

## BIOL 2230 – Directed Research in Biology

Anoka-Ramsey Community College  
Coon Rapids Campus

Syllabus – Fall 2017

**Instructor:** Kristen S. Genet, Ph.D.  
**Office:** S107  
**Email:** [kristen.genet@anokaramsey.edu](mailto:kristen.genet@anokaramsey.edu)  
**Phone:** 763.433.1269

**Office Hours:** Mon/Wed/Fri 10:00-11:00am  
Additional office hours online  
and/or by appt.

**Class Meeting Time(s):** Mon 11am-noon  
Additional meetings in the field  
Bring your schedules to the Week 1  
meeting and we will figure out a regular meeting schedule at that point.



*"I expect you all to be independent, innovative, critical thinkers who will do exactly as I say!"*

### Course Description:

Advanced concepts in biology research applied to real-life research problems. Under faculty direction, students will learn to analyze research problems, analyze data, and will use equipment and procedures typical of biological research in order to help address ongoing research problems. Students will be expected to present their research orally and in writing. Students may take the class more than once, to a maximum of 6 credits.

**Prerequisites:** At least one BIOL course and permission of instructor

### Required materials:

- Writing Papers in the Biological Sciences (6<sup>th</sup> edition) by McMillan
- Three-ring binder for handouts and research materials with tabbed dividers
- Internet access (high speed/broadband preferable)

### Learning Outcomes:

- Demonstrate an understanding of science as a process
- Participate in guided ecological research
- Develop and hone skills critical for advanced research
- Analyze relevant data and reports
- Analyze and evaluate student-generated data
- Develop and demonstrate communication skills appropriate for undergraduate research

## Course Policies:

1. *Attendance:* Regular attendance is expected and required if you anticipate doing well in this course. I expect each student to attend regularly and complete all work; if absences are necessary, please discuss this in advance with me. The time you spend on this course is commensurate to the credits you will earn.

Credits	Approx Class time per week (hrs)	Approx. Class time for semester (hrs)	Estimated independent/outside of class work each wk (hrs)
2	2	30	4-6

2. *Late Work:* Assignments are due at the beginning of class on the posted or announced due date. Assignments handed in late (including those handed in on the same day but *after* they are collected at the beginning of class) will NOT likely be accepted.
3. *Make up Options:* In the event of a prearranged, excused absence (or documented unforeseen emergency or catastrophe), it may be possible to arrange to make up missed work. Please contact and communicate with the instructor should a situation arise.
4. *Grading:* Your overall grade in BIOL 2230 will be determined by instructor, peer, and self-graded items. Final grades will be assigned based on a straight grading scale (grades will *not* be curved).

90-100%	=	A	60-69%	=	D
80-89%	=	B	<60%	=	F
70-79%	=	C			
5. *Course Grade Option and Incompletes:* You may elect to take this course for a letter grade (default option) or pass/fail. If you choose to take the pass/fail option, you must talk with me and arrange that before the end of the third week of the semester. No changes to your grade option can be made beyond the third week of the semester. An incomplete will only be given in the event of an unforeseen and unavoidable circumstance after >75% of course requirements have been successfully completed. If an incomplete is given, work will be completed based on a schedule mutually agreed upon between student and instructor, and MUST be completed no later than the end of the following term.
6. *Academic Honesty:* Plagiarism is the use of another's words or ideas without giving them due credit. I expect you to do your own work in this class, and if you copy any material from a textbook, lab manual, the internet, or another author (including another student), that constitutes plagiarism. This is just as serious as any other kind of cheating, such as cheating on an exam, and is considered academic misconduct. Please see your Student Handbook and Calendar for the Code of Student Conduct. Any student found cheating or plagiarizing will be penalized. Potential sanctions include: receiving a zero grade for the work, split points between all individuals involved, documentation of the issue in the student's permanent academic record, and/or disciplinary action by the Dean. If you see plagiarism or cheating in action, please report it to me immediately (anonymously). Academic misconduct hurts all students in the class, and reflects poorly on our school and community.

## Graded Activities:

1. *Written Assignments:* There will be several written assignments as you learn, develop, and hone your data collection, analysis, and presentation skills throughout the semester. A tentative list of assignments includes: article summary, annotated bibliography, journal discussion evaluations, peer review of papers, and/or data analysis. Each assignment will be worth 10-20 points. If you are taking the course for 3-4 credits, you will complete all written assignments for credit. If you are taking the course for 1-2 credits, you will not need to complete all written assignments. The optional assignments will be announced as we get to them in the schedule. Written assignments will contribute up to 100 points toward your overall course grade.
2. *Weekly Research Logs:* You will submit a research log at the end of each week this semester detailing your tasks, progress, data collected, and time spent. Each weekly log is worth 5 points, and research logs will contribute up to 80 points toward your overall course grade.
3. *Journal Discussion:* At least three times throughout the semester, we will present and discuss relevant and current research in our field. You will prepare a brief presentation and discussion questions, lead the group in discussion of your assigned paper, and participate actively in discussion of all papers. Your journal discussion grade will include instructor, peer, and self-graded evaluations. Each journal discussion will be worth 30 points. If you are taking this course for 3-4 credits, you are expected to present and participate each time. If you are taking this course for 1-2 credits, you will not be expected to present each time. Journal Discussion will contribute approximately 90 points of your course grade.
4. *Research Proposal:* Either individually or with a partner, students will prepare a formal research proposal to lay the groundwork for their specific research project. You will write a draft, participate in peer review, and have time to make edits before the final proposal is submitted. The research proposal is worth 30 points.
5. *Literature Review:* Each student will individually research, prepare, write, and edit a literature review on the specific topic and/or question chosen for exploration this semester. The literature review is worth 30 points.
6. *Final Paper:* You will be conducting the research, including data collection, analysis, evaluation, interpretation, and presentation – in order to best answer the objective and/or question you outline in your research proposal. It will be written in scientific manuscript format and include draft, peer review, editing, and final paper submission. Your final paper is worth 50 points.
7. *Presentation(s)* Near the end of the semester, you will present the results of your research experience orally and/or prepare a poster of your project. The presentation of your results is worth 50 points.



“Data don’t make any sense,  
we will have to resort to statistics.”

**Tentative Course Schedule:**

Wk	Content/Topic	Reading	Evaluation
1	Introduction to Ecological Research Project/Question Brainstorming	McMillan p. 1-4 Paper(s) provided by instructor	Article Summary Pre-Project Surveys
2	Background Research What is known about your research question?	Paper(s) provided by instructor McMillan p. 5-26	Annotated Bibliography
3	Research Study Design	McMillan p. 191-201 Papers TBD	Journal Discussion 1 (self and mentor evaluation)
4	Data Collection and Input	McMillan p. 210-217 Papers TBD	Research Proposal Draft – Peer Review
5	Spreadsheet management and manipulation Data Collection and Input	Papers TBD	Final Research Proposal
6	Data Collection and Input Progress Reports	Papers TBD McMillan p. 104-143	Journal Discussion 2 (self and mentor evaluation)
7	Data Collection and Input Progress Reports	Papers TBD McMillan p. 144-171	Literature Review Draft – Peer Review
8	Data Collection and Input Progress Reports	Papers TBD	Final Literature Review
9	Data Collection and Input Progress Reports	Papers TBD	Journal Discussion 3 (self and mentor evaluation)
10	Error Checking and Exploratory Data Analysis	McMillan p. 27-38 Papers TBD	Exploratory Data Analysis
11	Hypothesis Testing and Data Analysis	McMillan p. 201-209 Papers TBD	Hypothesis Testing and Data Analysis Poster Formatting
12	Data Interpretation and Evaluation Data Presentation	McMillan p. 39-60 Papers TBD	Constructing Presentation Figures and Tables Poster Draft – Peer Review
13	Presentation of Results	Papers TBD	Poster Presentations
14	Scientific Communication: Oral and Written	McMillan p. 61-103 Papers TBD	Journal Discussion 4 (self and mentor evaluation)
15	Research Project Wrap-up	McMillan p. 124-171 Papers TBD	Paper Draft – Peer Review
16	Research Project Wrap-up	McMillan p. 172-181 Papers TBD	Final Paper Due
17	Finals Week		Final Evaluations