

HNRS 110: Intellectual Inquiry
Getting Chummy with Math & Science

Professor: Dr. Maggie Rahmoeller (aka Dr. Maggie)
Office: Trexler 270B
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Class Meetings: MWF 1:10 – 2:10PM in New Hall 106

Office Hours: Available office hour times include:

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|-------------------|---|
| Monday: | 11AM – Noon, 3:30PM – 5PM |
| Tuesday/Thursday: | 9AM – 2PM |
| Friday: | 11AM – Noon (Except 9/10, 10/8, 11/5, & 12/3) |

Course Description: Lack of understanding of worldly phenomenon both drives scientific and mathematical study and potentially rejects it. The world was assumed to be flat until curiosity about shadows cast by the sun led to the discovery that the Earth was round. Astronomers learned that the planets revolve around the Sun in an elliptical orbit, which, along with falling objects (apples?), led to the discovery of gravity. Discovering penicillin came from experiments conducted by a bacteriologist. And yet, some people still believe the Earth is flat, and many more people believe that all vaccines aren't safe. The disconnect between scientific and mathematical results and the general public is disconcerting. How do we make these findings more approachable? And how do we bridge a gap of mistrust between STEM and the general public?

I expect you to spend at least 12 hours of work each week inside and outside of class.

Intended Learning Outcomes: At the end of the course, successful students will be able to

- describe ways in which scientific fields may differ from non-scientific fields, and discuss ways in which both types of fields may enhance our lives;
- describe the butterfly effect, both mathematically and non-mathematically, and its implications for knowledge and prediction;
- analyze current science reporting to identify potential biases and oversimplifications and discuss how we can develop informed opinions.

In addition to the topic-specific outcomes, all sections of HNRS 110 have the following learning outcomes.

- Students will be able to read, discuss, and write about college-level academic texts and ideas.
- Students will be able to use a process of drafting to write papers that have clear theses, cogent argumentation, proper use of evidence, effective organization, and a minimum of sentence-level errors.
- Students will be able to use library and other resources to find, evaluate, and synthesize information from multiple sources and use this information in support of a research question.
- Students will connect course content to their lives and to communities beyond the classroom.

Required Materials:

- *Bully for Brontosaurus* by Stephen Jay Gould
 - *The Believing Brain* by Michael Shermer
 - *The Best Writing on Math 2020* by Mircea Pitici (editor)
 - *Easy Writer (7th edition)* by Andrea Lunsford
- Additional readings will be taken from other sources and be provided by me.

Grading: Your grade will be determined by the following.

- 20% Reflection Papers
 - 1 – Math (5%)
 - 2 – Revision (5%)
 - 3 – Course Content (5%)
 - 4 – Course Context (5%)
- 50% Research Papers
 - 1 – Chaos in the World (20%)
 - 2 – Science in the News, Part I (15%)
 - 3 – Science in the News, Part II (15%)
- 5% Informal Writing / Class Participation
- 25% Community Engagement Project
 - 1 – Project Proposal Paper (7.5%)
 - 2 – Event (10%)
 - 3 – Project Reflection (7.5%)

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|-----|--------|-----|-------|-----|-------|-----|----------|
| A: | 93-100 | B: | 83-87 | C: | 73-77 | D: | 63-67 |
| A-: | 90-93 | B-: | 80-83 | C-: | 70-73 | D-: | 60-63 |
| B+: | 87-90 | C+: | 77-80 | D+: | 67-70 | F: | Below 60 |

Course Expectations

Attendance Policy: Regular attendance is expected. Most classes will be discussion-based and participation will depend on your involvement in class discussion. In-class discussions will be heavily centered around course readings, and thus to do well in class conversations, you must keep up with the reading. Although there is no “participation” component to your grade, a lack of participation could result in the lowering of your final grade by up to one grade letter.

Any absence that is not discussed with the instructor prior to the missed class is considered unexcused. Having more than two unexcused absences may result in a lowering of your final grade at the end of the semester. If you miss a peer review / workshop day, your grade on that paper will be reduced by one letter grade. When absent, excused or unexcused, you are responsible for all material covered in class.

If you have a temperature of 100.4 or higher or other COVID symptoms, don't come to class. Call Health Services IMMEDIATELY. Do not come to class or go to any public area on campus. In order for your absence to be excused, you must give Health Services permission to notify me that you have consulted them about COVID symptoms. If Health Services informs you that you should isolate and not attend class for multiple days, inform me so that we can make a plan to keep you current in the course. All absences caused by consultation with Health Services about coronavirus symptoms or isolation ordered by Health Services will be excused but you will need to do the work.

Masks

The College has issued a mask mandate for the start of the semester that requires masks to be worn in indoor common spaces such as our classroom. **For the health and safety of all members of our community, I will require all students to wear a mask in the classroom for the entire semester.** If you arrive without a mask, you will not be allowed to stay and may lose credit for attendance or in-class work. The Bookstore sells masks if you need to make a quick purchase.

Late Work: Each day an assignment is late, your grade on that assignment will be reduced by one letter grade. I will not accept assignments that are more than three days late.

Academic Integrity: Students are expected to adhere to the Academic Integrity policies of Roanoke College (https://www.roanoke.edu/inside/a-z_index/academic_integrity). All work submitted for a grade is to be your own work! Doing your own work and properly acknowledging the work of others is of utmost importance in the academic setting. Do not be afraid to use sources!! Part of academic writing (and any writing) is to use sources to increase your knowledge of the subject and provide evidence for your claims. But, proper citation is key! You must cite ANY sources used – whether you pull directly from the source, paraphrase the source, or summarize the content.

On Inclusion: I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

Course Modification: The syllabus serves as a course guideline and is subject to revision. We may need to make changes as the semester progresses. All changes will be announced in advance.

COURSE ASSIGNMENTS

Papers: You will write 3 research papers and 4 reflection papers in this course (not including components of the project, see below).

The 3 research papers will be broken into stages that include initial planning, a first (well-thought-out) draft, a peer review process, substantive revisions, and a final draft. All of these pieces will affect your grade on the paper. More details will be provided later, but the topics are as follows:

- **Chaos in the World.** A paper covering the human side (a specific story) and the historical side (with some “what if” speculation) of the butterfly effect. (5-7 pages)
Includes an annotated bibliography, draft, peer review, and final draft, each of which will be graded
- **Science in the News, Part I.** A compare-and-contrast, thesis-driven assignment to carefully analyze the quality and validity of science reporting in various media including magazines and tabloids. (4-6 pages)
Includes a thesis peer review, draft, peer review, and final draft, each of which will be graded
- **Science in the News, Part II.** A popular science report that makes a peer-reviewed research article more accessible and approachable to the general public. You will use what you learned from the previous research paper (above) to construct a quality popular science article. (2-3 pages)
Includes draft, peer review, and final draft, each of which will be graded

The 3 reflection papers won't have any formal drafting process, but informally, you will use skills you have learned and/or refined to edit these papers. More details will be provided later, but the topics are as follows:

- Mathematics. A reflective and personal paper in which you will contemplate the question, "What is math?" after considering and discussing assigned readings. (2 pages)
- Revision. A reflective paper in which you will review your Mathematics paper using Easy Writer. (2-3 pages)
- Course Content. A reflective paper in which you will pull from readings from class that resonated with you in order to offer your personal view of how to make math/science more approachable. (2-3 pages)
- Course Context. A paper in which you reflect upon how this Honors course fits in with a liberal arts education and with your journey through life. (2-3 pages)

Project: You will work in groups of about 3-5 on this project. Each group will choose a topic (a scientific or mathematical theory that isn't widely known to the general public) and create a project (activity, story, etc.) that will make the topic more accessible/approachable to children or young adults. Each group will plan a community event partnered with a local library and then run the event. There will be some time in class for brainstorming topics and designing the projects. There will be a group 3-4 page paper as part of this project in which each group will propose their community engagement topic, offer a detailed plan for holding the event, and provide a list of needed materials (all material expenses will be taken care of by the college). After holding the event, you will write a reflection (2-3 pages) about your experience with this project.

RESOURCES

The Writing Center @ Roanoke College, located on the Lower Level of Fintel Library (Room 15), offers free tutorials focused on writing projects and oral presentations for students working in any field. Writers and presenters at all levels of competence may visit the Writing Center at any point in their process—including brainstorming, drafting, organizing, editing, or polishing presentation skills—to talk with trained peer tutors in informal, one-on-one sessions. The Writing Center is open Sunday through Thursday from 4 to 9 PM. Simply stop in, or schedule an appointment at www.roanoke.edu/writingcenter. Questions? Email writingcenter@roanoke.edu or call 540-375-4949.

Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in **Fintel Library**. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Becky Harman, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Becky Harman at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Tentative Course Schedule – this schedule could change, but I will let you know in advance if it does

| Date | In-Class | Readings due for Class | Assignments |
|----------------|---|---|---|
| W 9/1 | Intro to Course Current math perspective? Science vs Non-science | | |
| F 9/3 | Rdg discussion “A Socratic Dialogue on Mathematics” – read together in class | “Math Instinct” | Reflection Paper 1 Assigned |
| M 9/6 | Rdg discussion More critical reading in class Intro to Chaos Theory | Excerpts from <i>What is Mathematics, Really?</i> | Reflection Paper 1 Due |
| W 9/8 | Rdg discussion Chaos Theory | “Butterfly Effect” & “Chaos Theory” | Reflection Paper 2 Assigned |
| F 9/10 | Rdg discussion Annotated Bibliography | BB - “Pandas Thumb...” | |
| M 9/13 | Reflection paper 2 discussions Rdg discussion Research Paper 1 discussion | BB - “George Canning...” | Reflection Paper 2 Due Research Paper 1 Assigned |
| W 9/15 | LIBRARY DAY Using sources for brainstorming Research skills | | |
| F 9/17 | Rdg discussion Research Paper 1 Topic Discussions | “The Pernicious Influence of Mathematics on Science” | |
| M 9/20 | PEER REVIEW DAY – annotated bibliographies | | Research Paper 1 – Annotated Bibliography Due |
| W 9/22 | Rdg discussion | BB – “Streak of Streaks” | |
| F 9/24 | Rdg discussion Math/Science Myths | BB – “Median isn’t the Message” | |
| M 9/27 | Rdg discussion | Excerpts from <i>Euclid in the Rainforest</i> | |
| W 9/29 | PEER REVIEW DAY Common themes discussion | | Research Paper 1 – Draft Due |
| F 10/1 | Rdg discussion | UNESCO – “The growth of science popularization” & “Science popularization: a view from the Third World” | |
| M 10/4 | Rdg discussion | UNESCO – “Can the mass media help...” and “Science journalism training...” | |
| W 10/6 | Discuss Research Paper 2 Example of Article | | Research Paper 1 – Final Draft Due Research Paper 2 Assigned |
| F 10/8 | Rdg discussion Thesis statements | UNESCO – “Media resource services...” and “Books and films...” | |
| M 10/11 | Rdg discussion Intros/Conclusions | UNESCO – “Science popularization in China” and “Mikhail Lomonosov...” | |

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| W 10/13 | Rdg discussion PEER REVIEW on thesis statements | | Research Paper 2 – Working Thesis Due |
| F 10/15 | Rdg discussions Conclusions | Excerpts from <i>Euclid in the Rainforest</i> | |

MONDAY 10/18 – FRIDAY 10/22 FALL BREAK

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| M 10/25 | LIBRARY DAY Evaluating Sources | | |
| W 10/27 | PEER REVIEW DAY | | Research Paper 2 – Draft Due |
| F 10/29 | Rdg discussion | Excerpts from “The Best Writing on Mathematics 2020” | Research Paper 2 – Final Draft Due |
| M 11/1 | Rdg discussion | Excerpts from “The Best Writing on Mathematics 2020” | |
| W 11/3 | Form project groups & brainstorm | | Project Assigned |
| F 11/5 | Project work day | //////////////////// | Research Paper 3 Assigned |
| M 11/8 | Discuss Research Paper 3 Article exploration | | |
| W 11/10 | Research Paper 3 – discussion cont. | | |
| F 11/12 | Project work day | //////////////////// | Project Proposals Due |
| M 11/15 | PEER REVIEW DAY Class discussion for each project proposal | | |
| W 11/17 | Rdg discussion | “The Golden Age” | |
| F 11/19 | Rdg discussion | BB – “Kropotkin was No Crackpot” | Research Paper 3 – Draft Due Project Kits Due |
| M 11/22 | PEER REVIEW DAY | //////////////////// | |

WEDNESDAY 11/24 – FRIDAY 11/26 THANKSGIVING BREAK

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| M 11/29 | Practice Run Through of Projects | Excerpts from <i>The Believing Brain</i> | (Optional – Submit 2 nd draft Research Paper 3 between now and Friday 12/3 for feedback from me) |
| W 12/1 | Practice Run Through of Projects | Excerpts from <i>The Believing Brain</i> | |
| F 12/3 | Rdg discussion | BB – “Chain of Reason” & “Charlatan” | |
| M 12/6 | Rdg discussion | Excerpts from <i>The Believing Brain</i> | |
| W 12/8 | Rdg discussion | Excerpts from <i>The Believing Brain</i> | Research Paper 3 – Final Draft Due |
| F 12/10 | Discuss & Reflect on Projects | Excerpts from <i>The Believing Brain</i> | Project Reflections due Reflection Papers 3 & 4 Assigned |

FINAL EXAM WEEK: Wed 12/15 –Reflection Papers 3 & 4 Due by 5PM