INF 501 **Research Methods in Informatics and Computing** Syllabus

Term	Class No.	Section	Units	Days & Times	Room	Mode
Fall 2018	4680	001	3	Fr 12:45PM - 3:15PM	090-223	Face-to-face

Enrollment Requirements

Pre-requisite: Admission to Informatics and Computing Ph.D.

Course Website

http://bblearn.nau.edu

Instructor(s)

Dr. Igor Steinmacher

Email: Igor.Steinmacher@nau.edu

Office Hours: TuTh 09:30AM – 11:20AM; Room 090-115. I also welcome and encourage students to schedule appointments in different hours.

Course Purpose

This course is intended to be taken in the first semester of a student's course of study in the Informatics and Computing Ph.D. program and begins with a broad overview of informatics and computing research areas with an emphasis on faculty presentations of current and future research projects. Topics relating to literature review, research methods, and experimental design are studied in a project-based context with the preparation of a detailed and well-researched project proposal. By the end of the course, students are prepared to affiliate with a faculty advisor and initiate their own research.

Course Student Learning Outcomes

Upon successful completion of this course, students will be able to demonstrate the following advanced competencies:

- **LO1:** Identify and interpret the goals and fundamental technical approaches for research in informatics and computing;
- **LO2:** Formulate and communicate the fundamental contributions of a research project within a specific research area of interest;
- **LO3:** Synthesize critical literature reviews conducive to identifying open questions within a specific research area of interest;
- **LO4:** Synthesize appropriate research questions/hypotheses or need/objectives for a specific research area of interest;
- **LO5:** Design research and experimental plans using methods and techniques appropriate to a specific research area of interest and within ethical constraints.

Assignments / Assessments of Course Student Learning Outcomes

Methods of assessment will include:

1. <u>Response essays</u> based on the researcher's talks and associated reading assignments. These assignments will help achieving LO1 and LO2, by requiring the identification of key points in a research and training writing skills.
    a. You only need to write response essays for four of the seven speakers. However, you must inform me no later than 24 hours after the speaker's presentation if you will not be writing a response essay for that speaker and his/her area. Note: *attendance is mandatory at all class sessions*; you must attend even if you do not plan to write a response essay for a particular speaker.
    b. Your response essays will be due, in electronic form by email to me on the Thursday before the next speaker's presentation. You will receive a 10% penalty on your grade for each 24 hours that your response essay is late.
2. <u>Mediating discussions</u> about the talk. Each of you is expected to mediate a post-talk discussion aiming at clarifying any potential question and collaboratively building knowledge about the research just presented.
3. <u>Peer-review</u>. You are expected to review essays from colleagues for those talks you chose to write about. The instructor will pair the students for each essay. This assignment will support LO3 by training the critical review of essays. Details of deadlines and methods will be provided in class.
4. A multi-part <u>research proposal</u> assignment. This assignment focuses on training the process of thinking, designing, and writing a research proposal, which provides means to support all learning outcomes.
    a. It consists of the following elements: (i) introduction; (ii) literature review; (iii) research questions/hypotheses and needs/objectives; (iv) research plan and methods.
    b. Since this is a step-by-step assignment, in case you do not deliver one part, it is expected that you submit it along with the next deliverable (for example, if you do not submit the introduction, you need to submit it with the literature review). Assignments missing the previous element will not be considered.
    c. More details of this assignment will be provided in class.

Grading System

A weighted sum of assessment components is used to determine your final grade in the course:

Assignment	Due Date	Weight
Attendance and Class Participation		10%
Discussion Mediation	See 2. above	5%
Response Essays	See 1. above	40%
Peer Reviews	See 3. above	10%
Research proposal 1: Motivation, Problem, Goals (Introduction)	October 26	5%
Research proposal 2: Literature Review	November 13	10%
Research proposal 3: Research Questions/Hypotheses, Needs/Objectives	November 30	5%
Elevator Pitch	December 7	5%
Research proposal 4: Final/complete, including Research Plan and Methods	December 10, 2:30 PM	10%

Grades will be awarded on the following scale:

Percentage Grade	Letter Grade
90% or above	A
80% through 89%	B
70% through 79%	C
60% through 69%	D
59% or below	F

There is no "curve". Each student's grade is based on their own outcomes assessments and not affected by the grades of other students. Extra credit opportunities may present themselves throughout the semester and will be announced during class meetings. Mistakes in grading to happen, and students are encouraged to discuss such concerns with the instructor during office hours.

Readings and Materials

Recommended sources include:

- Booth, W.C., Colomb, G.G. and Williams, J.M., 2003. The craft of research. University of Chicago Press.
- Creswell, J.W., 2013. Research design: Qualitative, quantitative, and mixed methods approaches. Sage Publications.
- Wilson, E.O., 2013. Letters to a young scientist. WW Norton & Company.
- Zobel, J. Writing for Computer Science, 2nd edition, Springer.
- http://www.sce.carleton.ca/faculty/chinneck/thesis.html
- http://cs.stanford.edu/people/widom/paper-writing.html#intro
- http://homes.cs.washington.edu/~mernst/advice/write-technical-paper.html
- https://www.hamilton.edu/documents/writing-center/_Tips_for_Peer_Review.PDF
- https://www.elsevier.com/reviewers-update/story/peer-review/peer-review-how-exactly-do-i-do-that

Additional readings may be assigned from specific research areas.

Class Outline and Tentative Schedule

SICCS faculty will present talks on their research. For each speaker, two or three papers will be assigned one week before their presentation. ***You are expected to read these papers and comprehend their main ideas before the speaker's talk, and come to the session prepared to ask questions that will help you fill gaps in your knowledge.*** Each talk session will be followed by a discussion session which will be mediated by one or two students assigned after the talk (***all students need to be prepared!)***. Mediator performance will be evaluated as part of the "attendance and class participation."

Below is the date for each speaker and a tentative schedule for the course:

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Week 1	Aug 31	Orientation and Essay Writing
Week 2	Sept 7	*Talk 1: Professor Joseph Mihaljevic*
Week 3	Sept 14	Peer-review workshop
Week 4	Sept 21	*Talk 2: Professor Marc Tollis*
Week 5	Sept 28	Proposal writing: introduction
Week 6	Oct 5	*Talk 3: Professor Tolga Yalcin*
Week 7	Oct 12	Conducting and reporting literature reviews
Week 8	Oct 19	*Talk 4: Professor Marco Gerosa*
Week 9	Oct 26	Research design and evaluation plan
Week 10	Nov 2	*Talk 5: Professor Truong Nghiem*
Week 11	Nov 9	Invited talk: How to prepare and present an elevator pitch Professor John Masserini
Week 12	Nov 16	*Talk 6: Professor Benjamin Rudell*
Week 13	Nov 23	NAU Holiday
Week 14	Nov 30	*Talk 7: Professor Toby Hocking*
Week 15	Dec 7	Elevator pitches
Week 16	Dec 10	Final Research Proposal deadline

Course Policies

Contact Methods: Don't hesitate to drop by my office or send me an email with any personal concerns. I appreciate to be in touch with students and will happily do my best to answer your questions and address your concerns. I reserve the right to ask you to come in for a chat during office hours for long answers, and reserve email for shorter answers. I will answer your emails as soon as I possibly can but don't bank on a response time measured in minutes (though, that may sometimes happen too). Also, please make sure that you put your name somewhere in the message. Without this information, there's no guarantee that I will answer your email.

Grading review: If you feel a mistake has been made in grading your assignment, please address your concerns during office hours or after class. The instructor will gladly explain his reasoning for deductions and correct any mistakes. However, any corrections must be discussed and made within a week of the assignment or exam's return date.

Assignment Sharing: The instructor may share anonymized student assignments (or parts of them) with the class for didactic purposes. If you don't want that something that you have produced to be shared with the rest of the class, state clearly in the respective deliverable.

Interventions: We have limited time. I will push, challenge, and question you hoping you will quickly learn. We hope you can recognize that the comments aren't personal, but part of the process. I also expect you to question me, challenge my point of view if you disagree, and engage in a real dialog with the teaching team. This approach may seem harsh or abrupt, but it is all part of our wanting you to learn to challenge yourselves quickly and objectively and to appreciate that as professionals, you need to learn and evolve faster than you ever imagined possible.

Academic Integrity: One of the foundations of academic life is honesty. Assignments and exams are ways to measure your understanding of the material covered in the course, not medieval implements of torture. By cheating, you are cheating yourself out of the chance to have your understanding accurately evaluated. Grades are an indication of your final proficiency over the material and not a form of punishment. Be honest and fair to your classmates: do your own work. You'd also be surprised at how easy it is to spot cheating.

Cheating and any other form of academic dishonesty (such as "borrowing" text or materials) will be dealt with seriously. Academic integrity violations will result in penalties including, but not limited to, a zero on the assignment, a failing grade in the class, or expulsion from NAU.

Appendix A. POLICY STATEMENTS FOR COURSE SYLLABI

SAFE WORKING AND LEARNING ENVIRONMENT POLICY

NAU's Safe Working and Learning Environment Policy (SWALE) prohibits discrimination and harassment, including sexual harassment, on the basis of sex, race, color, age, national origin, religion, sexual orientation, gender, gender identity, disability, or veteran status by anyone at this university. Retaliation of any kind as a result of making a complaint under the policy or participating in an investigation is also prohibited by SWALE. The Equity and Access Office (EAO) handles complaints of discrimination and harassment that fall under the SWALE policy and also assists with religious accommodations. You may obtain a copy of the SWALE policy from the college dean's office or from the EAO website nau.edu/diversity/. You may contact EAO for information or to file a complaint at Old Main, Room 113, PO Box 4083, Flagstaff, AZ 86011, by phone at 928-523-3312, TDD: 928-523-1006 and Fax: 928-523-9977, by email at equityandaccess@nau.edu or through the EAO website at nau.edu/diversity/.

TITLE IX

Title IX and NAU prohibit discrimination based on sex or gender in any education program or activity receiving federal financial assistance. Sex discrimination includes sexual harassment, sexual assault, relationship violence and stalking. The Title IX Coordinator is EAO Director, Pamela Heinonen. The Title IX Coordinator has overall responsibility for Title IX compliance, including training, education, and administration of grievance procedures. She may be reached at Pamela.Heinonen@nau.edu. Director, Equity and Access Office, Old Main, Room 113, PO Box 4083, Flagstaff, AZ 86011, Phone: 928-523-3312, Fax: 928-523-9977, TTD: 928-523-1006, by email at Pamela.Heinonen@nau.edu. Important information on Title IX, reporting requirements, complaint options and student resources is at http://nau.edu/Equity-and-Access/Title-IX/.

STUDENTS WITH DISABILITIES

If you have a documented disability, you can request accommodations by contacting Disability Resources (DR) at 523-8773 (voice) or 523-6906 (TTY), dr@nau.edu (e-mail) or 928-523-8747 (fax). Once eligibility has been determined, students are required to register with DR every semester to activate their accommodations. Although you may request an accommodation at any time, in order for DR to best meet your individual needs, you are urged to submit a self-identification form and necessary documentation (www.nau.edu/dr) at least 4 weeks prior to the time you wish to receive accommodations. DR is strongly committed to the needs of students with disabilities and the promotion of Universal Design. Concerns or questions related to the accessibility of programs and facilities at NAU may be brought to the attention of DR or the Equity and Access Office (523-3312 or equityandaccess@nau.edu). The university ADA/504 Coordinator is DR Director, Jamie Axelrod. He may be reached at Jamie.Axelrod@nau.edu.

ACADEMIC CONTACT HOUR POLICY

Based on the Arizona Board of Regents Academic Contact Hour Policy (ABOR Handbook, 2-224), for every unit of credit, a student should expect, on average, to do a minimum of three hours of work per week, including but not limited to class time, preparation, homework, studying.

ACADEMIC INTEGRITY

Integrity is expected of every member of the NAU community in all academic undertakings. Integrity entails a firm adherence to a set of values, and the values most essential to an academic community are grounded in honesty with respect to all intellectual efforts of oneself and others. Academic integrity is expected not only in formal coursework situations, but in all University relationships and interactions connected to the educational process, including the use of University resources. An NAU student's submission of work is an implicit declaration that the work is the student's own. All outside assistance should be acknowledged, and the student's academic contribution truthfully reported at all times. In addition, NAU students have a right to expect academic integrity from each of their peers.

Individual students and faculty members are responsible for identifying potential violations of the university's academic integrity policy. Instances of potential violations are adjudicated using the process found in the university Academic Integrity Policy. For more information on this policy, visit:
https://www5.nau.edu/policies/client/Details/307

RESEARCH INTEGRITY

The Responsible Conduct of Research policy is intended to ensure that NAU personnel including NAU students engaged in research are adequately trained in the basic principles of ethics in research. Additionally, this policy assists NAU in meeting the RCR training and compliance requirements of the National Science Foundation (NSF)-The America COMPETES Act (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education and Science); 42 U.S.C 18620-1, Section 7009, and the National Institutes of Health (NIH) policy on the instruction of the RCR (NOT-OD-10-019; "Update on the Requirement for Instruction in the Responsible Conduct of Research"). For more information on the policy and the training activities required for personnel and students conducting research, at NAU, visit:
http://nau.edu/Research/Compliance/Research-Integrity/

SENSITIVE COURSE MATERIALS

University education aims to expand student understanding and awareness. Thus, it necessarily involves engagement with a wide range of information, ideas, and creative representations. In the course of college studies, students can expect to encounter—and critically appraise—materials that may differ from and perhaps challenge familiar understandings, ideas, and beliefs. Students are encouraged to discuss these matters with faculty.

CLASSROOM DISRUPTION POLICY

Membership in the academic community places a special obligation on all participants to preserve an atmosphere conducive to a safe and positive learning environment. Part of that obligation implies the responsibility of each member of the NAU community to maintain an environment in which the behavior of any individual is not disruptive. Instructors have the authority and the responsibility to manage their classes in accordance with University regulations. Instructors have the right and obligation to confront disruptive behavior thereby promoting and enforcing standards of behavior necessary for maintaining an atmosphere conducive to teaching and learning. Instructors are responsible for establishing, communicating, and enforcing reasonable expectations and rules of classroom behavior. These expectations are to be communicated to students in the syllabus and in class discussions

and activities at the outset of the course. Each student is responsible for behaving in a manner that supports a positive learning environment and that does not interrupt nor disrupt the delivery of education by instructors or receipt of education by students, within or outside a class. The complete classroom disruption policy is in Appendices of NAU's Student Handbook. For more information on this policy, visit:
https://nau.edu/student-life/student-handbook/