

## Ethics, Society and Technology: Preparing for Our Cyborg Future

### Instructors:

The course will be taught principally by two faculty members:

- Dr. **Mason Cash**, a philosopher who works on questions of what makes us human, the role of technology and of normative and social factors in cognition, and on ethics in the design of technology. Mason.Cash@ucf.edu 407 823 6857 Office: PSY 246
- Dr. **Stephen M. Fiore**, a cognitive psychologist who studies the impact of technologies on human learning and performance in individuals and teams and who edits the journal *Cognitive Technology*. sfiore@ist.ucf.edu 407-882-0298 Partnership II Building, 3100 Technology Pkwy, Suite 140

### Office Hours :

Dr. Cash and Dr. Fiore will be available for up to 30 minutes after class for discussion of any course-related matter.

Dr. Fiore also has office hours Wed 12:00-1:00 pm in PII, Suite 140.

Dr. Cash has office hours T/Th 10:30-11:50 am in the BHC garden.

### Overview:

This is an interdisciplinary course exploring human-centered technology, what it means to be human in an age of such technology, and the social and ethical ramifications of ubiquitous technology.

We will bring together a variety of different resources from many disciplines cutting across the cognitive sciences (e.g., philosophy, psychology, engineering, computer science). Additionally, we may incorporate guest speakers to broaden the interdisciplinary dialogue.

Across these readings we will explore two major themes: (1) Technology and Humanity and (2) Ethics and Technology. Guiding us through these themes will be a set of questions, designed to help students see the connections across the varied disciplines from which we will be reading.

### Technology and Humanity

- How does the design of technology affect the relationship(s) people have with technology, with one another, and with their environments?
- Is a defining characteristic of humanity the human-technology symbiosis and have we always been “natural born cyborgs”?
- In what ways does changing our technology change how we live, what we can do, and the worlds in which we live?
- Does our technology also change us?
- Where are we headed as humans and what does it mean to be “human” in an age of pervasive technology?
- What are the benefits and dangers of different forms of “transhumanism”?
- What can we learn from depictions of technological utopias and dystopias in fiction (e.g., novels, films, videogames, poetry, and other artistic depiction) about ethical, environmental, social and political implications of different views of technology and its relationship(s) to persons?

## Ethics and Technology

- Does anyone direct the symbiotic process between humans and technology?
- How *should* this symbiotic process be directed, or *can* it even be directed?
- What roles should concerns about ethics and justice play in this process?
- What are the appropriate relationships between questions of design of technology and questions about what humans are and what humans should be?
- What are the ethical, social and environmental impacts of new technologies?
- What are the impacts of new assistive technologies in shaping the concept of “disability”, and of what it means to be a “normal” human being?
- Is there a greater need for ethical and political awareness, and perhaps for explicit policies, when designing, deploying and using emerging technologies that might be changing who we are and the worlds in which we live?

## Grading Scheme:

Your grade for this class will be determined from the following components:

- In-class team “lead discussant” presentation 5%
- Paper arguing for a position on what it means to be “normal” and/or “human” in the context of technology that augments people’s cognitive and physical abilities. 20%
- Team “technology design analysis”; presentation (10%) and report (10%) 20%
- Team “ethical, social and environmental impact” evaluation; presentation (10%) and report (10%) 20%
- Interpretation of literary depiction of technological utopia or dystopia: 10%
- Class participation and preparation 5%
- 2 in-class Quizzes 10%
- Final Quiz 10%

The total out of 100 will determine your final grade for the course.

We think a rigid set of cutoff points for grades is unfair because this would mean that people with very similar marks get different grades. Instead, we will try to make principled distinctions between groups of students. Borderline cases are decided using final exam and quizzes, individual assignments, in class participation and preparation.

Very roughly, the following are the approximate bounds of the ranges at which we often award grades. Final grades may not necessarily follow this precisely.

<b>Score</b>	0-49	50-59	60-69	70-85	85+
<b>Grade:</b>	F	D- D D+	C- C C+	B- B B+	A- A

## Required Textbooks:

- Donald Norman, *The Design of Future Things* (Basic Books, 2007).
- Andy Clark, *Natural Born Cyborgs* (Oxford University Press, 2004).
- Assorted research papers, web-sites, and journalistic articles linked from the schedule on WebCourses.

## Course Learning Objectives

This course is designed with two overarching learning objects: (1) The acquisition of knowledge from the various disciplines which touch upon technology and society; and (2) The acquisition of skills to use the knowledge to critically analyze, interpret, and evaluate ideas associated with technology and society.

### Knowledge Acquisition Objectives

Through active participation in the course, students should be able to:

- Understand and explain the ways that technology affects the relationship(s) people have with technology, with one another, and with their environments
- Identify principles of good design of human-centered technology
- Analyze what it means to be human in the context of human-centered technologies, and present and critique arguments about this
- Appreciate various ethical and social concerns regarding the impacts of new technologies, policies, applications or programs

### Analysis and Evaluation Objectives

Through active participation in the course, students should be able to:

- Critically evaluate new technologies according to these principles
- Argue for a position on what it means to be “normal” and/or “human” in the context of such technology
- Critically analyze the social and ethical impact of new technologies
- Argue for safeguards or alterations to such technologies to ameliorate negative consequences of the use or misuse of new technologies
- Analyze a depiction of a dystopia or utopia in terms of the relationship between humans and technology
- Persuasively argue for an interpretation of lessons we can learn from such depictions about how we should design our technology
- Communicate complex ideas and defend interpretations and arguments to an audience with varying academic backgrounds
- Successfully engage in interdisciplinary dialogue with peers by working on projects in interdisciplinary teams, in small-group settings.

## Course Structure

Classes will consist of a combination of lectures, whole-class and small-group discussions, and student presentations. Material will be presented in lecture, reading materials, and in-class exercises. Student discussions are a primary component of this course. Students will read and review papers from scholarly journals and will present their ideas in class and will lead discussions on these papers in class.

The course is divided roughly into three modules, with Dr. Cash and Dr. Fiore both contributing to each module.

- (1) What does it mean to be human in the context of technology that dramatically alters our cognitive and physical abilities? Are these technologies changing that meaning? Are we becoming “less human” in any significant way by augmenting our abilities in these ways?

- (2) Human technology symbiosis, detailing the ways that humans and our technology together form a symbiotic system, and analyzing the principles of good design of such technology that can help this symbiotic system flourish.
- (3) What are the ethical, social and environmental impacts of new technologies? How can we effectively analyze these implications of such developments and use it to inform and shape the direction that humanity takes by developing new technologies?

Because students will come from a variety of disciplinary backgrounds, they will work in interdisciplinary teams on projects as part of modules (1) and (3). Modules (2) and (3) will involve individual projects. Students will also work in pairs to present and lead a class discussion of one of the core readings.

## Assignments:

### Lead Discussants

In addition to regular class participation, one time during the semester you will be paired with another student to form a team that will lead class discussion on a core reading. This does not require a PowerPoint presentation of the material but you are free to do that if you choose.

The purposes of this are first, to develop skill in **organizing and presenting** information and, second, to encourage you to **think deeply** about the material presented in the reading.

A good presentation will achieve three related goals:

The team's role as *Lead Discussants* is to provide an **overview/summary** of the reading's principal conclusions and the argument or evidence for those conclusions. Your team should be comfortable enough with the reading to be able to field any questions that are asked during your discussion.

A good presentation will also **integrate** material across the readings and highlight the reading's relationships with other course readings, questions and issues. (For example, your team might want to note how the weaknesses in the approach presented can be strengthened via an approach from one of the other papers we have read.) Essentially, do your best to show how these papers/approaches complement each other and help us understand a given issue.

Finally, in order to encourage multidisciplinary thinking, your team is to use its own experience and expertise as a way to **generate class discussion**. So the latter portion of your team's discussion should discuss the paper from the context of your domain(s) of interest. Related to this, you are to bring at least two **questions** for your reading that you will use to initiate a class discussion of the paper and its implications. Given the goal of fostering multidisciplinary thinking, your team should use your personal areas of interest as a stepping off point for these questions.

This will be graded on the clarity and focus of the presentation of the reading's structure and argument, on the focus and depth of analysis in the integration of the reading, and on the depth and insight demonstrated in the questions raised for discussion.

### Group Projects

Students will work in multidisciplinary teams on two module projects, (1) to evaluate and assess the design of a piece of technology, and (2) to evaluate the ethical, social and/or environmental impact of a new innovation. Teams will present their preliminary results to the class in a presentation in a way that identifies concerns, asks questions and generates discussion. The final report can take advantage of this class discussion of the topic by incorporating feedback and comments from peers.

## Individual Projects

Students will also work relatively alone on two module projects, (1) a paper on what it means to be human in the context of technology that augments our cognitive and physical abilities, and (2) an analysis of a technological utopia or dystopia, and an interpretation of lessons we can learn from it regarding our relationship with technology and the kinds of technologies we produce.

See the Module descriptions for more details on the group and individual projects.

## Course Policies:

### Communication:

We use the email address in your account at <http://ecommunity.ucf.edu> to communicate with you (e.g. notices about class readings, changes in schedule, etc.). This is usually your knightsmail address. You are expected to check this address regularly, or forward mail to one you do check regularly.

We will also use the Message system within Webcourses for brief messages and announcements.

If you e-mail us, you should include the course title or number in the subject line and your full name at the end of your message. Please also sign your name. It is difficult to respond to messages from unidentified students. Also, to protect your privacy, it is against university policy for us to discuss grades in e-mail messages. If you wish to discuss your grades, please come to office hours or talk to us after class.

### Submission of written work:

Your work should be submitted twice: a printed copy in class, as well as an electronic copy to WebCourses by 11:59 pm on the due date.

### Extensions

Extensions to due dates will be granted only for documentable exceptional circumstances (medical or family emergencies). Anticipated absences are not reasons for extensions (submit it before you leave).

However, if you feel that your circumstances warrant consideration as an exception, discuss this with us as early as possible.

### Late Penalties

Late assignments will be deducted 5% of their potential value per day late (so an assignment worth a maximum of 9/10 points loses 1/2 a point a day; four days late its score will be deducted 2 marks, so it will earn only 7/10. Weekend days count fully.

### Classroom Behavior

Your responsibilities as a student at UCF are outlined in The Golden Rule.  
<http://www.goldenrule.sdes.ucf.edu/>.

If you wish to make a comment during class, raise your hand and wait to be called upon. Please do not interrupt people while they have the floor.

Please do not converse with others during class time. It disturbs those around you who are trying to pay attention to the class.

We expect you to be engaged in class business during class time. If you are not going to give your full attention to what is happening in class, please attend to your business elsewhere.

Turn off phones or set them to vibrate. Do not answer your phone in class. Either leave the call for voice mail (you are busy, after all), or unobtrusively leave the room before you answer it.

## **Plagiarism & Cheating**

Course assignments and quizzes are designed to have educational value; the process of preparing for and completing these exercises will help improve your skills and knowledge. Material you submit is therefore expected to be the result of your own original scholarly efforts.

Plagiarism in short, is presenting another's ideas, arguments, words or images without clear indication of the source and of which parts come from that source, thereby attempting to convey the impression that such work is your own.

Multiple Submissions is submitting the same academic work for credit more than once without the express written permission of the instructor.

Cheating is using unauthorized material, or giving or accepting unauthorized help on assignments or tests. These contradict the educational value of course assignments and quizzes. Students who attempt to obtain unearned academic credentials that do not reflect their skills and knowledge can also undermine the value of the UCF degrees earned by their more honest peers.

We have a responsibility for your education and the value of a UCF degree, and so have a responsibility to discourage and prevent unethical behavior, and to respond to infringements of academic integrity when necessary. Plagiarism is a serious academic offense.

The typical penalty for plagiarism, multiple submissions, or cheating in this course will be a loss of credit for the assignment AND a deduction of one full grade for the course (e.g. a B+ becomes a C+), which may result in a failing grade in the course.

In addition, UCF now uses a Z-Grade to record grades that resulted from academic dishonesty (e.g. ZF or ZC+) on your university transcript. Details of this policy are at <http://integrity.sdes.ucf.edu/zgrade>

Clearly, you would do better to write a weak job honestly than to cheat and get caught.

Perpetrators may also be required to take an academic integrity seminar. Serious cases can lead to academic probation, suspension, expulsion from the University, or the revocation of a degree. <http://www.osc.sdes.ucf.edu/> has more about UCF's Rules of Conduct.

We use [www.TurnItIn.com](http://www.TurnItIn.com) and other methods to make it difficult to plagiarize or cheat and relatively easy to detect attempts to do so. Copies of papers may be retained by TurnItIn.

We hope you will consider plagiarism and cheating to not be worth the risk, and can appreciate that doing the assignments honestly is part of the educational experience that you came to university to have.

## **Accessibility**

Students with permanent or temporary disabilities who would like to discuss the possibility of classroom or exam accommodations are invited to register with Student Accessibility Services <http://sas.sdes.ucf.edu> (407-823-2371)

## Course Modules, Readings and Module Assignments:

### Introduction: Humanity, Technology and Ethics

Designers of new technologies are driven principally by what we can do, and by a vision of what it is possible for us and our technology to become. But there is also a need to consider normative questions of what we should be able to do, and about what we should become.

This introduction gives an overview of the role of technology in human lives, and of the need for designers and users to ask questions about how we should employ new technologies, and about the social and environmental impact of their widespread use, as well as the impact of potential abuses. Concerns about ethics and justice, and in particular about what we want humanity, our world, and our societies to become, need to be prominent when designing technologies.

#### Readings:

Emmanuel Mesthene "The Role of Technology in Society." *Technology and Culture* Vol. 10, No. 4, Oct., 1969 . (Excerpt.)

Manfred Clynes and Nathan Klein "Cyborgs and Space." *Astronautics* September, 1960

Alexis C. Madrigal. "The Man Who First Said 'Cyborg,' 50 Years Later." *The Atlantic*, Sep 30, 2010.

Vannevar Bush. "As We May Think." *The Atlantic*, July 1, 1945

Maria Popova, "As We May Think: A 1945 Essay on Information Overload, "Curation," and Open-Access Science" *Brain Pickings*

<http://www.brainpickings.org/index.php/2012/10/11/as-we-may-think-1945/>

### Module 1: Natural Born Cyborgs?

What does it mean to be human in a technological age? In a sense, humans have always been "cyborgs", at least since we started wearing clothes and using tools. But the combination of plastic human brains and incredibly responsive "smart", well-fitted tools creates opportunities for mergers between humans and technology even more intimate and even more powerful than what has been historically possible. Andy Clark argues that this is simply a "natural" extension of humanity's history of tool use.

But do we have anything to fear or be concerned about in the increasing "cyborgization" of humanity? Is there a sense in which we are losing something important in the process of further merging with new technologies? Are we losing ourselves, our humanity?

#### Module 2 Assignment

A paper arguing for a position on what it means to be "normal" and/or "human" in the context of technology that augments people's cognitive and physical abilities. (20 points)

### Module 2: Human-technology symbionts: design principles for a good relationship

As we design "smarter" machines (or machines that make us smarter?), we need to be aware of principles from psychology, engineering, management and ergonomics that affect how well we are able to work with such machines. In a sense, humans are in a symbiotic relationship with our technology, and it is us and our technology that, as a combined system, are evolving, and are embedded in relationships to our physical and social environments.

Questions arise about who should be in control, about what is required for good decision making and effective action by such human-technology symbionts? How smart should "smart" machines be? How should they interact with their human partners? What assumptions about human users can or should designers of such "smart" tools make?

### **Assignment: Technology design report and presentation:**

Your team will identify and analyze the design of a piece of current human-centered technology, by applying Norman's rules for "Human Designers of 'Smart' Machines" and rules for "Machines to Improve their Interactions with People" (*The Design of Future Things*, p. 193).

Give a 5-10 minute presentation of your preliminary analysis of the ways the system does or does not conform to Norman's rules, in a way that generates discussion about the ways the design could be improved by further incorporating these rules. **(10 Points)**

After this presentation, write a report detailing your analysis of the design and explaining ways the system could be improved or redesigned. This report can take advantage of the class discussion instigated by the group's presentation. **(10 points)**

### **Module 3: "Where are we going? And what are we doing in this handbasket?"**

What are the ethical, political, social and environmental impacts of the new technologies? Is it possible to direct the changes we are making to ourselves and to our worlds by designing and using new technologies?

What are the responsibilities of designers? Of scientists? Of funders of science research and of technology projects? Of policymakers?

What can we learn from artists (novelists, filmmakers, etc) about the prospects for technological utopias and dystopias?

### **Module 3 Group Assignment: Social impact and ethical analysis of technology design:**

Your group will identify and explain a potentially controversial technological innovation, product, policy, program, or other use or misuse of technology (either currently in use or currently proposed).

Present your preliminary evaluation to the class (10 minutes) in a way that can generate class discussion about the technology, its social, ethical and environmental implications, potential for misuse, and guidelines for responsible design and use. **(10 Points)**.

You can utilize this class discussion in creating your written report. The report should do both of the following (1) identify and evaluate the technology's potential ethical, social and/or environmental implications. (2) make and justify recommendations about safeguards, policies or design modifications that might make it more responsible **(15 points)**

### **Module 3 Individual assignment: Analysis of literary or artistic depiction of a technology-sourced utopia or dystopia:**

Identify and analyze a piece of literature (novel, film, short story, poem, video game, or other artistic work) that comments on a vision of utopia or dystopia (or both) caused in part by the further development of technology.

In 1000 words or so, describe the role of technology in the world depicted and defend an interpretation of the lessons we can draw from it. What relationship(s) do people have with technology in this world? What do you think we should learn from this depiction about the future(s) created by our design of technology? **(10 points)**

- For topic suggestions, see lists of utopian and dystopian literature, such as Luke Mastin's list (<http://www.lukemastin.com/utopia/>), or Wikipedia's [list of dystopian literature](#).

### **Fiction on Utopia and Dystopia:**

- E. M. Forster "The Machine Stops"

- Iain M. Banks "The State of the Art"