

RISING RESEARCHERS

Microbiology, Bioinformatics, Molecular Biology

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TABLE OF CONTENTS

Pages	Title
1	WHAT IS RISING RESEARCHERS?
2	COURSE OBJECTIVES AND GOALS
3	COURSE MATERIALS AND REQUIREMENTS ASSESSMENTS AND ASSIGNMENTS
5	RISING RESEARCHERS COURSE OUTLINE
7	GRADING ACADEMIC HONESTY POLICY
8	LETTERS OF RECOMMENDATION ADDITIONAL RESEARCH OPPORTUNITIES FOR EXEMPLARY STUDENTS

WHAT IS RISING RESEARCHERS?

Rising Researchers is a research experience like no other. This research program has clear deliverables that provide our students with an advantage in college admissions. The research experience is highly customizable since the work with the research mentor is one-on-one.

Our mentors are MDs, DOs, PhDs, or Medical Students themselves. They have many publications to their name, presented at numerous conferences. Potential topics include microbiology, bioinformatics, and molecular biology.

The core concepts that will be learned include project design, manuscript writing, data analysis, and an introduction to medicine. Rising Researchers provides students at all levels the opportunity to sharpen their research skills and stand out in a competitive college and medical school application cohort.

The 10-week curriculum allows for flexibility, but ensures the efficient completion of deliverables. Students will virtually meet with their mentor once a week for a lesson (approximately 60-75 minutes), accompanied by assignments to be completed offline. Throughout the sessions, students will develop their own clinically-based project with their mentors, review existing literature, and practice analyzing data. Manuscript writing and poster creation will be continually expanded upon in each lesson.

For more information, please visit <https://risingresearchers.com>.

COURSE OBJECTIVES

- Explore a STEM topic of interest and career opportunities in microbiology, bioinformatics, or molecular biology
- Understand the development of a unique research question, project design, research methodologies, and data analysis
- Investigation of existing literature to build references
- Sharpen scientific writing skills through creation of a manuscript for publication
- Hone public speaking and presentation skills while preparing for your poster presentation

COURSE GOALS

- Describe and demonstrate the ability to use the scientific method
- Develop fundamental knowledge of biological or STEM-related research and its applications to medicine
- Independently develop and manage a research project
- Demonstrate competency in utilizing research tools and interpreting data to support the research question
- Demonstrate competency to draw reasonable conclusions based on research findings
- Demonstrate ability to communicate research and results through a manuscript and poster presentation
- Demonstrate the ability to communicate STEM career expectations and scientific topics

COURSE MATERIALS

This course does not have a textbook. The required videos, article readings, and materials will be shared with the student in advanced each week.

COURSE REQUIREMENTS

This course has no course prerequisites and is open to both high school and college students. The one-on-one nature of this program allows the research mentor to customize the learning experience for each student.

In order to be successful in this program, students must be committed to attending the virtual meetings, avoid canceling/rescheduling meetings last-minute, show up on time, learn, fully participate in discussions, readings, assignments, and be respectful.

ASSESSMENTS AND ASSIGNMENTS

As a 10-session course, each class will be a one-on-one session scheduled once a week with your research mentor. The sessions will be scheduled based on your availability. While the course is flexible, it is expected that the course is to be completed within a 4 month period.

The following guidelines exist:

- A minimum of 12-hours is needed for cancellations and rescheduling classes
- If a student fails to show up for a scheduled class or cancels last minute (less than 12 hours notice) the class is forfeited and a make-up class will not be scheduled

ASSESSMENTS AND ASSIGNMENTS

Course Format

Each session will be a 60-75-minute meeting held virtually via Zoom. The meeting links will be sent to you ahead of time.

In each session, different topics pertaining to research design, data analysis, manuscript writing, medicine, and presentations will be covered. Students are expected to actively engage with their mentors in each session.

At the end of each session, an assignment will be assigned based on the topic that was covered in the lesson plan. Assignments will be graded and reviewed in the beginning of each lesson plan.

All students are expected to submit a manuscript and give a poster presentation at the end of the course. The manuscript article will be published in the Rising Researchers Journal, which is released twice a year in the spring and fall. Students will give a poster presentation, followed by questions from the audience. All poster presentations will occur twice a year in the spring and fall.

RISING RESEARCHERS COURSE OUTLINE

Week 1: Introduction to Research

- Introduce types of research
 - Discuss the basics of how research projects can be designed using the scientific method.
 - Develop fundamental knowledge of a biological research field and career opportunities in microbiology or bioinformatics or molecular biology.
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Week 2: Research Format

- Discuss the contents of a research paper and how to identify research or knowledge gaps
 - Discuss how to perform a literature review
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Week 3: Reviewing Scientific Articles

- Learn what relevant information needs to be drawn from scientific articles as it applies to your research topic
 - Review published literature and develop a research topic
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Week 4: Research Design using Scientific Method

- Identify novel research questions and formulate hypotheses
 - Review methods sections in published literature
 - Develop and design an experimental strategy to test the hypotheses
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Week 5: Data Collection, Analysis, and Creating Figures

- Collect and analyze data. Understand statistical significance interpretation
- Create figures from the data collected

RISING RESEARCHERS COURSE OUTLINE

Week 6: Manuscript Writing I

- Continue collecting and analyzing data
 - Learn how to structure the introduction, materials and methods, and results sections for a manuscript
 - Review how to interpret data and findings
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Week 7: Manuscript Writing II

- Continue analyzing data
 - Learn how to write an abstract and discussion
 - Learn to properly cite references in the article and reference section
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Week 8: Manuscript Writing III

- Review manuscript sections and prepare for submission
 - Learn how to create and format a poster presentation
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Week 9: Manuscript Submission & Poster Edits

- Review final manuscript and submit
 - Review poster with research mentor and prepare for presentation
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Week 10: Poster Presentation Practice

- Present a poster presentation to your research mentor. Mentors will provide feedback on quality of presentations.
- Reflect on what you have learned throughout the process

GRADING

Breakdown of grading rubric:

Attendance 20%

Participation 20%

Weekly assignment completion 20%

Manuscript completion 20%

Final Poster Presentation 20%

This course is graded. Only students with a B grade or higher will be eligible to publish in the Rising Researchers Journal. The final grade will be determined based on the cumulative grades given throughout each session:

A: 90-100%

B: 80-89%

C: 70-79%

D: 60-69%

F: <59%

ACADEMIC HONESTY POLICY

Rising Researchers require integrity and honesty in scholarship and research. Plagiarism and violation of academic integrity is prohibited and will be subject to failure of the Rising Researchers course, forfeiting publication in the journal. Academic dishonesty includes but is not limited to:

- Cheating - intentional use or attempted use of trickery or deception in one's academic work
- Fabrication - intentional falsification and/or invention of any information or citation
- Plagiarism - knowingly representing the words or ideas of another as one's own work
- Facilitating dishonesty - knowingly helping or attempting to help another commit an act of academic dishonesty

LETTERS OF RECOMMENDATION

Letters of recommendation can be provided by request. Students must have a B grade or higher to be eligible to receive a letter of recommendation. We have set this requirement to ensure that research mentors feel confident in providing a strong letter that attests to the quality of work and personal attributes when recommending a student.

Please request letters of recommendations at least 2 weeks in advance of the deadline to ensure proper time for processing and submission.

ADDITIONAL RESEARCH OPPORTUNITIES FOR EXEMPLARY STUDENTS (OPTIONAL)

After completing the Rising Researchers STEM course, at an additional fee, exemplary students will be eligible to:

- Receive further guidance and mentoring to submit the research to a science fair or science competition
- Co-author/ write a research article with the mentor and publish in a peer-reviewed academic journal. Publishing in peer-reviewed academic journal is important for demonstrating academic rigor and establishing yourself as a STEM research scholar
- Co-author and submit a research project to a STEM research conference, with the possibility of presenting with the mentor.