

1. Format: Scientific Integrity and Responsible Research, GC401. The underlying theme of the course is that Good Laboratory Practices observed in combination with Concerns for Ethical use of Human and Animal Subjects, Awareness of issues of Academic Misconduct, Conflict of Interest, Ownership of Ideas, Plagiarism and Copyright and Diversity lead to an Outstanding Investigator.

2. Subject Matter: The following is a brief summary of the course content, and a list of the topics covered in the 15-week course.

Ethical Theories - Contrasting ethics and morality (1 week):

This lecture reviews the historical development of ethical and moral systems over the last three millennia. Using group discussions students come to differentiate between ethical and moral systems, and realize that many ethical systems have led to behaviors that are no longer acceptable in society.

Mentor/Trainee Responsibilities, & Good Laboratory Practices, Data Acquisition, Management (2 weeks):

These lectures emphasize that the responsibilities of an investigator include excellence and scrupulous integrity and the rights include public trust, personal and intellectual rewards. The lectures focus on how objectivity, excellence (good laboratory practices) and integrity are the key elements to an outstanding training and what are the external and internal pressures that challenge these features. The importance of accuracy, reproducibility, controls, documentation and truth in reporting as good laboratory practices are emphasized. Both hypothetical case studies and real examples of how failures can occur and the class is encouraged to come up with strategies of how they can be avoided.

Collaborative Science; Sharing & Ownership; Publication & Responsible Authorship (2 weeks):

This lecture addresses the importance of collaborative science and the increasing challenges it faces. The students are engaged in a discussion on what constitutes primary and senior authorship and who should be credited on a paper and how the credit should be given. The clear-cut definitions as well as the more subjective decisions are discussed

Grant Writing (1 week): The lecture addresses the components of effective grant writing. Students review the generation of falsifiable hypotheses, and the elements of *grantsmanship* needed to engage reviewing panels to maximize the probability of a positive outcome.

Peer Review - Papers & Grants (1 week): As some of the students are beginning graduate students, they are provided with a brief overview of the peer-review system both for publications and grants, and expected behavior with respect to sensitive and privileged information. Handouts include those published by national societies such as the Endocrine Society in their journals, on authorship and peer review.

Protecting Rights To Research Work Product: A Primer On Intellectual Property And Ownership Of Data.

Conflict Of Interest And Commitment (1 week): The students are given a primer on what is intellectual property, its assessment and valuation, who “owns” data, what is involved in technology transfer and technology commercialization, portfolio management, licensing and equity deals and conflict of interest. The format is a combination of didactic information coupled with case examples and studies.

Similarity, Copyright, & Plagiarism. But when is it plagiarism? (1 week): This lecture examines in depth the differences between similarity, copyright infringement, and plagiarism, some of which will be referenced in a later lecture on academic misconduct. Specific examples of how unacknowledged appropriation of the work of others is included in publications and how various peer review groups deal with it are provided. In particular the responsibilities of editors and reviewers in monitoring this is highlighted. The “reasons” underlying plagiarism are discussed and the examples provided demonstrate that this could range from “naïveté” of an inexperienced investigator believing that “imitation is the best form of flattery” to outright “dishonesty” and include seasoned as well as beginning investigators.

Human Subjects – Ethics And Specifics (IRB) (2 weeks): The students are exposed to an in-depth analyses of the various regulations involved in human subject research including a brief history of how these regulations came into place. The discussion includes the Nuremberg code, the Belmont report and in future will include a segment on the HIPAA regulations. The University of Illinois’s policies on human subjects are available at <http://oprs.ovcr.uic.edu>. The discussion centers around the ethical issues pertaining to human subject research, with numerous well-publicized examples. The challenges faced by different academic institutions including UIC in being required by the Federal government to reorganize their review processes and how we have dealt with it. Students are also provided with an overview of the IRB review process, the training required of investigators, what the process entails and common problems encountered by the IRB. The course draws upon a variety of instructors with outstanding expertise for this segment of the course.

Ethical Use Of Animals In Research (1 week): UIC has one of the best run, AALAC credited animal care facilities. All students using animals in their research are required to take a separate semester long course in Animal Handling, conducted by the instructor of this lecture. In this lecture the students are provided an overview of what are the regulations for use of animals, the genesis of these regulations, the composition of the Animal Review Committee and the criteria for approval.

Diversity Awareness Training (1 week): UIC has an office of Access and Equity (OAE), under the aegis of the Chancellor’s office. The staff of the OAE strives to increase access to employment, programs, and services in an environment free of unlawful discrimination and harassment. OAE represents the campus to federal and state agencies as well as to the higher education community on issues related to affirmative action, equal opportunity, harassment, and diversity. OAE assists in the recruitment and retention of women, men and women of color, persons with disabilities, and other under-represented groups, and offers training in areas related to managing or working in a diverse setting. One of their services is to deliver a workshop for this class. The format of the class includes a general description of the types of issues faced at the work place with respect to diversity awareness and specific examples pertaining to the biomedical sciences and health care professionals are provided.

Research Misconduct & Federal Review through OVCR (1 week): The lecture is based on the fact, that all members of the University community at UIC are expected to observe high standards of academic integrity and ethical behavior in research and publication. The lecture emphasizes that any practice or conduct by a member of the University community that seriously deviates from those ethical standards for proposing, conducting and publishing research that are commonly accepted within the professional community constitutes academic misconduct in violation of University policy (at http://www.vpaa.uillinois.edu/policies/ai_document.asp#III). Case studies are used with the class to help them understand what academic misconduct is, the procedures for reviewing allegations, and protection of a whistle blower should anyone wish to report a problem. Academic misconduct includes, but is not limited to:

- a. Fabrication or falsification of data, including intentionally misleading, selective or deliberately false reporting of credentials or other academically related information;
- b. Unacknowledged appropriation of the work of others, including plagiarism, the abuse of confidentiality with respect to unpublished materials, or misappropriation of physical materials;
- c. Evasion of, or intentional failure after notice by the University or Federal, State or other appropriate agency to comply with research regulations or requirements, including but not limited to those applying to human subjects, laboratory animals, new drugs, radioactive materials, genetically altered organisms, and to safety; and
- d. Other conduct that seriously deviates from accepted ethical standards in scholarship.
- e. Differences of interpretation or judgment, or honest error, do not constitute academic misconduct.

Key dates during your graduate career. Who to see in the Graduate College (1 week): The lecture addresses the establishing of a time-line for effective self-management of a graduate career, and the

productivity milestones that will maximize the possibilities for eventual employment in the academy, industry, or governmental research.

When things go wrong... UIC policies, procedures, & the grievance process (1 week): This lecture reviews the rights and responsibilities of students, faculty and staff at UIC. It also addresses the resources available to keep a career on track, and how to pursue 'due process' should events unfold in an unexpected fashion.