

# CS 4002

## Robots and Society

Spring 2013

TR 9:35-10:55

College of Computing 53

[http://www.cc.gatech.edu/classes/AY2013/cs4002\\_spring/](http://www.cc.gatech.edu/classes/AY2013/cs4002_spring/)

### Instructor:

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Office Hours: Immediately after class or by appointment

### Required Texts:

**Moral Machines: Teaching Robots Right From Wrong**

By Wendell Wallach and Colin Allen (2009)

**Digital People: From Bionic Humans to Androids**

by Sidney Perkowitz (2004)

**Robo Sapiens: Evolution of a New Species**

by Peter Menzel and Faith D'Alusio (2000).

### Graduate TA:

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### General Information

**Robots and Society** examines the role and impact of robotics, distributed sensing and actuation, ubiquitous computing and related technology in society. Robots and Society is an alternative to Computers in Society (CS 4001), and satisfies the required course on ethics for Computing majors. Like 4001, it is not a typical computer science course. Here we are less interested in the technical content of computing and robots, and focus instead on the *effects* of such technology on individuals, organizations, and society, paying close attention to what your responsibilities are as a computing professional.

There will not be any programming in this class, but you will do a lot of reading, a lot of analyzing, and a lot of communicating (both orally and in writing). Although there are some lectures, this is not a lecture course. Getting the most out of this course (including the best grade) will require your active participation throughout the semester. On any given issue, you may be asked to critique reading assignments from a variety of readings or to summarize group discussions or positions... but don't worry, it should still be fun.

### Objectives

There are several outcomes for the course. By its end, you should be able to:

- Communicate and argue coherently with others about technology and its impacts both in writing and orally
- Engage in the global debate on the ethical issues that arise from robotic technology, identifying the salient issues and evaluating the reasoning behind them
- Achieve and demonstrate a more than adequate writing ability
- Understand and explain the consequences of your profession on individuals, organizations, and society.
- Understand and explain the importance of all these issues

You will be challenged to broaden your understanding by learning something of the history of robotics, the similarities and differences in public attitudes and policies concerning robotics in the U.S. and in other countries. Some of these issues are unique to robotics; others arise in the context of computing in general as well as in other technologies; still others are new manifestations of more general ethical, political and constitutional law issues.

You will have ample opportunity to analyze critically various situations and descriptions in papers, books, on the web, and from your own observations.

You will be able to practice your ability to communicate by writing coherent and well-structured critiques of situations and papers, researching and organizing a longer paper, and leading and participating in class discussions and debates.

A detailed topical outline is given below. The actual schedule is available as well.

1. **Techniques of Rhetoric and Logical Argumentation.** Arguments as claims supported by reasons. Types of argument concerning the social consequences of robotics and the aptness of robotics-related policies. Evidence, authority, and the anticipation and rebuttal of objections.

Communicating with professional peers, customers, and the public.

2. **Ethical Foundations.** Rules as the basis for policymaking and legislation relevant to robotics; software as a mechanism for encoding and enforcing business practices, and norms of conduct. Consequences as the basis for policymaking and design decisions: Assessing and balancing the benefits and costs of alternatives to stakeholders. Virtue ethics as the basis for professional conduct and resolution of moral dilemmas (e.g. whistle-blowing). Asimov's Laws.
3. **Societal and Cultural Variations in Robotics Acceptance.** Astroboy vs Frankenstein.
4. **Privacy.** Personal information, its disclosure and misuse. Surveillance and changing interpretations of the Fourth Amendment.
5. **Robotics and Jobs.** Impact of revolutionary technological changes on employment.
6. **Robotics and Defense.** Ethical implications of machines that kill or assist in killing. Mixed initiative and rank. Lethal force.
7. **Entertainment Robots.** Manipulation of the individual through affect in consumer robotics. Robot pets. The illusion of life. Dehumanization and deterioration of humanity's social fabric.
8. **Medical and Assistive Robotics:** Human Augmentation and enhancement. Cyborgs.
9. **Sexual activity and robotics.** Robot partners. Robot marriage.
10. **Religion and Intelligent Machines.**
11. **Robots as Intelligent Beings.** Rights related to robots. Robot slavery and society. Robot aspirations.
12. **Professional Responsibility.** Professions as more than jobs requiring expertise. Intelligent System design compared to established professions. Professional codes of conduct, their validity, effectiveness and scope. Social responsibility and personal and corporate accountability and liability for harm.

### Teaching this Course

The primary purpose of this course is to help you develop into a responsible and effective professional, and that means having a basic understanding of and sensitivity to the ethical issues and principles of our field.

This is not going to happen with a professor lecturing at you about Kant (although this will happen as it turns out). As is the case in most courses, this is less about teaching and more about learning. Our role is to assist you in this process, and to provide enough structure so that a class of forty students can do this effectively.

If we think in terms of data structures, the fundamental one here is the thoughtful dialogue. We will make extensive use classroom discussions and writing assignments. You will be given many opportunities to express your positions on a variety of situations where robotics is having or may one day have an impact. Equally, you will be expected to read and listen critically to the arguments of others, and to demonstrate that you have done so.

This is not a debate course. The goal is not to persuade others with your rhetorical skill--though you will develop the skills to do so--nor is it to "win" the argument. The goal is to gain a better appreciation and understanding of how robotics is changing society and what your responsibilities should be as an effective professional.

In line with this, you are entitled to your opinions on these topics, whatever they happen to be. You will not be penalized for your positions even when we might think said position is insane; however, you *must* be able to support your arguments effectively. This means showing that you have actually given a position some thought and can discuss the various trade-offs and implications of the position you have chosen. This also means that you should be able take any side of an issue and explain it and argue for it sympathetically, even though your personal views may be different.

### Disclaimer

We reserve the right to modify any of these plans as need be during the course of the class; however, we will not do anything capriciously, anything that is changed will not be too drastic, and you will be informed as far in advance as possible.

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### Schedule

Some readings are not firm as of now, and many will be added the week before the class. Remember: there is *no excuse* for ignorance of the assigned reading material. Visit this page frequently. Bring a friend.

Date	Topic	Reading for Class Discussion (Read PRIOR to Class)	Assignment
Jan 8	Introduction I	<a href="#">Robot Ethics – The Economist</a>	
Jan 10	Introduction II/Ethical Foundations I	Robo Sapiens (RS), <i>Introduction</i> <a href="#">Why the future doesn't need us</a> (Bill Joy) <a href="#">A Robot in Every Home</a> (Bill Gates)	
Jan 15	Ethical Foundations II	Introduction to Ethics Article (Class Handout) Moral Machines (MM), Chapter 1	In class exercise 1
Jan 17	Ethical Foundations III	<a href="#">A survey</a> Digital People (DP), Chapter 1	
Jan 22	Argumentation	Using the Toulmin Model (Class Handout) DP, Chapter 2	HWK #1: Introduction to Ethics DUE 1/31
Jan 24	Asimov's Laws	MM, pp. 91-99 <a href="#">Three laws and Metaethics</a> <a href="#">Beyond Asimov</a> <a href="#">Uncanny Valley</a>	Term paper assignment #1 DUE 2/7
Jan 29	Defense: Killer Applications	RS, <i>Remote Possibilities</i> <a href="#">Military Robots and Ethics</a> <a href="#">Armed Robot Operations</a>	In class exercise 2
Jan 31	Defense II	RS, <i>Serious Fun</i> <a href="#">Review of Code with explanation of the 4 regulatory forces</a> (Focus on section titled 'What Regulates and How')	HW #1 DUE! HWK# 2 OUT: DUE 2//12
Feb 5	Entertainment/Companion Robots	<a href="#">If you kick a robotic dog, is it wrong?</a> <a href="#">The March of the Robot Dogs</a> <a href="#">Do People really want Robots?</a> <a href="#">Dangers</a> <a href="#">Where are they?</a>	
Feb 7	Lab Tour Meet at TSRB LOBBY 9:30AM	MM, Chapter 3 RS, <i>Electric Dreams</i>	TP#1 DUE!
Feb 12	Medical and Assistive Robotics	<a href="#">Robots and Rehabilitation</a>  <a href="#">Robots and Autism</a> <a href="#">Exoskeletons</a>	HW #2 DUE!
Feb 14	Cyborgs	<a href="#">Brains and Robots</a> <a href="#">Implant tumors</a> <a href="#">Mind reading</a>	In class exercise 3
Feb 19	Robots and Jobs	RS, <i>Workmates</i> <a href="#">World Robotics Summary</a> <a href="#">Droids take your jobs</a> <a href="#">Robots and the Workforce</a>	Term paper Outline and Debate topics (BOTH DUE 3/7)
Feb 21	Robots and Privacy	<a href="#">Socio-ethics</a> (Read at least sections 3 and 5) <a href="#">Security and Privacy</a>	In Class Exercise 4
Feb 26	<b>Midterm Exam</b>		

	<b>Past Midterm NOTE: This is not necessarily a guide for the future!</b>		
Feb 28	Religion and Robots I	DP, <i>Chapter 4</i> <a href="#">Robot: Child of God</a> <a href="#">Technoethics</a>	
March 5	Religion and Robots II	DP, <i>Chapter 5</i> <a href="#">Commander Data: A Candidate for Harvard Divinity School?</a>	
March 7	Sexual Activity and Robots I	DP, <i>Chapter 8</i> <a href="#">Legal Implications of Intimacy with Machines</a>	OUTLINE AND DEBATE TOPICS DUE! Term Paper (DUE 4/23)
March 12 <i>Drop Day is March 13</i>	Sexual Activity and Robots II	<a href="#">Robot Prostitutes</a> <a href="#">Robot Sex Tourism</a>	
March 14	Social and Cultural Distinctions I	DP, <i>Chapter 7</i> <a href="#">Who is Afraid?</a> <a href="#">Culture in Neuro-robotics</a>	Debate Assignments (Due 4/9) Homework #3 DUE 11:59 PM Monday before 3/28
March 19 March 21	<b>Spring Break</b>		
March 26	Social and Cultural Distinctions II	<a href="#">Cultural Acceptance: West versus Japan</a> <a href="#">Cross-cultural Robot Design</a>	
March 28	Intelligent Beings I (aka The Singularity)	DP, <i>Chapter 9</i> , <a href="#">I... am a Robot</a>	Student presentations
April 2	Intelligent Beings II	MM, <i>Chapter 4</i> <a href="#">Ethical Treatment of Robots</a>	Student presentations
April 4	Intelligent Beings III	RS, <i>Robo Sapiens</i> MM, <i>Chapter 12</i>	Student presentations
April 9	Debates I	<b>All debate documents for all debates are due at the beginning of class 4/9.</b>	Student debates
April 11	Debates II		Student debates
April 16	Debates III		Student debates
April 18	Professional Ethics	<a href="#">Using the new ACM code of Conduct for Decision Making</a> <a href="#">ACM Code of Conduct</a> <a href="#">IEEE Code of Conduct</a> <a href="#">IEEE Plagiarism</a> <a href="#">AUVSI Code of Conduct</a>	
April 23	Guest Lecture		TERM PAPER DUE!
April 25	What's Next? A Challenge		<b>Out: Take-Home Exam</b> <b>Oral Schedule</b>
April 29 – May 3	<b>Final Exam</b>		

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### Grading

#### Statement of Academic honesty

We hope that the possibilities for irony inherent in cheating in a course about ethics and professionalism are not lost on you. Naturally, you are expected to follow the [university's code of academic conduct](#). Feel free to discuss and debate your ideas in class and with each other, even if it directly concerns your term paper. Do not plagiarize. As professionals-in-training, we are sure that you understand proper attribution and the importance of intellectual honesty. If you are not sure, we are happy to discuss it with you.

#### Grading

Your final grade is divided into five components: participation and assignments, a group presentation / debate, two exams, and a final paper.

##### Class Participation

This class is built in large part around discussion and active participation. As such, you are expected to come to class having critically examined any assigned material. Come to class prepared to offer and defend your own view. Note carefully that there are actually two parts to this requirement. First, you must come to class. Second, you must participate in the discussions and oral exercises. Those who do both can expect full credit for class participation. Those who do not can expect little credit for class participation. A grade will be assigned to each student at the end of every class for their level of participation in the class discussions. Chime in!

Part of your participation includes some homework assignments. They are due at the start of class on the date indicated. Late submissions will not be accepted. All written homework assignments, individual presentations, take-home exam, and the term paper are to be original and done independently without collaboration with others (with the exception of the debates).

Readings are like assignments. You will be expected to have read the assigned readings before the class in which they will be discussed. Readings will be from a variety of sources, though mostly from the required text, available at the bookstore.

##### Group Presentation / Debate

There will be a group presentation and debate. Details and instructions will be given elsewhere. The debates are mandatory. It is not possible to pass the class without participating in one. You will be graded primarily on how well you present your argument, the quality of your research and preparation, and your presentation skills.

##### Midterm Exam

There will be a written mid-term so that you have a fair indication of how you are doing.

##### Final Exam

There will be a written take-home final exam. There will also be a one-on-one five minute oral defense of your exam. Details will follow.

##### Term Paper

There will be a five page term paper on a subject of your choosing due near the end of the term. There will be a few milestones along the way. Desiderata for the paper will be discussed in class.

#### Numbers

Component	Weight
Class Participation / Assignments	25%
Debates	20%
Midterm	15%
Final	20%
Term Paper	20%