

Repository Entry for CS 189
Embedded EthiCS @ Harvard Teaching Lab
Kate Vredenburgh

NOTE: this module should be labeled as “under development.”

<u>Overview</u>	
Course: CS 189: Autonomous Robot Systems	
Course Level: Upper-level undergraduate	
Course Description: “Building autonomous robotic systems requires making <i>Robots that Observe, Reason, and Act</i> . How does a robot make sense of the world from raw and noisy sensor inputs? How does it control its actions reliably and recover from failures? When does it need to reason about the world and when can it just react? How does it balance short-term problems versus long-term goals? How does it operate in a world where others (human and robots) exist? And how do we program a robot to achieve all these things? The goal of creating a robot is the goal of creating Embodied Artificial Intelligence . In this class we will study methodologies for achieving embodied AI through a hands-on and ground up approach of programming your own.” ²	
Module Topic: Robots and work	
Module Author: Kate Vredenburgh	
Semesters Taught: Spring 2018, Spring 2019	
Tags: libertarianism [phil]; liberalism [phil]; value [phil]; work [phil]; robotics [CS]; automation [CS]	
Module Overview: In this module, we consider the ethics of the increasing introduction of robots into the workplace. Robots play an increasingly important role in the workplace, a trend that is expected to continue. The increasing automation of tasks in the workplace raises ethical and political questions, both about the changing nature of the workplace and about the societal impacts of this increase in automation. This module examines ethical questions around the changing nature of the workplace. In particular, it examines the following three ethical questions: <ol style="list-style-type: none">1. Why is work valuable for workers?2. Are employers obligated to provide their employees with valuable work?3. How should employers design a workplace with robots, in light of the answers to questions (1) and (2)?	

² From the 2018 Course Syllabus.

<p>Connection to Course Technical Material: This module occurs near the end of the course. This allows students to bring the knowledge they have acquired about what kinds of tasks robots are good and bad at (given the state of modern robotics) to questions about how to design robot-including workplaces that provide valuable work to humans.</p>	
<p><u>Goals</u></p>	
<p>Module Goals:</p> <ul style="list-style-type: none"> ● Introduce students to examples of how advances in robotics have changed the nature of work. ● Have students apply material from earlier parts of the course to re-design a workplace that is valuable for workers and include robots. ● Introduce students to two philosophical theories of justice, libertarianism and liberalism. ● Give students practice applying these theories to the question of whether employers are obligated to provide meaningful work. 	
<p>Key Philosophical Questions:</p> <ol style="list-style-type: none"> 1. Why is work valuable for workers? 2. Do employers have an obligation to provide valuable work for workers? 	
<p><u>Materials</u></p> <ul style="list-style-type: none"> ● <u>Gheaus and Herzog (2016), “The good of work other than money,”</u> excerpts. ● <u>Kymlicka (1990), <i>Contemporary Political Philosophy</i>,</u> excerpts on Rawls’s project and on libertarianism. ● <u>Wiseman (1999), <i>Belfast, Maine</i>,</u> excerpts [documentary film]. ● <u>Wingfield (2017), “As Amazon pushes forward with robots, workers find new roles,” <i>New York Times</i></u> (https://www.nytimes.com/2017/09/10/technology/amazon-robots-workers.html). 	<p>Students are asked to read or watch all these materials before class. The first two provide philosophical background for the class, and the third and fourth provide factual background for the class.</p>
<p>Key Philosophical Concepts:</p> <ul style="list-style-type: none"> ● Libertarianism ● Liberalism ● Value ● Obligation 	
<p><u>Implementation</u></p>	

<p>Class Agenda:</p> <ol style="list-style-type: none"> 1. Robots in the workplace: history and key ethical issues. 2. Which workplace tasks are currently easy/hard to automate? 3. The value of work. 4. Active learning activity: how might an employer use robots to change the workplace to reflect the values just discussed? 5. Are employers obligated to provide valuable work to workers? 6. Nozickian libertarianism and Rawlsian liberalism, and implications for the obligations of employers. 7. Active learning exercise: (1) identify inequalities in the value of work; and (2) use Rawls' theory to say whether those inequalities are just or unjust. 	<p>Depending on time and instructor preference, the class can end at step 4.</p>
<p>Sample Class Activity:</p> <p>Students are shown a promotional video for Spyce, a local Boston restaurant that uses robots in food preparation. After watching the video, they are asked to discuss the following questions in small groups, followed by a full-class debrief:</p> <ol style="list-style-type: none"> 1. What goods of work does Spyce realize for those who work for Spyce, and to what extent does it realize those goods? 2. Pick one of the goods you listed above and propose one technological and one non-technological intervention to improve the realization of that good. 	