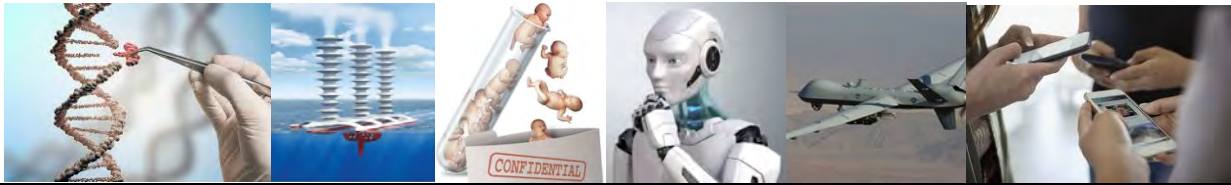


**CSCI 291/EGEN 291/LSCI 291/PHL 291
TECHNOLOGY, ETHICS & SOCIETY
SPRING 2020**



Primary Instructor: Kristen Intemann (History & Philosophy) kristen.intemann@montana.edu

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Office Hours: 1:30-3:00 Tuesdays & Thursdays

Co-Instructors:

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COURSE DESCRIPTION

Emerging technologies are new rapidly developing technologies that have the potential to significantly change and impact our quality or way of life. Such technologies often hold tremendous potential for addressing pressing social problems, but they may involve risks, uncertainties, unforeseen consequences, and can impact some social groups negatively. This discussion-based course will examine ethical issues in the development, testing, and implementation of emerging technologies. Students will learn about a variety of different technologies and their potential applications, including current research being done at MSU. These will include CRISPR, synthetic biology, reproductive technologies, food technologies, geoengineering, artificial intelligence and autonomous systems, robotics, the internet of things (e.g. smart cities), social media, and other information technologies. We will consider: 1) What are the potential benefits and risks of such technology? 2) How are the risks and benefits of technologies distributed? 3) How do technologies *change* us (as individuals and as a society)? 4) What ethical principles, codes of conduct, or regulatory policies should guide the design, development, testing and implementation of emerging technologies?

LEARNING OUTCOMES:

- Understand a variety of technologies and their applications.
- Identify ethical issues in relation to particular technologies.
- Analyze and evaluate how technologies can influence (create, reinforce, exacerbate, or alleviate) social inequalities, especially for marginalized communities.
- Construct arguments ethically evaluating technologies.
- Understand the professional and ethical responsibilities of engineers and scientists in technology research and design.
- Develop practical responses to the ethical challenges relating to technologies from different disciplinary perspectives.
- Ability to work as part of an interdisciplinary team to produce a final research product.

DESIRE 2 LEARN: The D2L page for this course can be found at: <https://ecat.montana.edu/>. Log in using your NetID and password. You will be able to access course materials, electronic readings, handouts, and your grades.

REQUIRED READINGS: All readings will be electronically available on D2L and will be posted under the week for which they are assigned under the “content” link on D2L.

COURSE REQUIREMENTS

Your work in this course will be assessed by three main things:

- Participation (15% of your final grade)
- Weekly Assignments (50% total, each assignment is 5% of your final grade)
- Final group project (35%)

Participation (15%): Everyone is expected to come to class having done the assigned readings, and to participate in class discussion. You can earn participation points in large group discussions, small group discussions or activities. Attending class regularly is necessary, but not sufficient, for participation points.

Weekly Assignments (50% total, 5% each): Each week you will have an assignment. Often these will be short (approximately 500 words) reflection papers that articulates your response to and understanding of our readings and discussions. In some cases, weekly assignments will be combined to result in a bigger project (such as a presentation or video).

Final Group Projects (35% total): For your final project, you will focus on a particular kind of technology (and students will be put into interdisciplinary groups based on your preferences). As a group, **you will create a poster about your project that you will present at the Engineering Design Fair on the last Thursday of class.** You will have a lot of freedom in choosing a focus for your final project, but your project should focus a particular **ethical issue** with respect to technology (e.g., privacy and the internet), or you might focus on a particular **design problem** (how to make a more sustainable material, how to address algorithm bias, or how to fix a design so as to make it more universally accessible), or an **outreach/education issue** (educating the public about important social/ethical impacts of a particular technology and how they might protect themselves). More detailed instructions and guidelines will be handed out in class. You will be given some in-class time to organize, discuss, and work on your projects, but you will likely need to spend some time outside of class to also work with group members. Your final project grade will consist in a score for your individual contribution, a score for your overall group project, peer-evaluations, and a self-evaluation.

GRADING: Your final grade will be determined by the percentage of points you earn out of 500 (the total points possible for the course). I will use the scale below in assigning final grades. I may also adjust an individual's grade for improvement.

94-100% = A	89-86% = B+	75-72% = C	68-66 = D+
93-90% = A-	85-82 = B	78-76% = C+	65-63 = D
	81-79% = B-	71-69 = C-	62-60 = D-
			Below 59 = F

ABSENCES, LATE/MAKE-UP WORK: Make-up exams or presentations will only be granted under exceptional circumstances. Absences for illness, or the serious illness or death of an immediate family member may be excused with my advance approval. Please talk to me as soon as possible if you know that you will be missing a class. **Unexcused late papers will be penalized.**

ACADEMIC MISCONDUCT: Work for this course must be completed by the person submitting it. This includes papers, journal entries, presentations, and any other work submitted for credit. Anyone

found guilty of plagiarism, cheating, forgery, falsification, or other forms of academic dishonesty will **fail the course**. In addition, the incident will be reported to the Office of Student Affairs. You are expected to be familiar with the University's academic misconduct policy, which can be found at http://www2.montana.edu/policy/student_conduct. Read the policy as well as examples including:

- **Collaboration: Unless otherwise specified**, students may not collaborate on graded material. Any exceptions to this policy will be stated explicitly for individual assignments. If you have any questions about the limits of collaboration, you are expected to ask for clarification.
- **Plagiarism:** Paraphrasing or quoting another's work without citing the source is a form of academic misconduct. Even inadvertent or unintentional misuse or appropriation of another's work (such as relying heavily on source material that is not expressly acknowledged) is considered plagiarism. If you have any questions about using and citing sources, you are expected to ask for clarification

LEARNING ENVIRONMENT: This classroom is a place where you will be treated with respect and will be expected to treat others with respect. I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of this class (see below).

CLASSROOM BEHAVIORAL EXPECTATIONS:

- Come to class on time.
- Turn off and put away all electronic devices. If you have a documented disability that requires use of some electronic device, please talk to me about it.
- Be respectful of others. Do not talk to your classmates during class. Do not use your phone during class. Some of the material for this course will be controversial and it is likely that you will strongly disagree with an author or a classmate. Disagreement is important and valuable! It allows us to develop critical thinking skills, helps us understand why we believe what we do, and increases our appreciation of why others hold different views. You are encouraged to express your views and disagreements. We also want to make sure that the way in which disagreements are expressed is respectful. Make sure you are criticizing an *argument*, rather than attacking the *person* who makes that argument.

ACADEMIC ACCOMODATIONS: Any student eligible for and needing academic accommodations because of a disability is requested to speak to me as soon as possible. If you suspect that you have a disability, contact Disabled Student Services at: (406) 994-2824 (voice), (406) 994-6701 (TTY), or on the web at: <http://www.montana.edu/wwwres/disability/index.shtml>.

291: TECHNOLOGY, ETHICS & SOCIETY
TENTATIVE COURSE SCHEDULE, TOPICS, READINGS, AND ASSIGNMENTS
 (Reading assignments and due dates may change – any changes will be announced in class)

DATE	TOPIC, READINGS, ASSIGNMENTS
WEEK 1	Introduction to Ethics and Emerging Technologies (Prof. Intemann)
Jan. 14	Course Syllabus; Identifying central ethical concerns raised by technology and introduction to ethical frameworks used in assessing them
Jan. 16	Ron Sandler, "Introduction: Technology and Ethics"
WEEK 2	Identifying Ethical Issues and Analyzing Case Studies (Prof. Cummings)
Jan. 21	In class exercises from <i>Ethics in the Information Age</i> , 7 th edition by Quinn and from <i>Ethics in a Computing Culture</i> , by Brinkman and Sanders (handout)
Jan. 23	Megan Molteni, " The Wired Guide to CRISPR " Prof. Blake Wiedenheft on the Science and Potential Applications of CRISPR
WEEK 3	Examining Biotechnologies: Gene Therapy vs. Enhancement, Equity and Access (Prof. Intemann)
Jan. 28	Eduardo Rodriguez, "The Ethics of CRISPR/Cas9" "Editing Our Evolution" (handout/group activity)
Jan. 30	Julian Savelescu, "Procreative Beneficence: Why We Should Have the Best Children" Inmaculada De Melo-Martin, "A Reply to Savelescu"
WEEK 4	Synthetic Biology, Nanotechnology, and Risk Assessment (Prof. Intemann)
Feb. 4	Jacob Sherklow and Henry Greeley, "What if extinction is not forever?" Amy Gutman, "The Ethics of Synthetic Biology: <i>Guiding Principles for Emerging Technologies</i> " Markus Schmidt, "Diffusion of synthetic biology: A challenge to biosafety"
Feb. 6	Kevin Elliott, "Risk, Precaution, and Nanotechnology" 5:30 pm Kate Brown talk at the Museum of the Rockies on Chernobyl and Nuclear Safety
WEEK 5	Technology & Environment: Energy, Agriculture, Water (Prof. LaMeres)
Feb. 11	Paul Gannon, Ch. 1 "Human Society and Ecological Footprint" United Nations Report, " Water, Food, and Energy "

Feb. 13	Paul Gannon, Ch. 9 “Food and Water” & Ch. 10 “Sustainability and Global Society”
WEEK 6	Tech, Society & Environment: Energy, Quality of Life, Pollution (Prof. LaMeres)
Feb. 18	Phillip Cafaro, “Avoiding Catastrophic Climate Change: Why Technological Innovation is Necessary, But Not Sufficient”
Feb. 20	Clive Hamilton, “Ethical Anxieties about Geoengineering”
WEEK 7	Social Responsibility in Engineering Decision Making (Prof. LaMeres)
Feb. 25	Donna Riley, “Engineering and Social Justice” Craig Woolard (Civil Engineering) talk on Challenges and Opportunities in Public Infrastructure, 4:30pm in Barnard 108
Feb. 27	Donna Riley, “Engineering and Social Justice” (Cont.)
WEEK 8	Computing Ethics: Artificial Intelligence and Algorithmic Bias (Prof. Cummings)
Mar. 3	James Vincent, “What Counts as Artificially Intelligent? AI and Deep Learning Explained” Nick Bostrom and Eliezer Yudowsky, “Ethics of AI”
Mar. 5	TechGuru, “Top 8 Ways that Facial Recognition Software is Used Today” Ted Talk by Joy Boulamwini. “How I’m Fighting Bias in Algorithms” Joy Boulamwini, “AI, Ain’t I a Woman?” Michelle Flenniken (Plant Pathology & Plant Sciences) talk on “The Buzz About Honey Bees” at 4:30pm (room TBA)
WEEK 9	More on AI: GPS, Autonomous Cars, Drones, Quantum Computing (Prof. Cummings)
Mar. 10	Brian Luftkin, “Why the Biggest Challenge Facing AI is an Ethical One” Julia Bossman, “Top 9 Ethical Issues in AI”
Mar. 12	Patrick Lin, The Ethics of Autonomous Cars” Caroline Lester, “A Study on Driverless Car Ethics Offers a Troubling Look into Our Values”
WEEK 10	NO CLASSES – SPRING BREAK March 16-20th
WEEK 11	Computing Ethics: Trust, Safety and Reliability (Prof. Cummings)
Mar. 24	Jamie Lynch, “The Worst Computer Bugs in History: The Ariane 5 Disaster” Desire Athow, “Pentium FDIV: The Processor Bug that Shook the World” Adam Fabio, “Killed by a Machine: The Therac-25”
Mar. 26	NCUR 2020 – NO CLASS

WEEK 12	Information Technologies Ethics: Power, Privacy and Surveillance (Profs. Mannheimer and Young)
Mar. 31	Yochai Benkler, Degrees of Freedom, Dimensions of Power Chris Lydgate and Nick Budnik, "RUBBISH! Portland's top brass said it was okay to swipe your garbage, so we grabbed theirs"
Apr. 2	Jacob Metcalf, "Ethics Codes: History, Context, and Challenges" Association for Internet Researchers, "Charting Ethical Questions by Data and Type"
WEEK 13	Privacy & Social Inequality (Profs. Mannheimer and Young)
Apr. 7	Bitch Media, Podcast Episode: " The Future of Privacy " Sam Adler-Bell: "Privacy for Whom?" Ciara Byrne, "Trading Privacy for Survival is Another Tax on the Poor" Erin McCormick, "Big Brother on Wheels? Fired Security Robot Divides Homeless People"
Apr. 9	Ted Talk by Safiya Noble, " Challenging Algorithms of Oppression " Kerry Rodden, "Is That a Boy or a Girl? Exploring a Neural Network's Construction of Gender" Al Jazeera, "Surveilling Black Lives Matter"
WEEK 14	Social Media (Profs. Mannheimer and Young)
Apr. 14	Hear Me Too Podcast, Episode 6: Not Safe Online
Apr. 16	John Lanchester, "You Are the Product"
WEEK 15	Diversity and Inclusivity in STEM; Universal Design (Prof. Intemann)
Apr. 21	Intemann, "Why Diversity Matters" IFL Science, "This Viral Video of a Racist Soap Dispenser Reveals a Much, Much Bigger Problem" Laura Stanley (Computer Science) talk on "Virtual Immersion Technology in Fighting Opioid Addiction," April 21 at 4:30pm (room TBA)
Apr. 23	WORK ON FINAL PROJECTS
WEEK 16	FINAL GROUP PROJECTS (Prof. Intemann)
Apr. 28	WORK ON FINAL PROJECTS
Apr. 30	ENGINEERING DESIGN FAIR PRESENTATIONS