

# INTRODUCTION TO THE PHILOSOPHY OF TECHNOLOGY

PHIL107.001 • Spring 2014 • TR 2.30–3.45PM • 169 Willard Bldg

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## COURSE DESCRIPTION

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Technologies are ubiquitous and play a pervasive role in our culture, in the decisions we make, in our social relationships, in our health, in our safety, in conflict resolution, in the careers we pursue, in the way we work, play, and live. Given their omnipresence and the pervasive role that they play in our lives, part of what it means to be human is to be a user of technology. Gaining a clearer and more articulated understanding of the metaphysical, moral, and social-political implications of technologies thus allows for a more considered view of our place in the world and progress of human civilization (scientifically, ethically, and socially).

This course is divided into three units and considers technologies from three different perspectives. **Unit I** investigates the meaning, social understanding of, and various ethical implications of technology in the 20<sup>th</sup> and 21<sup>st</sup> century. To this end, we will start with several questions about technology: (1) What is technology? Can we define it? (2) Is technology autonomous? Does it control us? (3) Do we control technology? Or, are the consequences, to some degree, out of our control? (4) How do we understand the development of technology? (5) Do technologies make our lives easier by allowing us to work more efficiently or are we simply asked to do *more* work as they allow us to do more work? (6) Who (if anyone) should select *which* technologies disseminate through society? In discussing these questions, we will read David Nye's (a historian) *Technology Matters: Questions to Live With*.

**Unit II** turns to *unintended consequences, risks, and accidents* associated with technology use. The development and use of technologies carry with them new (and potentially more dangerous) risks. Can we anticipate all of the risks associated with a technology before we start using it? What is the nature of risk and accident? Are all accidents the result of operator error (e.g. people using technologies incorrectly) *or* are some accidents unavoidable? If they are unavoidable, is there a way to brace for the unexpected? What sorts of ethical responsibilities do technological innovators have for the technologies they designed? Are there some technologies that produce risks so great that it is better to avoid using them altogether? How do we minimize risk in a world with dangerous technologies, e.g. nuclear weapons? In discussing these questions, we will read Charles Perrow's (a sociologist) *Normal Accidents: Living with High-Risk Technologies*.

Finally, **Unit III** turns to technologies involved in *human enhancement*. Emerging biomedical technologies allow not only for the possibility of *repairing* degraded body parts or *replacing* those that have been lost, but also to make humans stronger, faster, smarter, and more durable. What does it mean to *enhance* a human being? Is there a way to distinguish between *enhancement* and *rehabilitation / repair / neutral modification*? What are the ethical and social challenges that these sorts of technologies pose? Is there any way to control the development and uptake of these technologies or is there some technological push (or internal drive) that makes the use of these technologies inevitable? What does all of this say about what it means to be human? In discussing these questions, we will read Allen Buchanan's (a philosopher) *Beyond Humanity? The Ethics of Biomedical Enhancement* and several related articles on human enhancement.

## COURSE OVERVIEW

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### REQUIRED TEXTS

1. Nye, David. 2007. *Technology Matters: Questions to Live With*. Cambridge, MA: The MIT Press.
2. Perrow, Charles. 1999. *Normal Accidents: Living with High-Risk Technologies*. Princeton, NJ: Princeton University Press.
3. Buchanan, Allen E. 2011. *Beyond Humanity? The Ethics of Biomedical Enhancement*. New York: Oxford University Press.

## COURSE OBJECTIVES

- **Philosophy of Technology Content:** Students will learn several key ideas in the philosophy of technology, e.g. what is technology, what sort of relationship do humans have technology, what types of effects does society have on society, what does technology say about what it means to be human, how can we manage risky or dangerous technology, etc.
- **Critical Reading, Thinking, & Reasoning Skills:** Students will read texts in the philosophy of technology and bioethics critically by assessing the quality of arguments in terms of their validity, strength, cogency, soundness, etc.
- **Dialogue & Oral Expression:** As some issues in the philosophy of technology tend to be controversial and emotionally charged, students will develop their ability to engage in respectful conversation with others. Students will thus be encouraged to formulate their views on philosophy of technology issues by providing reasons for their position and criticizing alternatives by objecting to the *arguments* supporting these positions.
- **Articulation & Writing Skills:** Students will develop the capacity to respond to various arguments concerning the philosophy of technology in a rigorous and articulate way. They will learn how to summarize issues in the philosophy of technology in a succinct, charitable, and illustrative way and learn how to critical respond to arguments by raising objections and supporting their views with reasons.

## COURSE POLICIES

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### ACADEMIC MISCONDUCT

The general principles and policy relating to cheating and plagiarism, which are enforced in this class, can be found in the Penn State policy on academic misconduct. *Academic Integrity:* Academic dishonesty encompasses a wide range of activities, whether intentional or unintentional, that includes, but is not limited to: all forms of fraud, plagiarism, and any failure to cite explicitly all materials and sources used in one's work. Sanctions for these activities include, but are not limited to, failure in a course, removal from the degree program, failure in a course with an explanation in the permanent transcript of the cause for failure, suspension, and expulsion. If you are unclear about whether you or someone you know is engaging in academic misconduct, read the following: [University Statement on Academic Integrity](#). For more information, see [PSU Academic Integrity](#), [PSU ITS, Plagiarism Tutor](#), [Turnitin](#), [PSU Teaching & Learning with Technology](#)

### GRADE ROUNDING

Grades will be rounded up from the *second* decimal point, e.g. 90.95 rounds up to 91.0 while 90.94 rounds down to 90.90. In the event that eLION does not allow for a particular grade (e.g. D+), you will simply be given the letter grade (e.g. if you have a D+ then you will receive a D, and if you have a C-, you will receive a C).

A: 91–100%;	C+: 79.0–79.9	<a href="#">INCOMPLETE</a>
A–: 90.0–90.9	C: 70.0–78.9	<a href="#">DROP</a>
B+: 89.0–89.9	D: 60.0–69.9	
B: 81.0–88.9	F: 0–59.9	
B–: 80–80.9		

### LATE WORK

If you are planning on submitting an assignment late, you will need to clear this with the instructor *before* the day and time of the test. If the instructor is not informed that you will be taking the test late, a grade reduction of one letter grade is incurred for every day the test is late. So if the due date is Tuesday at 3PM and you email me on Tuesday at 3.01PM you will lose a letter grade. You will not lose an additional letter grade until 3.01PM the next day (i.e. Wednesday).

### ACCESSIBILITY STATEMENT & FURTHER STUDENT GUIDANCE

Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at: <http://equity.psu.edu/ods/>.

In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at <http://equity.psu.edu/ods/guidelines/documentation-guidelines>). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this

letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.

If you are in need of psychological counseling, please do not hesitate to contact Penn State's [Counseling & Psychological Services](#) (phone: 814-863-0395). For any problem related to your studies, university policies and procedures, do not hesitate to seek the help of the [Student Affairs Services](#), your Academic Advisor, or arrange a meeting with your instructor who will help you obtain assistance through one of the above, or another, agency.

### **USE OF ANGEL AND EMAIL COMMUNICATION**

Please check the webpage on the [ANGEL](#) website regularly. An online version of the syllabus is available there, and you will be notified of any cancellation of a course meeting there. If you need to contact me, send a well-constructed email to my email address with an appropriate subject line (e.g. P120 Question) and with an appropriate address (e.g. "Dear David"). Failure to do either, or emailing me with multiple links attached ("check this youtube link") will result in your instructor deleting your email. Students are responsible for activity on their computer accounts so only send emails pertinent to the course. Also, please do not send correspondence from cellular telephones (e.g. Blackberries, etc.).

### **DROP PROCEDURES, & INCOMPLETES**

Students who simply stop attending class, for whatever reason, without officially withdrawing from the course, will receive the grade of F. If you expect a refund, be aware that the date the withdrawal form is processed by Penn State registrar's office determines the amount of refund. Consult the Register site for [drop procedures](#). Consult the Handbook for taking an [Incomplete \(D/F\)](#). Before considering dropping the course or taking an incomplete, you might consider getting additional help: [Information Literacy Tutorial](#), [University Learning Center](#), [Writing Center](#)

### **CLASSROOM ENVIRONMENT**

A number of factors figure into creating a healthy classroom environment. In order to facilitate such an environment, I ask you to obey the following: (1) the use of cell phones in any capacity is prohibited (please turn ringers/buzzers off, no text-messaging during class), (2) please do not begin to 'pack up' your belongings before your instructor has *explicitly* dismissed you, (3) please come to class rested, sleeping in class is strictly prohibited, (4) please do not do other work in class. If you are incapable of performing (1)–(4) or are disruptive in class, you will kindly be asked to leave the classroom.

### **CHALLENGE EXAMINATION**

For some courses, students may request a [challenge examination](#) as a substitute for completing the usual requirements of a course. If the examination is successfully completed the credits received are described as "credits by examination" ([policy 42-50](#)).

## COURSE WORK

1. Attendance and Participation (10%)
2. Three Exams (10% each, 30% total)
3. Two Short Papers (5% each, 10% total)
4. A Medium-Length Paper on Issues Concerning Risk & Accidents (20%)
5. Argumentative Paper (30% total)

### 1. ATTENDANCE AND PARTICIPATION

Regular attendance and participation is strongly linked to success in this course. Since the course is a combination of lecture and seminar format, regular and active participation is required. Although it is not essential that you have *mastered* the text, you are expected to have read the assignment *before* attending class and have made notes in your text near passages, terms, or arguments you think are important. In addition, answering the reading questions before attending class is helpful preparation.

**Attendance** is assessed through the use of *Attendance Sheets* distributed periodically throughout the semester. Missing class without notifying your instructor in advance will result in the loss of one percentage point. If you plan on missing class, please email your instructor *before class* to let him know that you will not be able to attend.

**Participation** is assessed by using a variety of factors, including (but not limited to): the quality of your questions and answers, respectful dialogue with your classmates and instructor, your willingness to participate in class exercises, etc. Participation is not formally factored into your grade. However, in the case of borderline grades (A-/B+, B+/B etc.) there can be fine tuning based on your participation. *Excellent participation* throughout the semester can raise your grade (at most) one percentage point of the next highest grade (e.g. 79 to 80 not 78 to 80) while *moderate participation* can improve your grade half a percentage point (e.g. 79.5 to 80).

### 2. THREE EXAMS

There will be three exams in this course. These exams will cover *basic* information covered in the readings. A preliminary set of possible exam questions will be distributed via ANGEL before we begin each unit with a final list of exam questions distributed one week before each exam. This list of exam questions is **exhaustive** and so reviewing these questions *before* taking the exam will be an important step in preparing for the exam. The format of each of the exams is 20-25 multiple-choice / true-false questions with some short answer questions

### 3. TWO SHORT PAPERS

You are asked to write **two** short response papers to the readings in Unit I. **One of these must be Chapter 3 and the other is any of the chapters we cover in class.** The paper should be at least **750 words** and should consist of the following: (i) a brief summary of an argument or objection found in the reading that includes an explanation of key terms, (ii) your reaction to the argument or objection that includes (ii.a) citing reasons for your position and (ii.b) addressing any reasons that compelling counter-arguments to your view.

In some more detail, you will write on **two** of the questions considered in David Nye's *Technology Matters*.

Your goal is to (1) articulate the central question of the chapter, (2) clearly summarize at least one response / answer Nye gives to this question, and (3) go beyond this analysis by (3.1) stating whether you agree / disagree with Nye's position, (3.2) providing supporting reasons for your view, and (3.3) considering how some technology (or movie concerning technology) bears on the question. In addressing (3.3), you might choose some technology / movie Nye either does not consider or one he only considers in passing. In doing this, you should describe this technology in detail (what it's made of, what it's used for, who uses it, etc.), and explain how it bears on issue.

- In choosing a technology, try to pick a somewhat specific technology rather than something too broad, e.g. the transmission electron microscope, high-energy particle telescopes, a solid-state laser, the da Vinci surgical system
- In choosing a movie, you might consider ones that bear on *Virtual Reality*, *Artificial Intelligence*, *Video Game* (The Matrix; Side by Side; Avalon; A.I.: Artificial Intelligence; Tron; Dark City; Brazil; 2001: A Space Odyssey; Minority Report; 2010: the Year We Make Contact; Electric Dreams; The Terminator; Bicentennial Man; Nirvana), *Military or Chemical Weapons* (Fog of War; Resident Evil; Come and See; Dr. Strangelove; Fat Man and Little Boy), *Medicine*, *Cloning*,

*Experimentation* (Re-Animator; Blueprint), *Technological Development* (Side-By-Side), *Economic Health Care Issues* (Elysium), *Nuclear Power* (The China Syndrome), *Brain Computer Interface* (eXistenZ; Strange Days)

**Due Date:** These essays are due *in class* the day we cover the question considered by David Nye.

## 4. THE MEDIUM-LENGTH RESPONSE PAPER

You are asked to respond to an argument/objection in Charles Perrow's *Normal Accidents* (in considering an argument/objection, it may be helpful to consider Chapter 3 of David Nye's *Technology Matters*, but this is not necessary).

The paper should be at least **1500 words** and should consist of the following:

- (1) a clear *articulation* of an argument / objection found Perrow's *Normal Accidents* that includes an explanation of key terms, (2) your *reaction* to the argument / objection that includes
  - (2.1) a clearly stated thesis (e.g. rejecting a premise in the argument or arguing against some objection raised by Perrow)
  - (2.2) at least two clearly stated reasons that support your thesis, and
  - (2.3) a consideration of any compelling counter-arguments to your view
- (3) a consideration of how some technology (or movie concerning technology) that Perrow does not consider in the chapter bears on Perrow's position. In addressing (3), you should choose some technology / movie Perrow does not consider, describe this technology in detail (what it's made of, what it's used for, who uses it, etc.), and explain how it bears on Perrow position. Some things to keep in mind in trying to *go beyond* what Perrow says:
  - You could pick a technology and do some research about its creation / invention. Identify *who* invented that technology and try to determine (the best you can) for what purpose it was invented.
  - In addition, you might try to describe your technology in more detail than he does, e.g. who invented it, what does it do, who uses it, does it have any non-standard uses? And, then try to identify some unintended consequences of the technology.
- (4) a short introduction and conclusion

### THE RESPONSE PAPER: A STEP-BY-STEP APPROACH

**Step 1** Choose an argument, topic, objection raised in the reading

**Step 2** Give a brief summary of the topic, argument, or objection. Make sure you summarize the item in your own words and create an original example that helps clarify your point. In summarizing the item, it is helpful to keep a couple key questions in mind:

Q1. What previous pieces of information do I need to know in order to understand the argument or objection? For example, if you summarize an objection, your reader needs to know what position it is an objection to?

Q2. Would my summary give a clear idea to a moderately intelligent stranger who has never read any philosophy?

Q3. Have I defined all of the technical terms?

**Step 3** Respond to the argument / objection that you have summarized by (i) stating where you stand in relation to the argument / objection (agree or disagree) AND (ii) giving reasons for your view on the matter is correct. Here are some helpful questions to consider:

Q1. Do you agree or disagree with the position put forward in your summary?

Q2. Why do you agree or disagree with that position?

Q3. What are some reasons that would support your view AND convince an intelligent but open-minded individual who hasn't made his/her mind up on the issue?

**Step 4** Proofread your paper and make sure of the following: (i) it is 1500 words and (ii) your name is on the paper.

**Step 5** Once you have completed this paper, you will need to submit your paper in class.

### **WHAT IS NOT REQUIRED FOR THE PAPER**

It is not necessary that your paper have a reference page unless you cite sources beyond those used in class. If you do cite or use some part of text, be sure to indicate where you are drawing from, e.g. Rachels (p.54) thinks X. If you cite works external to those used in class, you will need to create a reference page (or bibliography). This is an alphabetized list (by author's last name) that contains the following pieces of information:

1. the author's name (last, first)
2. the title of the article/book
3. the year in which the article or book was published
4. for books: the place in which the book was published and the book's publisher (you can find this on the inside flap)
5. for articles: the journal in which the article was published, along with its volume number, issue number, and page numbers.

Husak, Douglas N. 2002. *Legalize This! The Case for Decriminalizing Drugs*. London: Verso.

Fraleigh, W.P. 1984. Performance-Enhancing Drugs in Sport: The Ethical Issue. *Journal of the Philosophy of Sport* 11:23-29.

# THE MID-LENGTH PAPER CHECK SHEET / RUBRIC

<b>Summary 30%:</b> Did you clearly, accurately, and concisely summarize an argument, issue, or objection?	
	(1) a clear <i>articulation</i> of an argument / objection found Perrow's <i>Normal Accidents</i> that includes an explanation of key terms, (2) your <i>reaction</i> to the argument / objection that includes
<b>Reaction 40%:</b> Is your reaction supported by reasons that a somewhat intelligent but impartial reader would accept?	
	(2.1) a clearly stated thesis (e.g. rejecting a premise in the argument or arguing against some objection raised by Perrow)
	(2.2) at least two clearly stated reasons that support your thesis, and
	(2.3) a consideration of any compelling counter-arguments to your view
<b>Going Beyond 10%:</b> Does the paper go beyond the text in a significant way by drawing upon some example not considered by Perrow? Does the discussion go beyond the text in a rigorous way (i.e. not simply relying upon common sense)?	
	(3) a consideration of how some technology (or movie concerning technology) that Perrow does <b>not</b> consider in the chapter bears on Perrow's position. In addressing (3), you should choose some technology / movie Perrow does not consider, describe this technology in detail (what it's made of, what it's used for, who uses it, etc.), and explain how it bears on Perrow position. Some things to keep in mind in trying to <i>go beyond</i> what Perrow says:  You could pick a technology and do some research about its creation / invention. Identify <i>who</i> invented that technology and try to determine (the best you can) for what purpose it was invented.  In addition, you might try to describe your technology in more detail than he does, e.g. who invented it, what does it do, who uses it, does it have any non-standard uses? And, then try to identify some unintended consequences of the technology.
<b>Mechanics and Length 15%:</b> Is your paper organized? Is it the required length? Does it contain an introduction and conclusion?	
	(4) a short introduction and conclusion. Your introduction should lay out the general plan for your paper and state your thesis. Your conclusion should wrap things up by restating your thesis and indicating the two reasons you gave in support of that thesis.
<b>Professional Submission 5%:</b> Is your paper stapled, typed, and professional-looking	

## 5. THE ARGUMENTATIVE PAPER

You are asked to write a paper on some issue considered in Allen Buchanan's *Beyond* David Nye's *Technology Matters* (chapters 4 and 10 may be helpful) and some aspect of Charles Perrow's *Normal Accidents* (earlier readings on PEDs may be helpful too!). In your argumentative paper, you will **argue for a position relating to the issue of human enhancement**.

Your goal is to argue for a position on the topic of human enhancement. The paper should be **2,500 words** and ideally should have the following components: (i) a brief introduction that introduces the topic of your paper and the thesis you will be arguing, (ii) a presentation of a single argument in *Beyond Humanity* that includes an explanation of key terms, (iii) whether you disagree / agree with the position and or argument, (iv) an argument that supports your position, one that (iv.a) cites reasons for your position and (iv.b) addresses any reasons and compelling counter-arguments to your view.

### TWELVE STEPS TO THE ARGUMENTATIVE PAPER

**Step 1:** Choose one argument raised by Buchanan in his *Beyond Humanity*?

**Step 2:** Present the argument in a very concise way.

[Title of Your Argument Here]

P1. Blah Blah Blah.

P2. Blah Blah Blah.

C. Therefore, blah blah blah.

Make sure you explain the premises, conclusion, and any important additional information. Here are some questions to keep in mind:

**Q1.** What previous pieces of information do I need to know in order to understand the argument I plan to present (see **step #1** and **step #3**)?

**Q2:** Have I defined **key terms** that occur in the argument?

**Q3.** Would my summary of the argument give a clear idea to a moderately intelligent stranger who has never read or thought about this issue?

**Step 3:** Respond to the argument that you have summarized by clearly stating accepting or rejecting the argument.

For example: The argument is flawed because P2 is false!

**Step 4 (Option #1):** If you think the argument is flawed, give reasons in support of *why* the argument is flawed

*Clarification:* In class we always present an argument and then analyze it by saying P2 is false.

*Example:* Argument X is flawed because P2 is false. P2 is false for two reasons. Reason #1 is [explain this reason]. Reason #2 is [explain reason].

*Remember:* You are giving reasons to an *intelligent* individual who knows *nothing about the subject* but will not be convinced if your reasons involve personal facts about you.

**Step #4 (Option #2):** If you think the argument is good, present one objection to this theory and give reasons in support of *why* the objection is flawed

*Clarification:* In class we present an argument, present objections, and then sometimes *respond* to those objections.

*Example:* Objection #1 says that Argument X is flawed because P2 is false. But P2 is not false and the objection is mistaken for two reasons. Reason #1 is [explain this reason]. Reason #2 is [explain reason].

*Remember:* You are giving reasons to an *intelligent* individual who knows *nothing about the subject* but will not be convinced if your reasons involve personal facts about you.

**Step 5:** Construct an outline of your paper.



*First, construct a simple outline. These can also serve as section titles for your paper.*

- 1. Introduction**
- 2. Argument X for Enhancement**
- 3. Objection to P2: P2 is false**
- 4. Conclusion**

*Second, try to flesh out §2-§3. Don't worry about the Introduction and Conclusion (always write these last).<sup>1</sup>*

- 1. Introduction**
- 2. Argument X for Aborting Persons**

*In this section, I will first present argument X. Here it is:*

**Argument X for Enhancement**

P1  
P2  
C

*Next, I will explain what each of these premises mean in different words, and maybe I'll use an example to illustrate them for my reader.*

P1 says X. Example #1  
P2 says Y. Example #2

*Third, I will offer some reasons for why P1 and P2 are true (this will help the reader see why anyone would ever accept Argument X)*

**3. Objection to P2: P2 is false because Reason Y**

*In this section, I will either*

**Option #1:** *reject a premise in argument X.* **OR**

**Option #2:** *accept the argument and so consider an objection to the argument that I plan on refuting.*

**3.1 Option #1 (You plan on rejecting a premise)**

If I choose **Option #1**, this section will look as follows:

*First, I will clearly state which premise is false.  
Second, I will give reasons for why it is false.*

**3.2 Option #2 (You plan on accepting the argument and so must deal with objections)**

If I choose **Option #2**, this section will look as follows:

*First, I will clearly present and explain an objection to the argument I accept.  
Second, I will give reasons for why this objection is false or misapplied. In other words, I will respond to the*

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<sup>1</sup> It may seem counterintuitive to write these sections last, but there are good reasons to do so. Your introduction lets your reader know what your paper will be about but you don't know what your paper will ultimately be about until you've completed it. Your conclusion lets your reader know what your paper was about or what issues are left unexplored, but you don't know what your paper was about (or what you need to consider further) until you've written your paper. Your introduction is (I think) more important than your conclusion. Be sure to introduce your topic, give a clear statement of the key idea or thesis you will present in the paper, and then some sense of how the paper is organized.

*objection.*

#### 4. Conclusion

**Step 6:** Using your outline, write §2-§3 of your paper (don't write the introduction and conclusion yet).

**Step 7:** Proofread your paper and make sure of the following ten things:

##### Easy Stuff

- 1 your paper is almost 1,500 words (you still have to write the intro & conclusion)
- 2 your paper has your name, a title and major sections have section titles (use your outline for this)
- 3 there are page numbers on the paper

✓

##### Medium Stuff

- 4 Your paper follows the structure of your outline (if it doesn't, modify your outline and see if everything is organized)
- 5 You clearly present *one* argument and present *one* objection (Choice #1) or one response to an objection (Choice #2)
- 6 Your position is not supported by reasons that rely upon personal facts, e.g. your religion, culture, upbringing, or personal psychological state.

##### More Difficult Stuff

- 7 You have deleted any non-essential, repetitious, or irrelevant sentences (this should reduce your paper down from 1,500 words)
- 8 You don't contradict yourself. This happens a lot when people try to reject two extreme positions and take the middle ground. The problem with the middle ground is that it is vague and sometimes inconsistent.
- 9 Your reasons would convince a hostile interpreter who would disagree with your position
- 10 You don't commit any blunders in reasoning (we've talked about a few in class, e.g. slippery slope argument, the bandwagon fallacy)

**Step 8:** Write your introduction and conclusion.

#### 1. Introduction

Don't bother with grand statements about the abortion debate. Neither you nor I are specialists in this area and so we will leave those kinds of statements to the experts. But, what we can do is focus on specific arguments and respond to them. In your introduction, I would like you to do the following three things:

1. *Very briefly state the position that Buchanan argues for.*
2. State what you plan on arguing for
3. Give your reader an idea of the **structure of your paper**:

**Option #1:** Buchanan argues for the view that Y. This paper will argue that his argument for Y is flawed because it wrongly assumes that p is true. In section 2, I shall present Argument X for Enhancement. In section 3, I will object to a key premise in this argument. *Thesis!*

**Option #2:** Buchanan argues for the view that Y. This paper will defend his Argument X for Aborting Persons from an objection that one of its key premises is flawed. In section 2, I shall present Argument X for Enhancement. In section 3, I present an objection to argument X and argue that this objection is false. *Thesis!*

#### 2. Argument X for Enhancement

#### 3. Objection to P2: P2 is false

#### 4. Conclusion

**Step 9:** Title your paper.

**Step 10:** Have someone *grade* your paper using a Rubric (see below). If you ask someone to simply *read over your paper*, they will likely just give you tips on grammar and spelling.

**Step 11:** Bring a printed paper to class for the peer-review session. Ask the person who is reading your paper to be as critical as possible.

**Step 12:** Turn in your paper: before 4:30PM EST on August 9, 2013 in my mailbox (232 Sparks Building)

#### SOME TIPS ON ARGUING

In putting forward your argument, here are some tips:

**Tip #1.** In summarizing an argument / objection you disagree with, make sure you present the *strongest* version of that position.

**Tip #2.** Be sure to criticize the position and/or argument that is being put forward; don't criticize the person putting forward the argument. One exception is if they claim that you should accept a position based on their expertise or testimony.

**Tip #3.** Avoid appealing to controversial authorities in supporting your view. That is, avoid statements like "P is true because I think it is so" or "P is true because the President thinks it's so."

**Tip #4.** It is okay to give your view on a matter but make sure it is supported by reasons that are not based solely on your personal experience.

**Tip #5.** Write your argument with the following audience in mind: someone who is intelligent, who is pretty different from you in terms of their beliefs, and who would likely disagree with what you are saying.

#### REFERENCES / CITING

If (i) you quote a passage from the text or (ii) draw an argument / information / objection from some part of the book, you will need to cite the author and page number

*Example:* Rachels (p.54) thinks X.

##### *References*

Here are two examples:

Husak, Douglas N. 2002. *Legalize This! The Case for Decriminalizing Drugs*. London: Verso.

Fraleigh, W.P. 1984. Performance-Enhancing Drugs in Sport: The Ethical Issue. *Journal of the Philosophy of Sport* 11:23-29.

# RUBRIC FOR THE ARGUMENTATIVE PAPER

Here is a rough idea of how your paper will be evaluated:

CATEGORY	SCORE
<p><b>Introduction &amp; Conclusion: 20%</b></p> <ul style="list-style-type: none"> <li>• Did you introduce your topic clearly? Is there a clear statement of what your paper is about? Does your introduction give your reader some sense of the <i>organization</i> or structure of your paper?               <ul style="list-style-type: none"> <li>○ <i>In this paper, I shall consider one argument for the pro-choice position.</i></li> <li>○ <i>In Section 2, I present Argument X for the pro-choice position. In Section 2, I shall ...</i></li> </ul> </li> <li>• Do you clearly state the main thesis / point of your paper in the introduction               <ul style="list-style-type: none"> <li>○ <i>In this paper, I shall ultimately argue that Argument X for the moral permissibility of abortion is flawed.</i></li> </ul> </li> <li>• Did you avoid grandiose, overly general, or trivial opening statements like:               <ul style="list-style-type: none"> <li>○ <i>People have been debating abortion for centuries.</i></li> <li>○ <i>Philosophers think many things about abortion.</i></li> <li>○ <i>Abortion is a controversial topic.</i></li> <li>○ <i>People have different views on abortion</i></li> </ul> </li> <li>• In the conclusion, did you give a statement about the main point of your paper?</li> </ul>	
<p><b>PRESENTATION OF THE ARGUMENT: 25%</b></p> <ul style="list-style-type: none"> <li>• Did you clearly, accurately, and concisely summarize an argument considered in the text, in class, or that an intelligent person might hold?</li> <li>• Did you present the argument in a way that clearly indicated the premises and conclusion               <p style="margin-left: 40px;"> <b>P1:</b> [Insert Premise 1 here]  <b>P2:</b> [Insert Premise 2 here]  <b>C:</b> [Insert Conclusion here]               </p> </li> <li>• Did you present the argument in a way that makes it stand out? For example, by setting it off in a block quote or putting it in a table (see above and handouts)</li> <li>• Did you explain each of the premises (giving reasons for these premises if controversial) and give an example (when necessary) to better illustrate anything that might be considered unclear in the premise?</li> <li>• Was the construction of your argument a strong and sympathetic one OR did you present an argument that no one would really ever accept?</li> </ul>	

CATEGORY	SCORE
<p><b>RESPONSE TO THE ARGUMENT: 40%</b></p> <ul style="list-style-type: none"> <li>• Did you give a clear statement of your position in relation to the argument?</li> <li>• Did you argue for this position?</li> <li>• Did you give reasons for your position?</li> <li>• Are the reasons you gave more controversial than the conclusion you are trying to prove? <ul style="list-style-type: none"> <li>◦ <i>Example:</i> Abortion in some rare circumstances is acceptable because an alien told me in the middle of the night! Aliens are real!</li> </ul> </li> <li>• Are the reasons you give in support of your conclusion those that a somewhat intelligent but impartial reader would accept?</li> </ul> <p><i>Choice #1</i></p> <ul style="list-style-type: none"> <li>• Did you clearly state that you <i>reject</i> the argument?</li> <li>• Did you <i>reject</i> a premise in the argument?</li> <li>• Did you give reasons for why that premise should be rejected?</li> <li>• What was the nature of those reasons?</li> </ul> <p><i>Choice #2</i></p> <ul style="list-style-type: none"> <li>• Did you clearly state that you <i>accept</i> the argument?</li> <li>• Did you clearly present an objection to that argument?</li> <li>• Did you give reasons for why that objection should be rejected?</li> <li>• What was the nature of those reasons?</li> </ul>	
<p><b>MECHANICS, LENGTH, PROFESSIONAL PRESENTATION: 15%</b></p> <ul style="list-style-type: none"> <li>• Is your paper organized?</li> <li>• Is it the required length?</li> <li>• Are there section titles for major sections of text?</li> <li>• Does your paper look good/professional?</li> <li>• Do you have page numbers at the bottom?</li> </ul>	
<b>TOTAL</b>	

## COURSE SCHEDULE

### UNIT 1: BASIC QUESTIONS ABOUT TECHNOLOGY

DATE	TOPIC	READINGS	ASSIGNMENT
Jan 14	Introduction		
Jan 16	Can We Define Technology?	Read Nye, Chapter 1, pp.1-15 <sup>2</sup>	
Jan 21	Does Technology Control Us?	Read Nye, Chapter 2, pp.17-31 <sup>3</sup>	
Jan 23	Is Technology Predictable?	Read Nye, Chapter 3, pp.33-47 <sup>4</sup>	Short Paper Due
Jan 28	Sustainable Abundance, or Ecological Crisis?	Read Nye, Chapter 6, pp.87-108	
Jan 30	Work: More, or Less? Better, or Worse?	Read Nye, Chapter 7, pp.109-134	
Feb 4	More Security, or Escalating Dangers?	Read Nye, Chapter 9, pp.160-184 <sup>5</sup>	
Feb 6	Variant M.A.D. Game		
Feb 11	Expanding Consciousness, or Encapsulation?	Read Nye, Chapter 10, pp.185-207	
Feb 13	snow day	snow day	snow day
Feb 18	Exam 1	Exam 1	Exam 1

### UNIT 2: TECHNOLOGICAL FAILURE, ACCIDENTS, & RISK

DATE	TOPIC	READINGS	ASSIGNMENT
Feb 20	Introduction	Read Perrow, Introduction, pp.3-14	
Feb 25	Three Mile Island	<i>Skim</i> Perrow, Chapter 1, pp.15-31; <i>Watch</i> "Meltdown at Three Mile Island" (1999): <a href="http://www.youtube.com/watch?v=mIWfQ'kR6y8">http://www.youtube.com/watch?v=mIWfQ'kR6y8</a>	
Feb 27	Nuclear Power & High Risk Systems	Read Perrow, Chapter 2, pp.32-46, 54-61	
Mar 4	Complexity, Coupling, and Catastrophe, Part 1	Read Perrow, Chapter 3, pp.62-89	
Mar 6	no class	no class	no class

March 9-15 Spring Break, No Class

Mar 18	Paper review day	Paper review day	Paper review day
Mar 20	Exam 2 & <b>Paper</b>	Exam 2 & <b>Paper</b>	Exam 2 & <b>Paper</b>

<sup>2</sup> *Other Helpful but Unassigned Readings:* Stephen Kline, *What is Technology?*; Arnold Gehlen, *A Philosophical-Anthropological Perspective on Technology*;

Langdon Winner, *Social Constructivism: Opening the Black Block and Finding it Empty*, pp.233-244

<sup>3</sup> *Other Helpful but Unassigned Readings:* Jacques Ellul, *The "Autonomy: of the Technological Phenomenon*, pp.386-397; Thomas Hughes, *Technological Momentum*; Robert L. Heilbroner, *Do Machines Make History*, pp.398-404; Langdon Winner, *Frankenstein's Problem: Autonomous Technology (ANGEL)*; Herbert Marcuse, *The New Forms of Control*, pp.405-412; Braudel, Fernand. *Capitalism and Material Life*; Ellul, Jacques. *The Technological Society*; Roszak, Theodore. "Technocracy's Children" In *The Making of a Counter Culture*; Winner, Langdon. *Autonomous Technology*

<sup>4</sup> *Other Helpful but Unassigned Readings:* Wise, George. 1976. *Technological Prediction, 1890-1940*. Ph.D. dissertation, Boston University.

<sup>5</sup> Turner, Barry A. and Nick F. Pidgeon. 1997. *Man-Made Disasters*.

### UNIT 3: HUMAN ENHANCEMENT BY TECHNOLOGICAL MEANS

DATE	TOPIC	READINGS	ASSIGNMENT
Mar 25	Therapy vs. Enhancement	<i>Skim</i> The Creation of The President's Council on Bioethics (Nov 28, 2001): <a href="http://bioethics.georgetown.edu/pcbe/about/executive.html">http://bioethics.georgetown.edu/pcbe/about/executive.html</a> <i>Read:</i> From the President's Council On Bioethics: "Staff Background Paper: <a href="#">Human Flourishing, Performance Enhancement, and Ritalin</a> " (Also available on ANGEL) <sup>6</sup>	
Mar 27	Drugs in Sports (PEDs)	<i>Read</i> Brown, W. M. 1980. Ethics, Drugs and Sport. <i>Journal of the Philosophy of Sport</i> , VII: 15-23. (ANGEL)	
Apr 1	Drugs in Sports (PEDs)	<i>Read</i> Simon, Robert L. 1985. Good competition and drug enhanced performance. <i>Journal of the Philosophy of Sport</i> 11: 6-13 (ANGEL)	
Apr 3	PED GAME	<i>Skim</i> Fraleigh, Warren P. 1985. Performance-Enhancing Drugs in Sport: The Ethical Issue. <i>Journal of the Philosophy of Sport</i> XI, 23-29. In class, we will play the "100M Dash Game" (ANGEL)	Extra Credit Opportunity
Apr 8	Bionic Athletes	<i>Read</i> "Bionic Athletes" In Sandel, Michael J. 2007. In <i>The Case Against Perfection</i> . Cambridge, MA: Harvard University Press, pp.25-44. (ANGEL)	
Apr 10	The Landscape of the Enhancement Debate	<i>Read</i> Buchanan, Chapter 1, pp.1-10, 13-19, 23-28	
Apr 15	Enhancement & Development	<i>Read</i> Buchanan, Chapter 2, pp. 35-52, 54-60	
Apr 17	Enhancement & Character	<i>Read</i> Buchanan, Chapter 3, pp.69-70, 77-83, 90-98 (end of first full paragraph), 101-109	
Apr 22	Unintended Consequences	<i>Read</i> Buchanan, Chapter 6, pp.171-183, 183-185, 189§6;	
Apr 24	Unintended Consequences	<i>Read</i> Buchanan, Chapter 6, pp. 193-194, 197-203	
Apr 29	Peer-Review Day & Exam Review Day	Peer-Review Day & Review Day	Peer-Review Day & Review Day
May 1	Exam 3	Exam 3	Exam 3
May 5	<b>Argumentative Paper Due</b>	<b>Argumentative Paper Due via ANGEL DROPBOX</b>	<b>Paper Due</b>

<sup>6</sup> *Other Helpful but Unassigned Readings:* Carl Elliott, Enhancement Technology? (ANGEL); Ray Kurzweil, Twenty-First Century Bodies (ANGEL); Hubert and Stuart Dreyfus, Why Computers May Never Think like People (ANGEL)

# EXAM QUESTIONS

## EXAM 1

### Chapter 1: What is Technology? (Reading Questions)

1. Does tool use separate humans from all other animals? If not, what other animals use tools and in what way? (p.1-2)
2. According to Nye, what is the central purpose of technologies? (p.2)
3. One thing that Nye wants to incorporate into the definition of technology is that technologies are not simply *what they do* (i.e. their purpose) but they are also “part of systems of meaning.” What does he mean by this? (p.2-3)
4. How is using a technology like constructing a narrative? (p.3-5)
5. What is the primary way that we *know* a technology, e.g. an axe (p.4)
6. According to Nye, which likely came first, technology or literacy? (p.5-6)
7. What common assumption do people often have about the relationship between science and technology? (p.9-11)

### Classroom Questions (See Handout)

8. What are some questions that philosophers of technology try to ask and answer?
9. What are the two ways in which the term “technology” is understood?
10. What is the problem with saying that *only humans use technology*?
11. What are some problems with saying that the meaning of a technology is the specific purpose for which it was designed?
12. What is the problem with understanding “technology” as only referring to *new* technologies?
13. What is the problem with saying that all technologies are developed by *applying science*?
14. What are some problems with saying that *only men* can create new technologies?

### Chapter 2: Does Technology Control Us?

15. What was the attitude of 16<sup>th</sup> century Japanese toward guns? (p.17)
16. According to Edward Tenner, do computers increase office efficiency? (p.21)
17. According to Karl Marx, does industrialized technology within a capitalistic structure lead to revolution? If so, how exactly is such a revolution supposed to occur? (p.23-24)
18. According to Werner Sombart and William Ogburn, failure and change of political institutions and economic systems is determined by technologies and what else? (p.25-26)
19. The wheel seems like a good example of why technological determinism is true, i.e. because every society and individual cannot resist using it. Why is this example complicated by individuals living in North Africa during the third century AD? (p.19-20)

### Classroom Questions (See Handout)

20. What is technological determinism?
21. What is social constructionism?
22. True or false: the invention of the railways determined the creation and institution of *standardized time*.
23. True or false: standardization of time was necessary to prevent railway collisions.
24. How might a technological determinist respond to the objection that technologies are not irresistible because the Japanese (at one point) no longer use guns and many Amish societies avoid the use of certain technologies?
25. What are two objections to the technological determinist’s claim that *in a sufficiently liberal society that has a free market there are certain technologies we cannot resist using*?
26. *Do technologies control us or are we free from their influence? Give two reasons for your view and support them with at least two examples.*



### Chapter 3: Is Technology Predictable?

27. What is the difference between prediction, forecasting, and projection? (p.33-35)
28. What types of people typically engage in prediction, forecasting, and projection?
29. According to George Wise, what percentage of 1,500 predictions between 1890-1940 about technology proved correct? (p.36)
30. According to George Wise, did the *method* of prediction make a difference in terms of the accuracy of technological prediction? (p.36)
31. How well can we predict, forecast, and project which technologies will emerge? (pp.36-38)
32. What are some notable failures to forecast and to project? (p.36-38)
33. What is “path dependency”? (p.38)
34. What role does the consumer have in determining what technologies get used? (p.39)

### Classroom Questions (See Handout)

35. True or false: The Ford Edsel was *correctly* projected to sell very well as it was a conventional car that involved some improvements on existing models of car at the time.
36. What are two reasons why the projection that the early AT&T picture phone turned would become popular turned out to be false?
37. True or false: if a technology is inexpensive, new, and would likely satisfy the desires of many customers, that technology will become popular.
38. True or false: since we cannot accurately predict which technologies will become popular, all prediction is empty speculation and there are no criteria to distinguish between good and bad prediction.
39. What role do environments/systems play in whether a projection/forecast/prediction will turn out to be true?
40. Even though Betamax (a format for recording and playing videos) was hailed as the better product, why did the VHS format become so popular?
41. *Are technologies predictable? Give two reasons for your view and support them with at least two examples.*

### Chapter 6: Sustainable Abundance, or Ecological Crisis?

42. Technological liberals believe in what? (p.88, 95)
43. According to Nye, Henry Ford’s assembly line symbolized what shift in perspective about our relationship with nature? (p.92)
44. In general, what is the position known as “technological optimism”? (p.93-94)
45. What problem does Nye identify with our capacity to use technologies to produce surpluses of food? What are some examples of this? (p.96-98)
46. On what issue do technological pessimists differ from technological optimists (be specific)? And, what are some problems that pessimists identify? (p.98-100)
47. True or false: Thomas More’s Utopia involves people living in a world filled with numerous luxuries? (p.100-101)
48. Rather than using technologies to gratify our material desires and needs, what does Henry David Thoreau suggest we do instead? (pp.101-102)
49. True or false: According to Nye, The Dutch refusal to drain the Zuider Zee and allowing hedgerows to regrow are examples of how technology and nature are irreconcilable opposites? (p.106-107).
50. With additional question does the question “how many people can the Earth support” depend? (p.107-108).

### Classroom Questions (See Handout)

51. True or false: One reason given in support of technological liberalism and optimism is that technologies have increased wages and decreased the cost of living.
52. What is technological pessimism?
53. Two arguments against technological pessimism is that continued production and distribution of goods given our current methods will lead to what? (Name both)

54. Assuming that we need to modify our current technological methods of production and distribution, what are three different fixes?
55. What is the difference between an attitudinal fix a technological fix?
56. Allowing hedgerows to block wind around one's home is an example of what?
57. Combating tooth decay by treating water with sodium fluoride is an example of what?
58. *Do technologies usher in a sustainable abundance or are they leading us to ecological crisis? Give two reasons for your view and support them with at least two examples.*

#### **Chapter 7: Work, Easier or Harder?**

59. Roughly 150 years ago, what was the profession of most people in both Europe and the United States? (p.109)
60. What percent of people currently work on farms? (p.109)
61. Over three centuries ago, how were most things made and how was knowledge of *how* to make these things transferred? (p.110)
62. In addition to the musical aspects of traditional work, *what* did factories also do away with and *how* did it do away with it? (p.111)
63. Which system does Henry Hughes think is better than industrialism and why? (p.114)
64. What does Frederick Winslow Taylor (Taylorism) argue for with respect to work? (p.114-115)
65. What did Jeremy Rifkin predict would be the result of increasingly mechanizing work? (p.118-119) And, was Rifkin correct? (p.119-120)
66. What is Nye's first explanation for why people are working harder? (p.129)
67. An audit of 25,000 Walmart employees found what? (p.131)
68. We might contend that Walmart's practices are an isolated case, but what sort of effect does Walmart's practices have on other retailers? (p.131).
69. The fact that Western society condones Walmart's practices signifies a preference for what sort of values? (p.132)
70. What is Nye's second explanation and third explanation for why people are working harder? (p.132-133)
71. How do mobile phones play a role in the work week of a "workaholic"? If technologies are thought to make work easier, how does the use of the mobile phone by the workaholic complicate this picture? (p.133-134)

#### **Classroom Questions (See Handout)**

72. True or false: The industrial technology model has led to an inequality of wealth?
73. True or false: The industrial technology model is associated with instances of exploitation of labor, e.g. sweatshops, unsafe and unfair working environments.
74. True or false: The industrial technology model has made some jobs mind-numbing, repetitive, and boring.
75. In de-skilling workers and in sub-dividing labor, how does the industrial technology model encourage us to look at workers? (see p.2)
76. What are some kinds of jobs that the industrial technology model has already eliminated?
77. What is wrong with Nye's assumption that working longer means working harder?
78. *Do technologies make work harder or easier? Give two reasons for your view and support them with at least two examples.*

#### **Chapter 9: More Security or Danger?**

79. According to Wolfgang Schivelbusch, there is an exact ratio between what two things? (p.163)
80. Be able to cite a supporting example that illustrates Wolfgang Schivelbush's claim (p.163-164).
81. What is Turner's notion of "disaster incubation period" (p.164)
82. What is the reaction of some consumers to innovations when they have a fear of unknown risk, e.g. in reaction to genetically-modified foods? (p.166)
83. According to Nye, does gun ownership make us safer? (pp.167-168)

84. An optimistic outlook on military weapons might be that they make us *safer* as advanced technology would quickly decide the outcome of conflict. How is this claim criticized by Nye? (p.171-173).
85. A pessimistic outlook on military weapons might be that they make us *safer* because they create a state of mutually assured destruction. How is this claim criticized by Nye? (p.175-183).

#### Classroom Questions (See Handout)

86. *Getting hurt from a fall as you were walking in a grass field vs. getting hurt in a high-speed motorcycle accident* is an example that supports what correlation?
87. What are two responses to the objection that technologies are making our lives safer because we can prevent all serious accidents with safety measures?
88. Getting lung cancer as a result of being exposed to asbestos is an example of what?
89. What is Nye's argument that *guns make us less safe*?
90. What is the problem with Nye's claim that two-thirds of all gun-related deaths were used to kill people they were purchased to protect?
91. What are the optimistic and pessimistic arguments that military weapons make us safer?
92. What does the acronym M.A.D. stand for?
93. What are some criticisms of M.A.D.?
94. *Do technologies make us safer or put us in increased danger? Give two reasons for your view and support them with at least two examples.*

#### Chapter 10: Expanding Consciousness, or Encapsulation?

95. What two things (potentially "side effects") does Nye contend may be happening as we are increasing our understanding of the world? (p.185-186)
96. In certain cases, individuals engaged in frequent multi-tasking and compulsively using certain kinds of technologies have similar symptoms as what group of people? (p.186)
97. For nearly 100 years, what goal did most recording engineers have? And how, in our century, has this changed? (p.191)
98. In discussing the question of whether all of our experiences are technologically mediated, Nye considers that perhaps visiting a national park might be one of the few non-technological experiences that we have left? How does Nye's description of the Grand Canyon complicate this? How do many people who visit the Grand Canyon prefer to experience it? (p.194-196)
99. Describe the basic plot of E. M. Forster's 1909 short story "The Machine Stops"? (p.196-198)
100. According to Albert Borgman (in *Technology and the Character of Contemporary Life*), how is a wood stove different from a furnace? What kind of commitment or knowledge does each require? (p.200).
101. In the discussion of what type of personality is normal in an online world, how is the view that a sane person is one who has a strong sense of a unitary self get criticized? (p.202-203)
102. What is the difference between an android and a cyborg? And, what are the respective goals in creating each? (p.204-205)

#### Classroom Questions (See Handout)

103. What are three drawbacks to our increased ability to access information?
104. What does it mean for a technology to be "naturalized"?
105. What is Borgmann's distinction between technologies that "engage us" and those that we "just use"?
106. Taking air in a room (which has been modified by heating, cooling systems) to be completely normal, routine, unusual, and interwoven into the basic fabric of our experience *is an example of what type of process?*
107. What are three criticisms raised by someone who accepts the view that experiences modified by technologies are *worse* than "natural" or "direct" experiences.
108. *Is there something irreducibly important about "real" / "natural" experiences or is it perfectly fine if all of our experiences are completely virtual? Give two reasons for your view and support them with at least two examples.*

## EXAM 2

### Introduction

109. What is a redundancy? (p.6)
110. Perrow considers an example on p.5-7 of an individual missing a job interview because of a series of events, where does Perrow say the cause of this accident is to be found (p.7)
111. In the extended example Perrow considers (pp.5-7), Perrow contends that the failures become serious not on their own, but when? (p.7)
112. What does Perrow mean by calling certain accidents “normal” (p.8)
113. Are normal accidents always the result of an initial large mistake, e.g. massive pipe break? (p.9)

### Classroom Questions (See Handout)

114. What key characteristic distinguishes *redundancies* from *quick, on the spot responses* to accidents?
115. What is this an example of: *Lawnmowers* have a lever that must be held closed by the operator’s hand. If the lever is released, then the mower’s blades stop.
116. What does the following view imply about human nature? “We **can** anticipate **all** of the *serious* accidents that might result from using technology. Human beings can work toward preventing dangers associated with accidents and ultimately we can prevent all serious accidents that result from our use of technology.”
117. SA: With a fairly high degree of forethought and inquiry, can we anticipate all of the serious accidents that might result from using technology? Give at least two reasons for your view and explain what your answer implies about the nature of human beings and their interaction with technologies.
118. SA: Be able to reconstruct Perrow’s basic argument for why complex, potentially catastrophic accidents are inevitable.

### Chapter 1: Normal Accident at Three Mile Island & Video

119. What happened at Three Mile Island Unit 2 near Harrisburg, Pennsylvania on March 28, 1979? (p.15)
120. What was Metropolitan Edison’s (the utility company) initial response to the problem at Three Mile Island? (video: 8-10minutes)
121. What was one disastrous effect that could have occurred at Three Mile Island?
122. What was the attitude of the Nuclear Regulatory Committee (NRC) concerning before the Three Mile Island accident concerning those who raised concerns about the safety of certain power plants? (video 18:30-19:10)
123. What sort of reaction does William Scranton III have to visiting the Three Mile Island plant? How does he see the plant as having a double significance? (video 19:20-20:20)
124. Which people in particular were recommended as evacuating Three Mile Island? And what was the reaction of the general population to this limited evacuation? (video 28:30-30:30)
125. When it was initially discovered that there was a hydrogen bubble in the reactor, what was the general state of *knowledge* that government officials, media, engineers, clergy, and members of the NRC had of the potential danger? (video 33:00-43:30).
126. What did then U.S. President Jimmy Carter do after hearing about the two different explanations about the hydrogen bubble in the reactor at Three Mile Island? (video 43-45)
127. Was there a meltdown at Three Mile Island? (video 49-50)

### Classroom Questions (See Handout)

128. What are the two most nuclear serious accidents since TMI?

## Chapter 2: Nuclear Power as a High-Risk System

129. Why does Perrow think there haven't been more accidents at nuclear power plants (pp.33-36)
130. What sorts of problems does Perrow identify concerning the *construction* of nuclear power facilities (pp.36-38)
131. Why was the pressurized light water reactor (PWR) chosen over other safer designs, e.g. heavy water reactors or gas-cooled reactors? (pp.38-39)
132. In the case of nuclear power in the United States, did demand for reactors generate their construction? (p.39)
133. Where does Perrow say the ideal location is for a nuclear reactor (p.41)
134. What kinds of other "trivial" accidents Perrow notes at nuclear power facilities (p.43-46)

## Classroom Questions (See Handout)

135. How does Perrow use the fact that there are 400 MW, 1000MW, boiling water reactors (BWRs), and pressurized water reactors (PWRs) to argue that there will be more TMIs in the future?
136. What are the two answers Perrow considers with respect to whether there will be TMIs in the future?
137. SA: If we accept that our safety systems are working and this is the reason that there haven't been more TMIs, there is still the issue that more TMIs are *possible* (they could happen in the future). Thus, there is a problem concerning *how safe* to make nuclear reactors. Using some of the examples we considered in class, show how this question poses serious practical issues.
138. Consider the following argument. What is the weaker (that is less controversial) version of this argument that we considered in class?

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### ARGUMENT FOR ABANDONING CATASTROPHE-PRODUCING COMPLEX TECHNOLOGIES

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- P1** If some complex technological systems are likely to produce unpredictable catastrophic events, then we should **abandon these technologies**.
- P2** Complex technological systems are likely to produce unpredictable catastrophic events.
- C** Therefore we should **abandon these technologies**.

## Chapter 3: Complexity, Coupling, and Catastrophe

139. What is an accident? (see p.63-66)
140. What is an incident (pp.66)
141. What are the four levels of a system and which levels do accidents occur on? (pp.65)
142. Who are first-party and second-party victims? (p.67-68)
143. Perrow contends that this book deals with "third-party" and "fourth-party" victims. Who are these victims? (p.67)
144. Innocent bystanders are an example of what "party" of victim? (p.68)
145. Fetuses are an example of what "party" of victim? (p.69)
146. What key feature distinguishes a component failure accident from a system failure accident? (p.70-71)
147. True or false: What distinguishes a system failure accident from other kinds of accidents is the source of the accident, i.e. both start with component failures (a failure of a part, unit, or subsystem) (p.70-71)
148. What is a final accident? (p.71)
149. If a linear interaction is a one-direction sequence of events, what is a feedback loop? (p.76)
150. What is a linear interaction? (p.72, 75, 78)
151. True or false: A heater that heats gas in a tank and absorbs excess heat from a chemical reaction is an example of a "common-mode" function (pp.72-73)
152. Perrow contends that we can anticipate failures resulting from what two different types of interactions? (p.77)
153. Increasing a system's automation decreases what? (p.79)

154. A February 1980 accident in a nuclear power plant in Crystal River, Florida is an example of an accident where overly responsive automation led to an accident. (p.81)
155. The default status of a control is what? (p.82)
156. Information about the state of components or processes in a complex system is of what nature? (p.83-84)
157. Perrow contends that more experience with systems will lead to what two things? (p.84)
158. True or false: Transformation processes are capable of being described and are discovered through trial and error, but these processes are not understood (p.85)
159. What are the six key components of a complex system (pp.85-86)
160. What are the key differences between complex and linear system? (p.86)
161. Although there are problems with complex systems, what are the benefits of complex systems over linear systems (p.88-89)

### Classroom Questions (See Handout)

162. SA: Consider the following argument drawn from Perrow. Pick out *the* controversial premise (discussed in class) and give at least one reason why that premise might be false.

PROXIMITY DOES NOT IMPLY INVOLVEMENT.

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- P1** There is no *practical* means of avoiding being within 50 miles of a nuclear reactor.
  - P2** Even if we could be farther than 50 miles from a nuclear reactor, certain weather conditions could contaminate areas more than 200 miles, e.g. if the weather conditions were right.
  - P3** We can only be seen as second-party victims if we use, are associated with, the technological system.
  - C** Therefore, those with no practical means of avoiding being near a reactor are not second-party victims.
163. Perrow contends that “[f]ourth-party victims potentially constitute the most serious class of victims” (p.69). Focusing specifically on genetic defects caused as a result of an accident, what reasons does Perrow give in support of this claim?

## EXAM 3

### The President’s Council On Bioethics: “Staff Background Paper: Human Flourishing, Performance Enhancement, and Ritalin”

164. What disorder is Ritalin prescribed to treat?
165. Name two different ways that Ritalin is taken?
166. Is ADHD caused by genetics, environment, or a combination of both?
167. In thinking about the widespread availability of Ritalin, what groups of people are potentially in the greatest at risk?
168. Name one ethical issue that Ritalin raises for adults.
169. In discussing the ethics of raising children, we considered two methods: the method of morals and the method of medicine. First, explain both of these methods. Second, adopting utilitarian viewpoint, explain the *positive consequences* for a child who adopts the method of morals.
170. In discussing the ethics of raising children, we considered two methods: the method of morals and the method of medicine. First, explain both of these methods. Second, adopting utilitarian viewpoint, describe a scenario where the utilitarian would say that one should adopt the method of medicine.
171. True or False: One ethical issue associated with the use of Ritalin by adults is that its use to get ahead in a hyper-competitive society.

172. True or False: One ethical issue associated with the use of Ritalin by adults/children is that it makes certain the results of certain tests inaccurate (e.g. LSAT, SAT, ACT, Ethics Exam).
173. True or False: One ethical issue/concern with the use of Ritalin by adults is that it may set a bad example for children (e.g. LSAT, SAT, ACT, Ethics Exam).

**Brown, W. M. 1980. Ethics, Drugs and Sport. *Journal of the Philosophy of Sport*, VII: 15-23.**

174. Does Brown think that non-natural methods of training (e.g. taking drugs that enhance performance) is morally wrong or morally permissible/acceptable?
175. How does Brown respond to the objection that drugs should be disallowed as they make sporting competitions unfair?
176. How does Brown respond to the claim that taking drugs should not be allowed as they put athletes in danger?
177. In assessing whether drugs should be allowed, what does Brown think is most important to consider, e.g. physical consequences to athletes, an athlete's freedom, preserving the integrity of sports records?
178. True or false: Brown thinks that PED use is morally wrong and should be prohibited because not everyone has access to PEDs.
179. Consider the following claim: *PED use is morally wrong and should be prohibited because it is not fair since not everyone has access to PEDs*. Circle the **two** ways that Brown responds to this objection:
- If lack of access to a particular resource gives individuals a competitive advantage (makes things *unfair*), then lots of things should be prohibited, e.g. clean air, top-of-the-line training equipment, excellent coaches, high-altitude, etc.
  - Even if the objection is true, PED use would still be morally acceptable provided we could give everyone access to PEDs.
  - Unfairness is not the reason that PED use is morally wrong. The real reason that PED use is morally wrong is because it is harmful to athletes and this harm is forced upon them.
  - Athletes are free to use PEDs and so if one athlete can get a competitive edge by using PEDs that another athlete cannot get access to, then that is *too bad* for the athlete that cannot get access.
  - Athletes should be well-informed about the drugs they use.
180. Consider the following claim: PED use is morally wrong and should be kept against the rules because using PEDs is unhealthy and dangerous. Brown has two objections to this claim. First, pick one of these and explain it to the best of your ability. Second, give an example that illustrates one of these objections.
181. True or False: Brown thinks that prohibition on PED use is a good thing as athletes should not be free to hurt themselves by taking dangerous PEDs.
182. True or False: Brown would *agree* with the following quote "But should we not restrict the use of some drugs, or blood doping? No, in no way whatsoever."
183. True or false: According to Brown, even if there are dangers associated with PED use, it would be morally wrong to keep athletes from using PEDs as this would wrongfully interfere with their free, rational, and well-informed choices.

**Simon, Robert L. 1985. Good competition and drug enhanced performance. *Journal of the Philosophy of Sport* 11: 6-13**

184. What is the "principle of harm"?
185. One reason given in support of PED use by athletes is that such use does **not** *harm others*. Which of the following are reasons given in support of the claim that PEDs **do** *harm others* (circle all that apply)
- Permitting PED use harms others by pressuring/forcing "pure" or "clean" athletes to either use PEDs or quit athletics.
  - Permitting PED use pressures professional athletes into using harmful PEDs.
  - Permitting PED use has negative effects on young people. If professional athletes use PEDs, it

- may encourage (or pressure) young people to use harmful PEDs.
- d. Permitting PED use harms the pharmaceutical companies who create PEDs as they will lose money if PED use is stopped.
- e. Permitting PED use interferes with the ability of competent adults to make the choice between taking PEDs or not taking PEDs.
186. Simon's reply to the claim that PED use is dangerous is which of the following:
- Heavy athletic training also exposures professional athletes to danger, but we do not prohibit heavy athletic training.
  - There must be a compelling reason to interfere with the freedom of professional athletes
  - When a professional athlete makes a decision to use PEDs, they are making an informed choice and this should not be stopped unless there is a compelling reason.
  - PEDs are not in fact dangerous. Rather, they enhance human performance by making athletes faster, stronger, and more functionally efficient.
187. Which one of the following three options does Simon think to be true:
- Option 1:** We should treat the risks of PEDs and the dangerous weight-lifting program alike and say that *both are morally impermissible*. That is, **both** professional athletics and PED use are **morally wrong**.
  - Option 2:** We should allow both PEDs and dangerous training activities and leave the choice up to the individual. That is, **both** professional athletics and PED use are **morally acceptable**.
  - Option 3:** We need to justify the claim that allowing PEDs *improperly* imposes *risks* on individuals while other forms of risk are acceptable. That is, we need some way to show that PED use is wrong while professional athletics is acceptable.
188. Which one of the following three options does Brown think to be true:
- Option 1:** We should treat the risks of PEDs and the dangerous weight-lifting program alike and say that *both are morally impermissible*. That is, **both** professional athletics and PED use are **morally wrong**.
  - Option 2:** We should allow both PEDs and dangerous training activities and leave the choice up to the individual. That is, **both** professional athletics and PED use are **morally acceptable**.
  - Option 3:** We need to justify the claim that allowing PEDs *improperly* imposes *risks* on individuals while other forms of risk are acceptable. That is, we need some way to show that PED use is wrong while professional athletics is acceptable.

### Classroom Activity Handout 3.5 (The 100m Dash Game)

189. Consider the following claim: The use of PEDs is a free, rational, and informed choice by profession athletes. Assuming that PED use is informed and rational, list two reasons why PED use by professional athletes might not be considered free. In other words, how might PED use by professional athletes be *coerced*?
190. Consider Brown's argument from human freedom:

#### Argument #1: Argument from Human Freedom

P1: We cannot reduce our activity of playing/competing to certain instinctive (animalistic) dispositions, e.g., competing in a race is not a *fight or flight response* (see pp.19-20).

P2: The use of PEDs is a free, rational, and informed choice by profession athletes. The activity of playing/competing in sports is a free (rational) choice, an act of exaltation, an act aimed to explore the limits of our strength (see p.19).

P3: We should not interfere with human freedom (unless it causes harm to others).

C: Therefore, the rules of sport should not prohibit the use of PEDs.

Given the 100m dash game, which premise is the most problematic and why?



**“Bionic Athletes” In Sandel, Michael J. 2007. In *The Case Against Perfection*. Cambridge, MA: Harvard University Press, pp.25-44.**

191. Rather than eroding our human agency, Sandel contends that enhancement technologies indicate what about human nature? (p.26-27)
192. Sandel says that *effort* and *striving* is not the only point of sport. If they aren't, what is for Sandel (p.28)
193. What does Sandel say is the “real problem” with genetically altered athletes? (p.29)
194. While many point to safety as a reason to prohibit PEDs, Sandel thinks that even safe enhancements are problematic. Why is that? (p.35-6)
195. According to Sandel, U.S. Supreme Court Justice argues that sports do not have a what? (p.42-43)

**Classroom Questions (See Handout)**

196. True or false: Sandel thinks that the use of PEDs by professional athletes is wrong because it degrades human agency, i.e. their capacity to take ownership of their accomplishments.
197. Sandel thinks that there is an essence, telos, or purpose to sports. How does this differ from the view of U.S. Supreme Court Justice Scalia and in what context does Scalia's view emerge (i.e. what case was he considering)?
198. What point does the following thought experiment (used by Sandel) aim to prove: Let's suppose there are two athletes SP and MJ. These two athletes are identical in every way except for two characteristics: SP is the hardest working boxer, but not very talented (SP lacks the natural gifts necessary to succeed in professional athletics) while MJ is endowed with an amazing amount of natural talent but does not work as hard as SP. Finally, MJ and SP agree to fight, and MJ triumphs with a third round knockout.

**Buchanan, Chapter 1, pp.1-10, 13-19, 23-28**

199. What does Buchanan think is the “most serious problem with the appeal to gratitude” (p.3)
200. Habermas asserts that we cannot regard ourselves as free if we are the product of genetic engineering. Buchanan claims that this reasoning is flawed for what reason? (see p.5, top)
201. Buchanan notes that one argument by those against enhancement technologies is that the pursuit of enhancement is a pursuit of total mastery over nature, a thirst that can only be quenched by perfections and immortality. Buchanan criticizes this argument by saying that we can desire to what without desiring to be perfect? (p.9, bottom)
202. What are the two central views in the literature on enhancement (p.13)
203. Would it be fair to characterize those that reject the “anti-enhancement” view as denying that there are any potential risks involved in enhancement technologies (p.15)
204. How does Buchanan propose we ought to define “biomedical enhancement”? (pp.23-24)
205. What are the five main types of enhancement discussed in the literature on the ethics of biomedical enhancement? (p.25)

**Classroom Questions (See Handout)**

206. How does Buchanan define “biomedical enhancement” and if someone is biomedically enhanced does this mean they are *in fact* improved?
207. One of Sandel's key concepts in the “Argument from the Gratitude for the Given” is that pursuit of biomedical enhancement implies a lack of gratitude for what is given. Besides the fact that the idea of nature giving gifts is unclear, how else does Buchanan criticize this premise?
208. SA: According to Buchanan, why is setting up the two sides of the debate as *those that are pro-enhancement* versus *those that are anti-enhancement* an improper way of thinking about the debate? What are the two key sides to this debate and what are the key ideas each side is committed to?

**Buchanan, Chapter 2, pp.35-52, 54-60**

209. What are the two framing assumptions that Buchanan thinks are false (see pp.35-38)
210. Why does Buchanan think that the Personal Goods Assumption is false (see pp.36-37, 49-50)
211. Why does Buchanan think that the Market Goods Assumption is false (see pp.37-38, 49-50)
212. According to Buchanan, is human enhancement something new, i.e. distinctive to the 20<sup>th</sup> or 21<sup>st</sup> century (see pp.38-40)
213. One criticism of biomedical enhancements is to say that unlike other forms of enhancement, these changes are irreversible. What is Buchanan's reply to this objection? (see pp.40-41)
214. Suppose we reject the idea that increased productivity increases our well-being and instead accept the idea that increased productivity increases our *potential* for increasing our well being. According to Buchanan, where has increased productivity historically come from? (pp.44-45)
215. According to Anders Sandberg, what two benefits would result from improving the IQ of individuals with low IQ (see p.47)
216. What happens to the value of enhancements that have network effects when *more* individuals have that enhancement? (pp.48)
217. What is a positional good? (pp.48)
218. According to Buchanan, are all enhancements zero-sum or positive-sum affairs? (pp.48-49)
219. Buchanan argues that we ought to adopt a Balancing Approach to the ethics of enhancement debate. He notes, however, that the Balancing Approach would be false if the Conclusive Reasons View were true. This view says that we should not evaluate the pros and cons of enhancement technologies because there are already some conclusive \_\_\_\_\_ reasons against biomedical enhancement technologies (pp.58)
220. SA: Buchanan considers what he calls "the Simple Conservative Argument". Summarize this argument in a semi-formal way (listing premises P1, P2, .... Pn, and its conclusion), then explain two of Buchanan's objections to this argument (listing these as O1 and O2) (see pp.54-57)

**Classroom Questions (See Handout)**

221. The idea that enhancement technologies should be "market goods" is contrasted against the idea that they should be distributed by the State (or government). Why is this latter option almost immediately rejected without discussion?
222. What is biomedical enhancement exceptionalism?
223. One argument against biomedical enhancement technologies is that they will increase distributive injustices by distributing people into a group of super rich, super enhanced people and a group of super poor, unenhanced people. What is Buchanan's principle objection to this?
224. Buchanan thinks there are two positive benefits that are often overlooked by critics of biomedical enhancement technologies. Name both.
225. In a nutshell, what is the argument from conservatism?
226. If we accept Buchanan's claim that biomedical enhancement technologies should be evaluated in terms of the "Balancing Approach", why does this not mean that every type of enhancement technology is acceptable?
227. What does the Conclusive Reasons View say about trying to balance the pros / cons of enhancement technology?

**Buchanan, Chapter 3, pp.69-70, 77-83, 90-98 (end of first full paragraph), 101-109**

228. What is the expressivist concern about character? (pp.69)
229. What is the consequentialist concern about character? (pp.69)
230. Why does Sandel reject the Buchanan's Balancing Approach to the ethics of human enhancement? Why do we not need to assess all of the pros and cons of enhancement technologies to know it is a bad thing? (pp.77)

231. Buchanan considers a possible counter-argument (or reply) from Buchanan concerning the “Argument from Giftedness”. This reply has Sandel saying that enhancements will destroy our sense of giftedness, but do what to it? (pp.81)
232. One criticism of the enhancement enterprise is that it involves a problematic attitude toward the self and this problematic attitude toward the self is *inherently wrong*. What attitude is this? (pp.90, see bottom of p.91)
233. Buchanan argues that it is sometimes morally obligatory to regard one’s self as an object. Name the kind of cases he considers and be able to explain how Ulysses’s behavior is an example of this (pp.91)
234. After rejecting what might be called “The Argument from the Inherent Immorality of Self Manipulation” (see pp.92-93), Buchanan says that we need a way to determine what are (and are not) the appropriate ways that we can treat ourselves as objects to be manipulated (see p.93 top). In order to do this, he suggests looking at three central moral risks involved with rational self-manipulations (p.93, bottom). What are these three risks? (p.94-98, 101-103)
235. One worry about enhancement technologies is that they will weaken our existing moral powers. How does Buchanan respond to this charge? (see p.94)
236. What does Buchanan mean by “authenticity”? (p.101-102)
237. One issue with enhancement concerns inauthentic relationships. One suggested proposal for enhancement technologies are “love drugs”, i.e. drugs that sustain the biochemical factors that play a role in preserving human pair-bonding (see p.105). That is, drugs that will keep people sexually faithful. How does Buchanan (using the work of Savlescu and Sandberg) argue that the use of love drugs is morally acceptable (see pp.106-107)
238. SA: Summarize Sandel’s “Argument from Giftedness” in a semi-formal way (listing premises P1, P2, .... Pn, and its conclusion), then explain two of Buchanan’s objections to this argument (listing these as O1 and O2) (see pp.78-81)

#### **Classroom Questions (See Handout)**

239. What is “moral character” and what is the general argument posed by critics of enhancement technologies concerning moral character?
240. SA: How does Buchanan show that the argument from objectification / manipulation / instrumentalization is flawed? In your own words, give a clear step-by-step reconstruction of his response.
241. How does the existence of learned “moral rules” undermine the claim that using moral enhancement technologies will lead to the weakening of our moral powers?
242. SA: In your own words, explain the “Argument from Inauthentic Existence” and articulate two objections to this view, citing a thought-experiment (or some kind of example) to clarify your objections.
243. SA: In your own words, explain the “Argument from Inauthentic Relationships” and articulate two objections to this view, citing a thought-experiment (or some kind of example) to clarify your objections.

#### **Buchanan, Chapter 6, pp.171-183, 183-185, 189§6; 193-194, 197-203**

244. What does Buchanan think is the most serious factor weighing against the idea that we ought to cautiously engage in the use and development of enhancement technologies (p. 171, see p.178)
245. What types of harms does “risk” cover when thinking about the risks of human enhancement, and what types of harms does Buchanan focus upon? (p.172, see p.178)
246. What are the three reasons that Buchanan thinks that those in *favor* of enhancement technologies do not accept enhancements through intentional genetic modification (see pp.172-174)
247. What does Buchanan think the biggest “obstacle” to use of intentional genetic modification on *humans* is? (p.174)

248. Buchanan suggests that of the four stages of cost benefit analysis, critics of enhancement technologies focus on a particular stage and ignore another. Which stage do critics focus on and which stage do they ignore? (p.176)
249. Buchanan notes that there are two reasons why critics of enhancement think that a consideration of the morality of enhancement technologies through a cost-benefit analysis is *shallow*. The first is that we cannot quantify all of the pros and cons that the analysis requires. What is the second reason? (p.177)
250. Buchanan considers three different strategies for dealing with the potential unintended bad biological consequences that accompany intentional genetic modification (IGM). What are these three strategies? (see pp.179, 179-184)
251. Critics of enhancement argue that it is imprudent to ignore the many years it has taken nature to develop human beings. In order to support this claim, they make use of what Buchanan calls “the Master Engineer Analogy.” What is this analogy? (p.181, see p.183)
- ~~252. Buchanan summarizes two objections to the Master Engineer Argument from chapter 5. What are both of these objections? (see p.184)~~
253. Buchanan contends that nature is not a Master Engineer but a what? (p.184, bottom)
254. The Mater Engineer argument treats organisms as if they were optimally designed by *unintentional* genetic modification (UGM), but Buchanan thinks that UGM shows that the design of organisms is what? (see p.184)
255. What two traits do microbes and various traits have that human beings don’t and what problem might IGM allow us to overcome by having these traits? (p.189§6)
256. Buchanan considers two different formulations of the precautionary principle (see pp.199-200), what does he take to be its basic idea and what paradox follows from it? (p.201)
- ~~257. What is the maximin version of the precautionary principle? (p.201)~~
- ~~258. What is the maximin version of the precautionary principle and under what two conditions is it supposed to apply? (pp.201-202)~~
- ~~259. Which of the two conditions of the maximin version of the precautionary principle applies in the enhancement debate? (pp.202)~~
260. SA: Buchanan contrasts his pluralistic risk-reduction strategy (see p.198-199) with there being a single master principle of risk reduction like the precautionary principle. What fundamental consideration guides Buchanan’s choice for a pluralistic strategy over the master-principle precautionary strategy? Illustrate this with two examples from his list of seven principles (pp.198-199, see p.200 bottom, 202)

#### Classroom Questions (See Handout)

261. How might a critic of biomedical enhancement technology agree (i) that there is nothing different between previous non-biomedical technologies and new biomedical technologies, (ii) that biomedical enhancement technologies certainly do have the potential to increase productivity as well as produce network effects and thereby increase the well-being of all, (iii) that there is no *conclusive* reason that outweighs a pro/con evaluation of the risks / benefits of biomedical enhancement technologies YET reject the claim that we should use / develop biomedical enhancement technologies?
262. On the assumption that we accept some kind of “Balancing Approach” (pro/con weighing of the goods/harms) to various biomedical technologies, what two objections are there to the actual carrying out of the balancing approach and how does how does Buchanan respond to these objections by clarifying what he means by “cost-benefit analysis”?
263. Consider that a critic of biomedical enhancement technologies might argue that some cases of enhancement *intentional genetic modification* (IGM) might be acceptable but we ought to avoid their use since (i) we are prone to misjudge whether a particular ET is safe or not (ii) the safest route is to avoid error by not using enhancement IGM at all. Buchanan says that this argument depends upon what *two* factors?
264. SA: We have considered a variety of arguments for and against the use and development of enhancement technologies. Assuming that the use of emerging biomedical science and technology is

morally acceptable, *in your own words but relying on Buchanan's heuristic guidelines*, outline what sorts of principles / guidelines we should use in using these technologies. Use examples to illustrate and clarify your answer.

265. SA: Is it morally acceptable to enhance human beings by using biomedical technologies? In your own words, clearly state your answer, justify this by putting forward an argument that includes premises and a conclusion. Be sure to articulate any key terms you use and use examples or concrete illustrations to support and clarify your position.

**Last Updated:**