

GEORGE MASON UNIVERSITY
COLLEGE OF SCIENCE

GGG 322/759 – Science and Policy
Exploratory Hall L003
Fall - 2015

Syllabus

Instructor:

Name: Dr. Paul R. Houser

Email: phouser@gmu.edu (preferred method of communication)

Phone: (301) 613-3782

Office Hours: **In Person:** Exploratory 2209; Mondays 4-6pm or by appointment

Virtual: Email, Phone, Skype (prhouser),

I am generally available Monday at 9 am to Friday at 5 pm for student inquiries. During this 5 day period, I will respond to student inquiries within 24 hours.

Course Description:

Scientists are unbiased observers who use the scientific method to conclusively confirm and falsify theories. Scientists have no preconceptions in data collection and logically derive theories from these objective observations. Science is self-correcting, because scientists readily abandon theories when they are shown to be irrational. Although such views are readily accepted, they are almost completely untrue. Data can neither conclusively confirm nor falsify theories, there is no such thing as the scientific method, data become somewhat subjective in practice, and scientists are surprisingly loyal to their theories and assumptions. There have been many misconceptions of what science is and is not, perhaps because scientists themselves are ignorant of the philosophy of science.

The philosophy of science is concerned with the assumptions, foundations, methods, implications of science, and with the use and merit of science. It is important for all scientists and scientific institutions to create and nurture a research environment that promotes high ethical standards, contributes to ongoing professional development, and preserves public confidence in the scientific enterprise. The objective of this course is to provide science students and professionals with practical skills, insights, and resources needed for success in a science-based career. The course purpose is not to inculcate virtue, nor to determine whether or not you are ethical; rather the purpose is to help you develop skills for dealing with hard problems on your own. There are often no hard and fast rules for determining the proper thing to do, and standards of conduct vary from community to community. This course will be taught as a forum with active participation from students. The course will focus on case studies that will help students develop critical thinking and reasoning for resolving difficult ethical, political, funding, and trust issues. The course is recommended for advanced undergraduate science students, but is especially important for graduate students prior to starting their research career.

Course Prerequisites:

None.

Topics:

- Scientific method & its assumptions – uncertainty, truth, human nature
- Science and trust – scientific codes of conduct
- Normative science – Policy driven science
- Peer-Review – History, independent, anonymous, traditional, modern methods
- Scientific Integrity and Misconduct – Plagiarism, Fabrication, Falsification
- Science politics – funding, authorship, awards, publication, tenure, reputation, etc.

Questions to be explored:

- What is the future of peer review?
- Is Peer-Review a Requirement of Good Science?
- Why is there fraud in science?
- Is plagiarism out of control?
- Why do scientists do bad things?
- Is industry funded research trustworthy?
- Is government funded research trustworthy?

Required Text:

Extensive readings will be provided via blackboard, web link or library resource. Students will need to come to class prepared to discuss the readings.

Selected Resources:

- *Scientific Integrity: An Introductory Text with Cases*, Macrina F. L. , 2000
- <http://www.scientificintegrity.net/>
- *Peer Review and Scientific Assessment: A handbook for fungi organizations, regulatory agencies and editors*, Moghissi AA, Love BR, Straja SR. Alexandria VA Institute for Regulatory Science 2013
- *Integrity in Scientific Research: Creating an Environment That Promotes Responsible Conduct* (2002), National Academies Press
- *Volume 2 of Responsible Science: Ensuring the Integrity of the Research Process*, National Academies Press, 1993
- *Responsible Conduct of Research*, Oxford University Press, USA, 2009

Lecture Topics:

August 31: Overview and introduction; introduction to scientific integrity

Sept 14: Scientific integrity and ethics: definitions, values, norms, and decisions (A, B)

Sept 28: Bias in research design, normative science (C, D)

Oct 5: Animal and human subjects (E, F)

Oct 13 (TUESDAY): Mentoring and collaboration

Oct 19: Scientific funding and grants, fiscal responsibility & reporting

Oct 26: Authorship, publication, peer review, and credit (G, H)

Nov 2: Intellectual property and copyright management (A, C)

Nov 9: Professional integrity: conflict of interest & whistleblowing (B, D)

Nov 16: Diversity, hiring practices, science management (E, G)

Nov 23: Data and software management: recordkeeping, ownership (F, H)

Nov 30: Career pathways: road to fame and fortune?

Dec 7: Project presentations

Performance-based Assessments:

1. Pop-Quizzes:

Session quizzes will assess student progress toward learning objectives. Quizzes will be assessed periodically to assess student progress and comprehension. Students are expected to do their own work.

2. Case Study Reviews:

Students will present two scientific integrity “case studies” during the semester. These presentations should be ~10min in length, use appropriate audio-visual materials, and show professionalism. The presentation will be followed by a class discussion. Try to choose a case study that is relevant to the weekly lecture topic. Deliverable: Class presentation.

3. Class Project:

Students will make a full scientific integrity assessment of a “hot topic” in science, and present their findings to the class on the final day. Deliverables: A short project paper and a class presentation.

4. Participation:

This class is highly focused on student participation and interaction. Attendance in class is critical and will be part of this grade, but student interaction in the classroom will also be assessed. Therefore, participation in class discussions will be included as part of the grade. Make sure to have some insights, questions, or ideas ready to present based on the readings and lecture materials.

Grading:

Students will be evaluated in the following areas:

- **Participation & Discussions** (20%)
- **Case Study Reviews** (20%)
- **Quizzes** (20%)
- **Class Project** (40%)

Graduate students will be expected to perform additional case study reviews and to take on a more extensive class project.

Grades are assigned using a ten point scale:

A= 90 – 100 B = 80 – 89.9 C= 70 – 79.9 D= 60 – 69.9 F= 0 – 59.94

Student Expectations:

Academic Integrity

Students must be responsible for their own work, and students and faculty must take on the responsibility of dealing explicitly with violations. The tenet must be a foundation of our university culture. [See <http://academicintegrity.gmu.edu/distance/>].

Honor Code

Students must adhere to the guidelines of the George Mason University Honor Code [See <http://oai.gmu.edu/honor-code/masons-honor-code/>].

MasonLive/Email (GMU Email)

Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account. [See <https://thanatos.gmu.edu/masonlive/login>].

Patriot Pass

Once you sign up for your Patriot Pass, your passwords will be synchronized, and you will use your Patriot Pass username and password to log in to the following systems: Blackboard, University Libraries, MasonLive, myMason, Patriot Web, Virtual Computing Lab, and WEMS. [See <https://thanatos.gmu.edu/passwordchange/index.jsp>].

University Policies

Students must follow the university policies. [See <http://universitypolicy.gmu.edu>].

Responsible Use of Computing

Students must follow the university policy for Responsible Use of Computing. [See <http://universitypolicy.gmu.edu/1301gen.html>].

University Calendar

Students must follow the university policies. [See <http://catalog.gmu.edu>].

Students with Disabilities

Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See <http://ods.gmu.edu>].

Religious Holidays

A list of religious holidays is available on the University Life Calendar page (<http://ulife.gmu.edu/calendar/religious-holiday-calendar/>). Any student whose religious observance conflicts with a scheduled course activity must contact the Instructor at least 2 weeks in advance of the conflict date in order to make alternative arrangements.

Students are expected to follow courteous Internet etiquette.

Student Services:

University Libraries

University Libraries provides resources for distance students. [See <http://library.gmu.edu/distance>].

Writing Center

The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing. [See <http://writingcenter.gmu.edu>]. You can now sign up for an Online Writing Lab (OWL) session just like you sign up for a face-to-face session in the Writing Center, which means YOU set the date and time of the appointment! Learn more about the [Online Writing Lab \(OWL\)](#) (found under Online Tutoring).

Counseling and Psychological Services

The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See <http://caps.gmu.edu>].

Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act of 1974 (FERPA), also known as the "Buckley Amendment," is a federal law that gives protection to student educational records and provides students with certain rights. [See <http://registrar.gmu.edu/privacy>].