks after the start of the semester. Please send your letter to me by email and I will get back to you.
Canvas course site:
- Please check Canvas course website as well as your Tufts email daily for announcements.
- All class materials will be posted on the Canvas course website:
  - Course information
    - Syllabus
    - Learning Catalytics instructions
    - Textbook readings
  - Pre-lecture slides
  - Post-lecture slides
  - Recitation handouts and answers
  - Videos from lectures
  - Not required but interesting information
  - Exam materials (exam practice problems with answers will be posted one week before each exam; exam answers will be posted after each exam)

Textbook:
- **Textbook is NOT required.** It is an additional, optional resource.
- Exams will be based on material presented in lectures and other resources posted on Canvas (lecture slides, problem sets, recitation handouts and exam practice problems).
- The official course textbook is Genetics: From Genes to Genomes, Hartwell *et al.*
- Textbook readings for each lecture (chapters and/or page numbers for both 5th and 6th editions) are posted on Canvas: Course Information → BIO 41 textbook readings.
- Textbook is available on reserve in the University library. You can buy hard copy in the University bookstore or purchase electronic access online.
- Textbook is recommended for the following purposes:
  - If you find it difficult to follow lectures. Try reading the book before or after class. Reading before class will prime you for lecture; you will be familiar with the key terms and concepts. Reading after class will clarify what was confusing in lecture.
  - If you comprehend written information better than verbal.
  - If you want to learn more than what was covered in class. The textbook contains additional examples and more detailed explanations, so it will enhance your learning experience.
HOW TO STUDY FOR THIS CLASS

This is going to sound as a cliché, but do not leave studying to the last day before the exam! Genetics is not a subject that you can master in one day. Below is my suggestion on how to study for this class. Based on my experience, students who follow this strategy succeed in BIO 41.

How to study lecture material after class:

**Step 1: Passive studying.** Read your own notes as well as notes in post-lecture slides and make sure that everything makes sense.

**Step 2: Active studying.** Explain lecture slides to someone else. Find a study partner and take turns: one person explains 5 slides, another person asks questions; then switch. Explaining concepts to someone else is the best possible way to be sure that you are comfortable with the material, that you can make all necessary logical connections and answer relevant questions. If you don’t have a study partner – use an ARC tutor! They will be happy to be your sounding board.

**A word of caution regarding problem sets:**
You are allowed and encouraged to discuss problems in the problem sets with your classmates. However, it is really important that you solve those problems by yourself first, and only after that discuss them with friends. This way, you will know how well you are prepared for the exam. Otherwise, you might get a false sense of knowledge, which is really your friends’ knowledge and not your own. Remember, at the exams you will be working by yourself.

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### HOW TO SUCCEED IN BIO 41

| go to lecture and take notes |
| download pre-lecture slides for note taking |
| study lecture material |
| use your own lecture notes and post-lecture slides |
| make sure you understand everything! |
| solve problems in recitation handout (to practice problem solving) |
| EITHER work by yourself / with a friend, then check your answers (posted) |
| OR go to recitation (W,T,F) and work with classmates and TA |
| complete problem set (treat it as a study tool!) |
| study first → close everything and work the problem set |
| - check your answers using class materials |
| - compare answers with a friend |
| - look at posted answers and explanations |
| goal: to be able to solve all problems in recitation handouts and problem sets without using any class materials or consulting with anyone (as if you are taking the exam) |

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**OFFICE HOURS**
Monday & Friday
2:00 – 3:30 PM
<table>
<thead>
<tr>
<th>Day</th>
<th>Lecture number and topic</th>
<th>Recitations and Problem Sets**</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH Jan 16</td>
<td>L1: Mendelian genetics and probability</td>
<td>No recitation; no PS</td>
</tr>
<tr>
<td>TU Jan 21</td>
<td>L2: Chi-square test and pedigree analysis</td>
<td>W, T, F = Recitation 1***</td>
</tr>
<tr>
<td>TH Jan 23</td>
<td>L3: Extensions to Mendelian genetics – 1</td>
<td>Jan 26 = PS1 (covers L1&amp;2)</td>
</tr>
<tr>
<td>TU Jan 28</td>
<td>L4: Extensions to Mendelian genetics – 2</td>
<td>W, T, F = Recitation 2</td>
</tr>
<tr>
<td>TH Jan 30</td>
<td>L5: Chromosomes – 1</td>
<td>Feb 2 = PS2 (covers L3&amp;4)</td>
</tr>
<tr>
<td>TU Feb 4</td>
<td>L6: Chromosomes – 2</td>
<td>W, T, F = Recitation 3</td>
</tr>
<tr>
<td>TH Feb 6</td>
<td>L7: Recombination and linkage analysis – 1</td>
<td>Feb 9 = PS3 (covers L5&amp;6)</td>
</tr>
<tr>
<td><strong>TU Feb 11</strong></td>
<td><em><em>EXAM 1</em>: Covers lectures 1 – 6</em>*</td>
<td>No recitation; no PS</td>
</tr>
<tr>
<td>TH Feb 13</td>
<td>L8: Recombination and linkage analysis – 2</td>
<td></td>
</tr>
<tr>
<td>TU Feb 18</td>
<td>L9: DNA</td>
<td>W, T, F = Recitation 4***</td>
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<tr>
<td>TH Feb 20</td>
<td>No class (Monday schedule)</td>
<td>Feb 23 = PS4 (covers L7&amp;8)</td>
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<tr>
<td>TU Feb 25</td>
<td>L10: Replication in prokaryotes</td>
<td>W, T, F = Recitation 5</td>
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<tr>
<td>TH Feb 27</td>
<td>L11: Eukaryotic chromosomes</td>
<td>Mar 1 = PS5 (covers L9&amp;10)</td>
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<tr>
<td>TU Mar 3</td>
<td>L12: Recombination at the molecular level</td>
<td>W, T, F = Recitation 6</td>
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<tr>
<td>TH Mar 5</td>
<td>L13: Mutations, mutagens and DNA repair</td>
<td>Mar 8 = PS6 (cover L11&amp;12)</td>
</tr>
<tr>
<td><strong>TU Mar 10</strong></td>
<td><em><em>EXAM 2</em>: Covers lectures 7 – 12</em>*</td>
<td>No recitation; no PS</td>
</tr>
<tr>
<td>TH Mar 12</td>
<td>L14: Using mutations to study gene structure</td>
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<tr>
<td>TU Mar 17</td>
<td>No class (Spring recess)</td>
<td>No recitation; no PS</td>
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<tr>
<td>TH Mar 19</td>
<td>No class (Spring recess)</td>
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<tr>
<td>TU Mar 24</td>
<td>L15: Using mutations to study gene function</td>
<td>W, T, F = Recitation 7</td>
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<tr>
<td>TH Mar 26</td>
<td>L16: Transcription and RNA processing</td>
<td>Mar 29 = PS7 (covers L13,14&amp;15)</td>
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<tr>
<td>TU Mar 31</td>
<td>L17: Genetic code</td>
<td>No recitation; no PS</td>
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<tr>
<td>TH Apr 2</td>
<td>L18: Translation</td>
<td></td>
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<tr>
<td>TU Apr 7</td>
<td>L19: Restriction enzymes</td>
<td>W, T, F = Recitation 8</td>
</tr>
<tr>
<td>TH Apr 9</td>
<td>L20: Recombinant DNA</td>
<td>Apr 12 = PS8 (covers L16,17&amp;18)</td>
</tr>
<tr>
<td>TU Apr 14</td>
<td>L21: DNA sequencing and genomics</td>
<td>W, T, F = Recitation 9</td>
</tr>
<tr>
<td>TH Apr 16</td>
<td>L22: Analysis of genomic variation</td>
<td>Apr 19 = PS9 (covers L19&amp;20)</td>
</tr>
<tr>
<td>TU Apr 21</td>
<td>L23: Guest lecture, Tony Monaco</td>
<td>W, T, F = Recitation 10</td>
</tr>
<tr>
<td>TH Apr 23</td>
<td>L24: From genotype to phenotype</td>
<td>Apr 26 = PS10 (covers L21&amp;22)</td>
</tr>
<tr>
<td><strong>TU May 5</strong></td>
<td><em><em>FINAL EXAM</em>: Covers lectures 13 – 24</em>*</td>
<td>section 1 = 3:30-5:30 PM; section 2 = 12:00-2:00 PM</td>
</tr>
</tbody>
</table>

*There will be a Q&A review session the day before each exam; time and location will be announced (assuming that I can reserve the room, I try to schedule review sessions for 6:00 – 8:00 PM).

**Problem Sets (PS) are due at 11:59 PM on Sunday via Learning Catalytics, no extensions.

***Wednesday recitation #1 and Thursday recitation #4 might be in different rooms, because those days are “Tufts Mondays.” Locations will be announced later. Remember, you can attend any recitation section that fits your schedule on any week.