

CS 105, Computer Science Seminar & Ethics and Professionalism,

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<http://wwwdev.uah.edu/dmr/cs105/>

Catalog description Covers issues associated with the ethical use of computers in the current information age. Ethics, professionalism, software piracy, copyrighting software, ethical standards and the impact of computers on society will be covered. Familiarization with the local computing environment will also be covered.

Textbook A Gift of Fire 2nd, Sara Baase, Prentice-Hall, 2003. Possibly third edition
<http://www-rohan.sdsu.edu/faculty/giftfire/>

Goals To provide the students with an opportunity to think about the value questions related to the computer science professions and the impact of computing on society.

Topics

Facts and Values Moral Reasoning Professions

The ACM Code Legal Issues

Special topics: ownership, privacy, responsibility, liability, abuse, and accessibility

Oral and Written Communication There will be several brief assignments during the semester and these will account for 80% of the final grade. Some of the assignments will be in class others will be outside of class. There is also an examination. It is expected that students will attend class and participate in discussions.

Grading Policy:

Late assignments: - 5 pts per 24 hours late

All 100-level courses in the College of Science now have a mandatory attendance policy. This course is no exception. Three (3) unexcused class absences are allowed. These unexcused absences are meant to cover routine illnesses, car trouble, etc. Absences beyond three must be documented by the student and approved by the instructor.

Excessive absences will affect the final grade as follows:

Absences	Points deducted from final average
0 – 3	0
4	1
5	3
6	5
7	7
8 or more	10

Year 2001 Model Curricula for Computing
Computer science body of knowledge
<http://www.computer.org/education/cc2001/index.htm>

<p>DS. Discrete Structures (43 core hours)</p> <ul style="list-style-type: none"> DS1. Functions, relations, and sets (6) DS2. Basic logic (10) DS3. Proof techniques (12) DS4. Basics of counting (5) DS5. Graphs and trees (4) DS6. Discrete probability (6) <p>PF. Programming Fundamentals (38 core hours)</p> <ul style="list-style-type: none"> PF1. Fundamental programming constructs (9) PF2. Algorithms and problem-solving (6) PF3. Fundamental data structures (14) PF4. Recursion (5) PF5. Event-driven programming (4) <p>AL. Algorithms and Complexity (31 core hours)</p> <ul style="list-style-type: none"> AL1. Basic algorithmic analysis (4) AL2. Algorithmic strategies (6) AL3. Fundamental computing algorithms (12) AL4. Distributed algorithms (3) AL5. Basic computability (6) AL6. The complexity classes P and NP AL7. Automata theory AL8. Advanced algorithmic analysis AL9. Cryptographic algorithms AL10. Geometric algorithms AL11. Parallel algorithms <p>AR. Architecture and Organization (36 core hours)</p> <ul style="list-style-type: none"> AR1. Digital logic and digital systems (6) AR2. Machine level representation of data (3) AR3. Assembly level machine organization (9) AR4. Memory system organization and architecture (5) AR5. Interfacing and communication (3) AR6. Functional organization (7) AR7. Multiprocessing and alternative architectures (3) AR8. Performance enhancements AR9. Architecture for networks and distributed systems <p>OS. Operating Systems (18 core hours)</p> <ul style="list-style-type: none"> OS1. Overview of operating systems (2) OS2. Operating system principles (2) OS3. Concurrency (6) OS4. Scheduling and dispatch (3) OS5. Memory management (5) OS6. Device management OS7. Security and protection OS8. File systems 	<p>HC. Human-Computer Interaction (8 core hours)</p> <ul style="list-style-type: none"> HC1. Foundations of human-computer interaction (6) HC2. Building a simple graphical user interface (2) HC3. Human-centered software evaluation HC4. Human-centered software development HC5. Graphical user-interface design HC6. Graphical user-interface programming HC7. HCI aspects of multimedia systems HC8. HCI aspects of collaboration and communication <p>GV. Graphics and Visual Computing (3 core hours)</p> <ul style="list-style-type: none"> GV1. Fundamental techniques in graphics (2) GV2. Graphic systems (1) GV3. Graphic communication GV4. Geometric modeling GV5. Basic rendering GV6. Advanced rendering GV7. Advanced techniques GV8. Computer animation GV9. Visualization GV10. Virtual reality GV11. Computer vision <p>IS. Intelligent Systems (10 core hours)</p> <ul style="list-style-type: none"> IS1. Fundamental issues in intelligent systems (1) IS2. Search and constraint satisfaction (5) IS3. Knowledge representation and reasoning (4) IS4. Advanced search IS5. Advanced knowledge representation and reasoning IS6. Agents IS7. Natural language processing IS8. Machine learning and neural networks IS9. AI planning systems IS10. Robotics <p>IM. Information Management (10 core hours)</p> <ul style="list-style-type: none"> IM1. Information models and systems (3) IM2. Database systems (3) IM3. Data modeling (4) IM4. Relational databases IM5. Database query languages IM6. Relational database design IM7. Transaction processing IM8. Distributed databases IM9. Physical database design IM10. Data mining IM11. Information storage and retrieval
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<p>OS9. Real-time and embedded systems OS10. Fault tolerance OS11. System performance evaluation OS12. Scripting</p> <p>NC. Net-Centric Computing (15 core hours) NC1. Introduction to net-centric computing (2) NC2. Communication and networking (7) NC3. Network security (3) NC4. The web as an example of client-server computing (3) NC5. Building web applications NC6. Network management NC7. Compression and decompression NC8. Multimedia data technologies NC9. Wireless and mobile computing</p> <p>PL. Programming Languages (21 core hours) PL1. Overview of programming languages (2) PL2. Virtual machines (1) PL3. Introduction to language translation (2) PL4. Declarations and types (3) PL5. Abstraction mechanisms (3) PL6. Object-oriented programming (10) PL7. Functional programming PL8. Language translation systems PL9. Type systems PL10. Programming language semantics PL11. Programming language design</p>	<p>IM12. Hypertext and hypermedia IM13. Multimedia information and systems IM14. Digital libraries</p> <p>SP. Social and Professional Issues (16 core hours) SP1. History of computing (1) SP2. Social context of computing (3) SP3. Methods and tools of analysis (2) SP4. Professional and ethical responsibilities (3) SP5. Risks and liabilities of computer-based systems (2) SP6. Intellectual property (3) SP7. Privacy and civil liberties (2) SP8. Computer crime SP9. Economic issues in computing SP10. Philosophical frameworks</p> <p>SE. Software Engineering (31 core hours) SE1. Software design (8) SE2. Using APIs (5) SE3. Software tools and environments (3) SE4. Software processes (2) SE5. Software requirements and specifications (4) SE6. Software validation (3) SE7. Software evolution (3) SE8. Software project management (3) SE9. Component-based computing SE10. Formal methods SE11. Software reliability SE12. Specialized systems development</p> <p>CN. Computational Science and Numerical Methods (no core hours) CN1. Numerical analysis CN2. Operations research CN3. Modeling and simulation CN4. High-performance computing</p>
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<p>SP1. History of computing [core]</p> <p><i>Topics:</i> * Prehistory -- the world before 1946 * History of computer hardware, software, networking * Pioneers of computing</p> <p><i>Learning objectives:</i> 1. List the contributions of several pioneers in the computing field. 2. Compare daily life before and after the advent of personal computers and the Internet. 3. Identify significant continuing trends in the history of the computing field.</p>	<p>SP6. Intellectual property [core]</p> <p><i>Topics:</i> * Foundations of intellectual property * Copyrights, patents, and trade secrets * Software piracy * Software patents * Transnational issues concerning intellectual property</p> <p><i>Learning objectives:</i> 1. Distinguish among patent, copyright, and trade secret protection. 2. Discuss the legal background of copyright in national and international law.</p>
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SP2. Social context of computing [core]

Topics:

- * Introduction to the social implications of computing
- * Social implications of networked communication
- * Growth of, control of, and access to the Internet
- * Gender-related issues
- * International issues

Learning objectives:

1. Interpret the social context of a particular implementation.
2. Identify assumptions and values embedded in a particular design.
3. Evaluate a particular implementation through the use of empirical data.
4. Describe positive and negative ways in which computing changes the modes of interaction between people.
5. Explain why computing/network access is restricted in some countries.

SP3. Methods and tools of analysis [core]

Topics:

- * Making and evaluating ethical arguments
- * Identifying and evaluating ethical choices
- * Understanding the social context of design
- * Identifying assumptions and values

Learning objectives:

1. Analyze an argument to identify premises and conclusion.
2. Illustrate the use of example, analogy, and counter-analogy in ethical argument.
3. Detect use of basic logical fallacies in an argument.
4. Identify stakeholders in an issue and our obligations to them.
5. Articulate the ethical tradeoffs in a technical decision.

SP4. Professional and ethical responsibilities [core]

Topics:

- * Community values and the laws by which we live
- * The nature of professionalism
- * Various forms of professional credentialing and the advantages and disadvantages
- * The role of the professional in public policy

3. Explain how patent and copyright laws may vary internationally.
4. Outline the historical development of software patents.
5. Discuss the consequences of software piracy on software developers and the role of relevant enforcement organizations.

SP7. Privacy and civil liberties [core]

Topics:

- * Ethical and legal basis for privacy protection
- * Privacy implications of massive database systems
- * Technological strategies for privacy protection
- * Freedom of expression in cyberspace
- * International and intercultural implications

Learning objectives:

1. Summarize the legal bases for the right to privacy and freedom of expression in one's own nation and how those concepts vary from country to country.
2. Describe current computer-based threats to privacy.
3. Explain how the Internet may change the historical balance in protecting freedom of expression.
4. Explain both the disadvantages and advantages of free expression in cyberspace.
5. Describe trends in privacy protection as exemplified in technology.

SP8. Computer crime [elective]

Topics:

- * History and examples of computer crime
- * "Cracking" ("hacking") and its effects
- * Viruses, worms, and Trojan horses
- * Crime prevention strategies

Learning objectives:

1. Outline the technical basis of viruses and denial-of-service attacks.
2. Enumerate techniques to combat "cracker" attacks.
3. Discuss several different "cracker" approaches and motivations.
4. Identify the professional's role in security and the tradeoffs involved.

SP9. Economic issues in computing [elective]

Topics:

<ul style="list-style-type: none"> * Maintaining awareness of consequences * Ethical dissent and whistle-blowing * Codes of ethics, conduct, and practice (IEEE, ACM, SE, AITP, and so forth) * Dealing with harassment and discrimination * "Acceptable use" policies for computing in the workplace <p><i>Learning objectives:</i></p> <ol style="list-style-type: none"> 1. Identify progressive stages in a whistle-blowing incident. 2. Specify the strengths and weaknesses of relevant professional codes as expressions of professionalism and guides to decision-making. 3. Identify ethical issues that arise in software development and determine how to address them technically and ethically. 4. Develop a computer use policy with enforcement measures. 5. Analyze a global computing issue, observing the role of professionals and government officials in managing the problem. 6. Evaluate the professional codes of ethics from the ACM, the IEEE Computer Society, and other organizations. <p>SP5. Risks and liabilities of computer-based systems [core]</p> <p><i>Topics:</i></p> <ul style="list-style-type: none"> * Historical examples of software risks (such as the Therac-25 case) * Implications of software complexity * Risk assessment and management <p><i>Learning objectives:</i></p> <ol style="list-style-type: none"> 1. Explain the limitations of testing as a means to ensure correctness. 2. Describe the differences between correctness, reliability, and safety. 3. Discuss the potential for hidden problems in reuse of existing components. 4. Describe current approaches to managing risk, and characterize the strengths and shortcomings of each. 	<ul style="list-style-type: none"> * Monopolies and their economic implications * Effect of skilled labor supply and demand on the quality of computing products * Pricing strategies in the computing domain * Differences in access to computing resources and the possible effects thereof <p><i>Learning objectives:</i></p> <ol style="list-style-type: none"> 1. Summarize the rationale for antimonopoly efforts. 2. Describe several ways in which the information technology industry is affected by shortages in the labor supply. 3. Suggest and defend ways to address limitations on access to computing. 4. Outline the evolution of pricing strategies for computing goods and services. <p>SP10. Philosophical frameworks [elective]</p> <p><i>Topics:</i></p> <ul style="list-style-type: none"> * Philosophical frameworks, particularly utilitarianism and deontological theories * Problems of ethical relativism * Scientific ethics in historical perspective * Differences in scientific and philosophical approaches <p><i>Learning objectives:</i></p> <ol style="list-style-type: none"> 1. Summarize the basic concepts of relativism, utilitarianism, and deontological theories. 2. Recognize the distinction between ethical theory and professional ethics. 3. Identify the weaknesses of the "hired agent" approach, strict legalism, naïve egoism, and naïve relativism as ethical frameworks.
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OFFICIAL UAH COMPUTER SCIENCE DEPARTMENT POLICIES AND PROCEDURES

1. Responsibilities of the teacher

- 1) Provide a detailed syllabus. This syllabus should list office hours, course objectives, textbooks, references, prerequisites, and grading policy/method of assessment.
- 2) Come to class well prepared, on time, and make full use of the class time.
- 3) Provide timely and adequate feedback on grades. Return graded material promptly.

- 4) Conduct final exam at the time designated in the class schedule. Never post grades.
- 5) Not assign **new** work (i.e. not listed on syllabus) that is due in last two weeks of classes.
- 6) Avoid leaving the examination room without a proctor. Provide paper for exams.
- 7) Make reasonable use of the assigned textbook.
- 8) Check students have proper prerequisites. Instructor does not waive assigned prerequisites.

2. Responsibilities of the student (see also, Student Handbook Article II)

- 1) Come to class with the proper prerequisites, well prepared, on time, and make full use of the class time.
- 2) Provide adequate notice of anticipated absences and take full responsibility for finding out about missed work, announcements, and assignments.
- 3) Submit assessment material on time and submit **only your own work**. (see integrity)
- 4) Do not allow other students to copy your work.
- 5) Read and understand the syllabus and follow announced policies.

3. Complaint Procedure

If you have difficulties or complaints related to this course, your first action should be to discuss them with your instructor. If such a discussion would be uncomfortable for you or fails to resolve your difficulties, you should contact Professor Heggere S. Ranganath, Chair of the Computer Science Department. His office is in Technology Hall N-300, telephone 824-6088, ranganat@cs.uah.edu. If you are still unsatisfied, you should discuss the matter with Dr. Dan Rochowiak, Associate Dean of the College of Science, drochowi@cs.uah.edu. Dr. Rochowiak's office is CS 207 Materials Science Building.

4. Students with disabilities

Your instructor would like to hear from anyone who has a disability that may require a modification of seating, testing, or other class procedures. Please see instructor after class or during office hours to discuss appropriate modifications. You should also contact Student Development Services in UC 113 (Ph. 824 6203) for further assistance.

5. Student computer account

Students enrolled in any CS course are entitled to an account on the departmental computer network. Use of such an account is subject to departmental and university policies. To apply for an account, and see the current policies, go to the departmental web site at <http://www.cs.uah.edu/account/>

6. Examination policy

In response to past student complaints about problems during examinations, the Computer Science Department has developed the following guidelines for in-class examinations in all courses.

1. Come to the exam prepared to complete it without a break. If you think you will need a break, please inform the proctor before the exam if possible.
2. Do not communicate with other students. Talk only to the instructor.
3. Whenever you leave the exam room turn in your exam.
4. Use only the paper provided by the instructor for all writing.
5. If assigned a specific seat, remain in that seat.
6. Unless specifically permitted by the instructor, use no books or other reference materials. Do not bring calculators, computers, pocket-organizers, cell phones, pagers, or other electronic devices to the exam.

7. Integrity

We expect CS instructors and students to conduct themselves in a professional manner. Students are subject to all the provisions in the UAH Code of Student Conduct, which is available free from the Office of Admissions and Records. Information on plagiarism and other forms of misconduct is presented in the Student Handbook Article III.