Future of Biotechnology
Pre-syllabus
P Bishop,

Introduction

I've called this document a "pre-syllabus" because I'm still feeling my way into this course. I typically begin a new course with the statement that "new courses emphasize enthusiasm over experience!" Well, I'm enthusiastic (and I hope you are, too), but not yet experienced.

I'm patterning this course after the only other special topics course I've taught in futures – Our Future in Space – that I thought off and on at Clear Lake. The difference is that I had a background in the space program (to some extent) through work I had done in space commercialization with NASA in the 1980s. While I still learned a lot in the course, I had some background to start with.

This case is different because, though I keep up with biotechnological developments as much as other futurists, I do not have any explicit background in the subject. So we will all be learning more as a group than as a teacher and a class. That's fine. Most of the people in the course are veterans—certainly as students and many as futures students so we've got the drill down.

The overall objective of the course, as it was with the Space course, is to create images of the future of this domain (biotechnology) grounded in solid evidence and reasoning plus a good dose of well-reasoned, yet imaginative speculation. As with all futures work, we want to expand people's awareness (and our own in this case) of the plausible futures that could happen.

Fundamentally the backbone of the course will be a set of books that we will read, discuss and use as the basis of the products we develop. Given the developments in biotechnology over the last few decades, the literature in this area is vast. So there is no way we can read it all. But since we are starting out, books are probably the best entry into the field, even though some may be outdated almost as fast as they are published. We'll then supplement that reading with articles and scanning hits that we will find along the way.

The books and topics that I have discovered so far are –

Overall topic	**Recommended book(s)**	**Brief description**
Basic science of biotechnology	*An Introduction to Genetic Engineering*, Nicholl	Basic biology
The history of biotechnology	*From Alchemy to IPO*, Robbins	History of biotech industry
	Billion Dollar Molecule, Werth	Case study of drug creation

Overall topic	Recommended book(s)	Brief description
One specific domain – stem cells and anti-aging research	*The Immortal Cell*, West *Merchants of Immortality*, Hall	Development of embryonic stem cells Critique of anti-aging research
An overall forecast of medical developments	*Redesigning Humans*, Stock	Medical advances
The transhumanist perspective	*More Than Human*, Naam *Rapture*, Alexander	Transhuman developments History and cultural context of Transhumanists/bioutopians
Ethical dilemmas	*Made not Born*, Walker	Readings on ethics and critiques
Agricultural and industrial applications	*No book yet*	
Use in environmental applications	*Nature's Operating Instructions*, Ausubel	Readings on environmentally sensitive biotech

Each section should take about two weeks. Some topics have one book which we will all read. Some have two, in which case I will randomly assign half the class to read one or the other, but of course you can read both if you wish. And if you have or know of another good book on that topic, please suggest it and we might add it to the list. We are trying to tried to use fact-based, futures-oriented, balanced treatments of the subject

The weekly (or bi-weekly) activities will include things like –

1. A report on your reading –
    a. What you learned
    b. What you disagreed with
    c. What questions you still have
    d. Implications of all this for the future
2. Internet search – other books, articles, experts, organizations and websites on the topic

There will also be three term products, based on a sub-domain of biotechnology chosen by the student –

1. A scanning journal containing at least 10 events or new pieces of information that appeared in that sub-domain during the semester.
2. A framework document containing the raw information one would use to create a forecast in the sub-domain. *(I'll teach what a framework document is for those that have not had that in the curriculum yet.)*
3. A magazine article containing an interesting and well-supported forecast of some aspect of the sub-domain.

We will develop these products using periodic milestones so that all the work does not pile up at the end.