

RECEIVED

1. General Information

1a. Submitted by the College of: ENGINEERING

Date Submitted: 4/1/2013

1b. Department/Division: Ctr For Biomedical Engineering

1c. Contact Person

Name: David Pienkowski

Email: pienkow@uky.edu

Phone: 859-323-1568

Responsible Faculty ID (if different from Contact)

Name:

Email:

Phone:

1d. Requested Effective Date: Semester following approval

1e. Should this course be a UK Core Course? No

2. Designation and Description of Proposed Course

2a. Will this course also be offered through Distance Learning?: No

2b. Prefix and Number: BME 640

2c. Full Title: Biomedical Engineering Ethics

2d. Transcript Title:

2e. Cross-listing:

2f. Meeting Patterns

LECTURE: 1

2g. Grading System: Letter (A, B, C, etc.)

2h. Number of credit hours: 1

2i. Is this course repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester?

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APR 1 2013

OFFICE OF THE
SENATE COUNCIL

2j. Course Description for Bulletin: This course presents an engineering-based approach to study the system of ethics applicable to biomedical engineering. This course will describe and examine the responsibilities of biomedical engineers to stakeholders, e.g. patients, research subjects, and engineering clients as well as to the legal system (where applicable) and the profession as an entity. As a scholarly discipline, biomedical engineering ethics draws upon principles from subjects such as: the philosophy of science, the philosophy of engineering, and the ethics of technology. Materials from these principles will be used in this course with adaptation to the special circumstances attending the practice of Biomedical Engineering.

2k. Prerequisites, if any: none

2l. Supplementary Teaching Component:

3. Will this course taught off campus? No

If YES, enter the off campus address:

4. Frequency of Course Offering: Fall,

Will the course be offered every year?: Yes

If No, explain:

5. Are facilities and personnel necessary for the proposed new course available?: Yes

If No, explain:

6. What enrollment (per section per semester) may reasonably be expected?: 15

7. Anticipated Student Demand

Will this course serve students primarily within the degree program?: Yes

Will it be of interest to a significant number of students outside the degree pgm?: Yes

If Yes, explain: [var7InterestExplain]

8. Check the category most applicable to this course: Relatively New – Now Being Widely Established,

If No, explain:

9. Course Relationship to Program(s).

a. Is this course part of a proposed new program?: No

If YES, name the proposed new program:

b. Will this course be a new requirement for ANY program?: Yes

If YES, list affected programs: Masters and Doctoral programs in Biomedical Engineering

10. Information to be Placed on Syllabus.

a. Is the course 400G or 500?: No

b. The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from 10.a above) are attached: Yes

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: No

Interactive Video: No

Hybrid: No

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4. Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6. How do course requirements ensure that students make appropriate use of learning resources?

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (<http://www.uky.edu/UKIT/>)?

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? NO

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10. Does the syllabus contain all the required components? NO

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|BJSTOK0|Barbara J Brandenburg|College approval for ZCOURSE_NEW BME 640|20121108

SIGNATURE|ZNNIKO0|Roshan N Nikou|Graduate Council approval for ZCOURSE_NEW BME 640|20121126

SIGNATURE|BJSTOK0|Barbara J Brandenburg|Approval resent to college for ZCOURSE_NEW BME 640|20130304

SIGNATURE[ZNNIKO0]Roshan N Nikou|Graduate Council approval for ZCOURSE_NEW BME 640|20130307

Courses	Request Tracking
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New Course Form

<https://myuk.uky.edu/sap/bc/soap/rfc?services=>

[Open in full window to print or save](#)

Generate F

Attachments:

Upload File

ID	Attachment
Delete 1516	BME 640 Syllabus.doc
First 1 Last	

Select saved project to retrieve...

Get New

(*denotes required fields)

1. General Information

- a. * Submitted by the College of: ENGINEERING Today's Date: 4/1/2013
- b. * Department/Division: Ctr For Biomedical Engineering
- c.
 - * Contact Person Name: David Pienkowski Email: pienkow@uky.edu Phone: 859-323-1568
 - * Responsible Faculty ID (if different from Contact): Email: Phone:
- d. * Requested Effective Date: Semester following approval OR Specific Term/Year¹
- e. Should this course be a UK Core Course? Yes No
 If YES, check the areas that apply:
 - Inquiry - Arts & Creativity Composition & Communications - II
 - Inquiry - Humanities Quantitative Foundations
 - Inquiry - Nav/Math/Phys Sci Statistical Inferential Reasoning
 - Inquiry - Social Sciences U.S. Citizenship, Community, Diversity
 - Composition & Communications - I Global Dynamics

2. Designation and Description of Proposed Course.

- a. * Will this course also be offered through Distance Learning? Yes No
- b. * Prefix and Number: BME 640
- c. * Full Title: Biomedical Engineering Ethics
- d. Transcript Title (if full title is more than 40 characters):
- e. To be Cross-Listed² with (Prefix and Number):
- f. * Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours³ for each meeting pattern type.

<input type="checkbox"/> 1 Lecture	<input type="checkbox"/> Laboratory ⁴	<input type="checkbox"/> Recitation	<input type="checkbox"/> Discussion
<input type="checkbox"/> Indep. Study	<input type="checkbox"/> Clinical	<input type="checkbox"/> Colloquium	<input type="checkbox"/> Practicum
<input type="checkbox"/> Research	<input type="checkbox"/> Residency	<input type="checkbox"/> Seminar	<input type="checkbox"/> Studio
<input type="checkbox"/> Other			

If Other, Please explain: _____
- g. * Identify a grading system: Letter (A, B, C, etc.) Pass/Fail
- h. * Number of credits: 1
- i. * Is this course repeatable for additional credit? Yes No
 If YES: Maximum number of credit hours: _____
 If YES: Will this course allow multiple registrations during the same semester? Yes No

j. * Course Description for Bulletin:

This course presents an engineering-based approach to study the system of ethics applicable to biomedical engineering. This course will describe and examine the responsibilities of biomedical engineers to stakeholders, e.g. patients, research subjects, and engineering clients as well as to the legal system (where applicable) and the profession as an entity. As a scholarly discipline, biomedical engineering ethics draws upon principles from subjects such as: the philosophy of science, the philosophy of engineering, and the ethics of technology. Materials from these principles will be used in this course with adaption to the special circumstances attending the practice of Biomedical Engineering.

k. Prerequisites, if any:

none

i. Supplementary teaching component, if any: Community-Based Experience Service Learning Both3. * Will this course be taught off campus? Yes No

If YES, enter the off campus address:

4. Frequency of Course Offering.

a. * Course will be offered (check all that apply): Fall Spring Summer Winter

b. * Will the course be offered every year? Yes No

If No, explain:

5. * Are facilities and personnel necessary for the proposed new course available? Yes No

If No, explain:

6. * What enrollment (per section per semester) may reasonably be expected? 15

7. Anticipated Student Demand.

a. * Will this course serve students primarily within the degree program? Yes No

b. * Will it be of interest to a significant number of students outside the degree pgm? Yes No

If YES, explain:

topics covered are applicable to other engineering disciplines

8. * Check the category most applicable to this course:

Traditional – Offered in Corresponding Departments at Universities Elsewhere

Relatively New – Now Being Widely Established

Not Yet Found in Many (or Any) Other Universities

9. Course Relationship to Program(s).

a. * Is this course part of a proposed new program? Yes No

If YES, name the proposed new program:

b. * Will this course be a new requirement⁵ for ANY program? Yes No

If YES⁵, list affected programs:

Masters and Doctoral programs in Biomedical Engineering

10. Information to be Placed on Syllabus.

a. * Is the course 400G or 500? Yes No

If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in 10.b. You must include: (i) ident additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR

b. * The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if appl 10.a above) are attached.

- Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.
- The chair of the cross-listing department must sign off on the Signature Routing Log.
- In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, is two hours per week for a semester for one credit hour. (from SR 5.2.1)
- You must also submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.
- In order to change a program, a program change form must also be submitted.

Rev 8/09

[Submit as New Proposal](#) [Save Current Changes](#) [Delete Form Data and Attachments](#)

UNIVERSITY OF KENTUCKY
CENTER FOR BIOMEDICAL ENGINEERING
BME 640 Biomedical Engineering Ethics
COURSE SYLLABUS

Fall, 2013
Classroom Rm. 19 Wenner-Gren
Meeting time TBD
1 credit hour
email

Instructor: David Pienkowski, Ph.D.
Office: 205 Wenner-Gren
Telephone: 323-1568
Hours: by appointment
pienkow@uky.edu

Course Description

This course presents an engineering-based approach to study the system of ethical principles applicable to biomedical engineering. This course will describe and examine the responsibilities of biomedical engineers to stakeholders, e.g. patients, research subjects, and engineering clients as well as to the legal system (where applicable) and the profession as an entity. As a scholarly discipline, biomedical engineering ethics draws upon principles from subjects such as: the philosophy of science, the philosophy of engineering, and the ethics of technology. Materials from these principles will be used in this course with adaption to the special circumstances attending the practice of Biomedical Engineering.

Course Objectives:

1. trace the foundations of biomedical engineering ethics from historical developments in classical engineering disciplines and the practice of medicine,
2. confer students with an appreciation concerning the rights of and duties to patients, research subjects, and other recipients of biomedical engineering practice,
3. explore the development of various Codes of Ethics used in the engineering, medical and legal professions and examine those proposed for adoption by Biomedical Engineers,
4. instill competence in ethical reasoning by using the case method to study actual examples of engineering ethics in practice.

Course Outline:

1. Ethics in various professional practices
2. Ethical Professional Conduct
3. Animal & Human Research Studies: rights and responsibilities of Biomedical Engineers
4. Codes of Ethics
5. Case studies of Ethics in Engineering.

Lecture Schedule:

Lectures will be based upon the course materials shown in the class schedule. Content of the lectures may be modified due to the varying abilities/backgrounds of the students and the instructor's travel schedule. Lectures may end early or late to achieve logical "breakpoints". Guest instructors will be invited to lecture in class, as time and opportunity permit, to aid student learning of the materials presented in class.

Performance Evaluation:

Evaluation of the student's performance will be based upon the instructor's assessment of student progress as determined by absolute and relative standards. Attendance, class participation, and attitude will also be used to evaluate performance. The following will be the approximate "guide" for grading:

Mid-term exam	25%
Final Exam	45%
Class participation	<u>30%</u>
	100%

Examinations

Examinations will consist of in-class essay/short answers to ethics related questions pertaining to lecture/discussion topics held in class. Exams may be given outside of class time (to compensate for classes missed due to holidays and the instructor's out-of-town travel). Each exam will be 1-2 hours in duration and the final exam will be comprehensive. Exams require two blue or black pens (no pencils) to record your answers on plain white paper. No other materials (books, book bags, note sheets, briefcases, knapsacks, etc.) will be permitted anywhere in the exam room. I may also implement "unannounced" quizzes at my discretion. Please come to each class prepared for a quiz.

Project

Students may be required to engage in a biomedical engineering ethics related project. This potentially optional project will be designed to provide students with a real-world application of the principles learned in the course to a situation in biomedical engineering. The project's contribution to the overall grade will be negotiated before the project begins.

Attendance:

Class attendance is a strong indicator of success, and thus students need to attend class and take notes to learn the material presented. The material in this course, in general, is not found in any one textbook, hence the importance of class attendance. Role will be taken; unexcused/unacceptable absences may result in a diminished grade. Absences are acceptable if: 1) excused in advance (I prefer an email note) 2) they are bona fide, and 3) if the notes from the missed class are obtained from another classmate. Unexcused absences reflect poorly upon the scholarly intentions of the student. Because attendance is mandatory, for the third and each subsequent unexcused absence your final average may be lowered by 2 percentage points for each class missed. To be counted as present, you must be present for the entire class session. If any student misses in excess of 20% of the total instructional class hours in this course, the instructor retains the right to ask the student to withdraw even if the absences are excusable.

Acceptable reasons for "excused" absences are defined by Senate Rule 5.2.4.2 and include:

- 1) serious illness
- 2) illness or death of family member
- 3) University-related trips
- 4) major religious holidays
- 5) other circumstances that I determine are "reasonable cause for nonattendance."

Class Participation

I expect each student in the class to follow the material carefully and remain up to date regarding the issues discussed. Students should be ready to answer questions posed by the

instructor at any particular time during the class regarding the situation under discussion. I also expect students to ask questions, especially the "what if's" regarding alternative scenarios.

Classroom Behavior, Decorum and Civility

Classroom demeanor is an increasingly significant problem on campus' nationwide. The Center for Biomedical Engineering respects the dignity of all students and as well as the differences among members of the University of Kentucky academic community. The instructor recognizes the right of all students to respectfully disagree on occasion. Students clearly have the right to take reasoned exception, and to voice opinions contrary, to those offered by the instructor or other students (Senate Rule 6.1.2). Equally, the instructor has the right, and the responsibility, to ensure that all academic discourse occurs in a context characterized by respect and civility. To summarize, "...it is acceptable to disagree with the instructor or your classmates, but it is not acceptable to be disagreeable while doing so".

Class Enrollment

Students who are attending class but are not on the class roll (i.e., not enrolled) will be directed to the Registrar. No member of the University has an obligation to instruct students who fail to properly enroll or whose enrollment becomes nullified during the semester.

Learning

This is a graduate level course, and as such, it is the instructor's responsibility to guide the education of the student. The student's education is, however, the sole responsibility of the student. This means that the student must take charge of their learning process. Most commonly, this means that the student must study outside of class. Merely coming to class, taking notes, and then not opening a notebook or studying the material outside of class is one of the most common means of failing to learn the material and develop intellectually to one's full potential. Students must study their notes outside of class, engage in supplemental reading (as suggested from the Reference List), try to understand situations (especially those shown in class) on their own without the aid of references, and think about how the material presented is linked to the practice of biomedical engineering. The material presented will challenge you, and thus as an approximate guide, a minimum of 4 hours of study per week outside of class time is needed to provide a solid basis for understanding.

Learning Styles and Attitude

Students learn at different rates and by differing methods, e.g., visual vs. verbal, application vs. theory, repetition vs. single-exposure, etc. There is not sufficient class time for the instructor to determine each student's particular learning style and adapt the course to each of these particular styles. Thus, the instructor will use all of the above methods in the presentation of the class materials to help ensure that each student develops proficiency in biomedical engineering ethics.

Learning Environment Expectations:

All students are expected to have a mature interest in learning biomedical engineering ethics. I expect this maturity to be manifested by: classroom attendance, participation, and etiquette, as well as by clear, orderly, and timely performance for any assignments. Failure to adhere to classroom etiquette (excessive non-class related talking during lecture, cell phone texting, and other activities which interfere with your learning or the learning of others) will be dealt with by verbal warnings, reduced grades, and if necessary, a report to the Dean of Students (followed by potential punishable disciplinary action).

My Commitment to Your Learning

I care that you learn biomedical engineering ethics not just because it's my job, but because it is important for your professional career. Biomedical engineering ethics provides the basis for all decisions regarding the application of biomedical engineering principles to aid those with injuries, diseases, or congenital malformations. If I am unable to teach you these skills, for whatever reason, please communicate this to me in public or private and I'll arrange for supplemental individual instruction, modification to the course materials, or additional lectures for the entire class.

Language

Excellent communication is essential for learning. Those whose native language is not English and whose English skills are less than adequate may experience difficulty with this course. If this applies to you, please consult with me soon after the first class.

Academic Offenses

Academic integrity is important to scholarship. Sadly, the prevalence of cheating on campuses across the country is at a historic high point. This reality is disturbing not only to faculty but to the many students who choose not to cheat. Cheating and plagiarism are offenses that are taken seriously with zero tolerance. Students caught cheating will receive a failing grade for the entire course. **UNIVERSITY REGULATIONS REGARDING CHEATING AND PLAGIARISM ON EXAMS AND HOMEWORKS WILL BE STRICTLY ENFORCED AS PER SENATE RULES 6.3.0 (and following).**

To help safeguard against cheating, I reserve the right to implement any or all of the following during exams:

- assign or change seating in the exam room,
- prohibit cell phones/pagers from being brought into examination rooms,
- require students to place all personal effects out of view in the exam room,
- prohibit the wearing of wide-brimmed caps or hats,
- consider that "talking during the exam will be construed as cheating;"
- create a "sign-in" sheet and compare signatures on the exams with those on the sign-in sheet;
- examine the desktops during the examination and require removal of any extraneous material;
- monitor carefully all segments of the room at regular intervals during the examination;
- announce that anybody leaving the classroom during the exam will not be allowed to return,
- confiscate all evidence of cheating immediately and without comment.

Textbook

A text is "suggested", but no text fits the needs of the course exceptionally well. Every text is a compromise. Reprinted Harvard Business School cases are sometimes used, and due to copyright restrictions, these also require individual student purchase. Attendance is mandatory and important because the material for the course is derived from a variety of sources.

Supplemental Materials:

When needed, copies of important supplemental materials will be provided as handouts at the beginning of class. Physical incorporation of these materials into your notebooks is strongly recommended to aid your extra-class study of the materials presented in these handouts as diligently as your notes.

Late Arrival:

I frequently walk to Wenner-Gren from a meeting in another building on campus and sometimes get delayed in route. Please, in the event of lateness on my behalf, give me 15 minutes courtesy time before you leave the room and assume that there will be no class. If I

am going to be later than 15 minutes, I will call Becky Heisel and ask her to write a note on the board in room 19 explaining the circumstances. Also, to be sure before you leave the class and assume I'm not coming, please call Becky (257-8101) and inquire regarding my anticipated arrival..

In the Event of Severe Weather:

The University may be closed in the event of severe weather. I try to get in despite the weather; however, I recommend you call my office if you are uncertain if we will have class. For official University information, refer to:

UK TV cable channel 16
UK radio (WUKY 88.9 FM)
UK infoline 257-5684
UK website www.uky.edu

Suggested Text

Vallero, Daniel. *Biomedical Ethics for Engineers: Ethics and Decision Making in Biomedical and Biosystems Engineering*. Academic Press, New York, 2007

Recommended Reading

1. American Society of Civil Engineers (2010) [1914]. *Code of Ethics*. Reston, Virginia, USA: ASCE Press. <http://www.asce.org/Leadership-and-Management/Ethics/Code-of-Ethics/>. Retrieved 2011-12-07.
2. American Society of Civil Engineers (2000). *Standards of Professional Conduct*. Reston, Virginia, USA: ASCE Press. https://www.asce.org/pdf/ethics_manual.pdf. Retrieved 2006-10-20.
3. Birsch D and Fielder, JF. *The DC-10 Case: A Study in Applied Ethics, Technology, and Society*, State University of New York Press, Albany, NY. 1992
4. Birsch D and Fielder, JF. *The Ford Pinto Case: A Study in Applied Ethics, Technology, and Society*. State University of New York Press, Albany, NY. 1994
5. Vallero, D. *Biomedical Engineering Desk Reference*; Chapter 8.1: Ethics. Academic Press, New York, 2009
6. Institution of Civil Engineers (2004). *Royal Charter, By-laws, Regulations and Rules*. http://www.ice-london.org.uk/london/documents/charter_and_bylaws_2005.pdf. Retrieved 2006-10-20.
7. Layton, Edwin (1986). *The Revolt of the Engineers: Social Responsibility and the American Engineering Profession*. Baltimore, Maryland, USA: The Johns Hopkins University Press. ISBN 0-8018-3287-X.
8. National Society of Professional Engineers (2007) [1964]. *Code of Ethics*. Alexandria, Virginia, USA: NSPE. <http://www.nspe.org/resources/pdfs/Ethics/CodeofEthics/Code-2007-July.pdf>. Retrieved 2006-10-20.
9. Petroski, Henry (1985). *To Engineer is Human: the Role of Failure in Successful Design*. St Martin's Press. ISBN 0-312-80680-9.

10. "Ethical Issues in Biomedical Engineering: The Bjork-Shiley Heart Valve," *Engineering in Medicine and Biology*, Vol 10, No.1, March 1991
11. "The Bioengineer's Obligations to Patients," *Journal of Investigative Surgery*, Vol.5, No.3, July-September 1992.
12. "Breast Implants," *Engineering in Medicine and Biology*, Vol. 11, No.2 (June, 1992).
13. "Ethical Issues in Medical Device Implant Retrieval," *Engineering in Medicine and Biology*, Vol.11, No.3 (Sept., 1992).
14. "Ethical Issues in Clinical Trials," *Engineering in Medicine and Biology*, Vol.12, No.1 (March, 1993).
15. "Fair Allocation of Resources and the Artificial Heart," *Engineering in Medicine and Biology*, Vol.12, No.2 (June, 1993).
16. "More Bad News About Bjork-Shiley C/C Heart Valves," *Engineering in Medicine and Biology*, Vol.13, No.2, April, 1994.
17. "The Shiley Heart Valve - Continued," *Engineering in Medicine and Biology*, Vol. 13, No.4, November/December, 1994.
18. "An Ethical Issue in the Bjork-Shiley Artificial Heart Valve Case," *Proceedings of the Twelfth Southern Biomedical Conference*, April 2-4, 1993.
19. "Analyzing Ethical Problems in Medical Products: The Role of Conflicting Ethical Theories," *Clinical Research and Regulatory Affairs*, Vol.11, No.2, May 1994. Co-author, Glenn Rahmoeller.
20. "But Doctor, It's My Hip!: The Fate of Failed Medical Devices," *Kennedy Institute of Ethics Journal*, Vol.5, No.2 (June 1995). Co-author, Jonathan Black.
21. "Defects and Deceptions: The Bjork-Shiley Heart Valve," *Technology and Society*, Vol.14, No.3, (Fall 1995), 17-22.
22. "Ethics," *Engineering in Medicine and Biology*, Vol.10, No.4 (Dec.1991).
23. "A Misbehavior in Science," *Engineering in Medicine and Biology*, Vol.11, No.1 (Mar.1992).
24. "How well do Medical Devices Work?" *Engineering in Medicine and Biology*, Vol.13, No.3 (June/July 1994).
25. "Floors, Doors, Latches, and Locks," in *The DC-10 Case: A Study in Applied Ethics, Technology, and Society*, (Albany, NY: State University of New York Press, 1992). Co-author: Douglas Birsch.
26. "The Ethics and Politics of Auto Regulation," in *The Ford Pinto Case: A Study in Applied Ethics, Technology, and Society*, (Albany, NY: State University of New York Press, 1994) Coauthor: Douglas Birsch.
27. "Ethical Analysis of Case Studies," in *The DC-10 Case: A Study in Applied Ethics, Technology, and Society*, (Albany, NY: State University of New York

Press, 1992). Co-author: Douglas Birsch, and *The Ford Pinto Case: A Study in Applied Ethics, Technology, and Society*, (Albany, NY: State University of New York Press, 1994) Co-author: Douglas Birsch.

28. "Publication, Ethics, and Scientific Integrity," *Journal of Biomedical Materials Research*, Vol. 30, 129-131(1996). Reprinted in *Engineering in Medicine and Biology*, Vol.15, No.4, July/August 1996.

7 March 2013