1. General Information

1a. Submitted by the College of: ENGINEERING

Date Submitted: 2/12/2014

1b. Department/Division: Department of Biomedical Engineering

1c. Contact Person

Name: David Puleo

Email: puleo@uky.edu

Phone: 859-257-2405

Responsible Faculty ID (if different from Contact)

Name:

Email:

Phone:

1d. Requested Effective Date: Specific Term/Year [1] Fall 2015

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 301

2c. Full Title: Fundamentals of Biomedical Engineering

2d. Transcript Title: Fundamentals of Biomedical Engineering

2e. Cross-listing:

2f. Meeting Patterns

LECTURE: 3

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

2h. Number of credit hours: 3

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?

2j. Course Description for Bulletin: Overview of the application of engineering principles to problems in living systems and healthcare delivery. Fundamental anatomy and physiology for engineers. Quantitative measurement and analysis of the structure, function, and control of biological systems.

2k. Prerequisites, if any: Engineering standing or consent of instructor.

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?: 20

7. Anticipated Student Demand

Will this course serve students primarily within the degree program?: No

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

If Yes, explain: This course will be of interest to students in other engineer disciplines. It may be able to serve as a free or technical elective.

8. Check the category most applicable to this course: Traditional – Offered in Corresponding Departments at Universities Elsewhere,

If No, explain:

9. Course Relationship to Program(s).

a. Is this course part of a proposed new program?: Yes

If YES, name the proposed new program: Minor in Biomedical Engineering

b. Will this course be a new requirement for ANY program?: No

If YES, list affected programs:

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|BME 301 NEW College Review|20140212

SIGNATURE|PULEO|David A Puleo|BME 301 NEW Dept Review|20140212

SIGNATURE|PULEO|David A Puleo|BME 301 NEW Dept Review|20140212

SIGNATURE|CHE202|Kimberly W Anderson|BME 301 NEW College Review|20140213

SIGNATURE|JMETT2|Joanie Ett-Mims|BME 301 NEW Undergrad Council Review|20140919

Courses | Request Tracking

New Course Form

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

Open in full window to print or save

Generate Report

Attachments:

Browse... No file selected. Upload File

	ID	Attachment
Delete	3473	BME 301 syllabus - revMay2014.pdf

First 1 Last

Select saved project to retrieve... Get New

(*denotes required fields)

1. General Information

a. * Submitted by the College of: ENGINEERING Submission Date: 2/12/2014

b. * Department/Division: Department of Biomedical Engineering

c.
* Contact Person Name: David Puleo Email: puleo@uky.edu Phone: 859-257-2405
* Responsible Faculty ID (if different from Contact) Email: Phone:

d. * Requested Effective Date: ○ Semester following approval OR ● Specific Term/Year [1] Fall 2015

e.
Should this course be a UK Core Course? ○ Yes ● No

If YES, check the areas that apply:

- ☐ Inquiry - Arts & Creativity
- ☐ Inquiry - Humanities
- ☐ Inquiry - Nat/Math/Phys Sci
- ☐ Inquiry - Social Sciences
- ☐ Composition & Communications - I
- ☐ Composition & Communications - II
- ☐ Quantitative Foundations
- ☐ Statistical Inferential Reasoning
- ☐ U.S. Citizenship, Community, Diversity
- ☐ Global Dynamics

2. Designation and Description of Proposed Course.

a. * Will this course also be offered through Distance Learning? ○ Yes [4] ● No

b. * Prefix and Number: BME 301

c. * Full Title: Fundamentals of Biomedical Engineering

d. Transcript Title (if full title is more than 40 characters): Fundamentals of Biomedical Engineering

e. To be Cross-Listed [2] with (Prefix and Number):

f. * Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours[3] for each meeting pattern type.

3	Lecture		Laboratory[1]		Recitation		Discussion
	Indep. Study		Clinical		Colloquium		Practicum
	Research		Residency		Seminar		Studio
	Other	If Other, Please explain:					

g. * Identify a grading system:
- ● Letter (A, B, C, etc.)
- ○ Pass/Fail
- ○ Medicine Numeric Grade (Non-medical students will receive a letter grade)
- ○ Graduate School Grade Scale

h. * Number of credits: 3

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:

Overview of the application of engineering principles to problems in living systems and healthcare delivery. Fundamental anatomy and physiology for engineers. Quantitative measurement and analysis of the structure, function, and control of biological systems.

k. Prerequisites, if any:

Engineering standing or consent of instructor.

l. Supplementary teaching component, if any: ○ Community-Based Experience ○ Service Learning ○ Both

3. * 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? 20

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:

This course will be of interest to students in other engineer disciplines. It may be able to serve as a free or technical elective.

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:
Minor in Biomedical Engineering

b. * Will this course be a new requirement [5] for ANY program? ○ Yes ◉ No

If YES [5], list affected programs::

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) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR 3.1.4.)

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.

[1] Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.
[2] The chair of the cross-listing department must sign off on the Signature Routing Log.
[3] 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, represents at least two hours per week for a semester for one credit hour. (from SR 5.2.1)
[4] You must also submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.
[5] In order to change a program, a program change form must also be submitted.

Rev 8/09

Submit as New Proposal Save Current Changes

BME 301

Fundamentals of Biomedical Engineering

Fall 2014

Class Meetings: Mondays, Wednesdays, and Fridays, 1:00 - 1:50 p.m.
19 Wenner-Gren Laboratory

Coordinator: David Puleo, Ph.D., 209 Wenner-Gren Lab, 257-2405, puleo@uky.edu

Teaching Team: Dr. Babak Bazrgari (babak.bazrgari@uky.edu)
Dr. Abhijit Patwardhan (abhijit@uky.edu)
Dr. David Pienkowski (pienkow@uky.edu)
Dr. David Puleo (puleo@uky.edu)
Dr. Hainsworth Shin (hy.shin@uky.edu)
Dr. Sridhar Sunderam (sridhar.sunderam@uky.edu)
Dr. Guoqiang Yu (guoqiang.yu@uky.edu)

Course Description

Overview of the application of engineering principles to problems in living systems and healthcare delivery. Fundamental anatomy and physiology for engineers. Quantitative measurement and analysis of the structure, function, and control of biological systems.

Prerequisites

Engineering standing or consent of instructor

Learning Objectives

After completing this course successfully, a student will be able to:

1. Define what is meant by the term biomedical engineering and explain the roles biomedical engineers play in the healthcare delivery system
2. Describe the anatomy and physiology of major organ systems and illustrate biomedical engineering applications related to these systems
3. Apply mathematical and physical engineering principles to quantify properties and functions of living systems related to the following areas of biomedical engineering, including but not limited to biomechanics, biomedical imaging, biomedical signal processing, cellular and molecular biotechnology, and biomaterials and tissue engineering

Course Grade

exams (4)	20% each
assignments	10%
group project	10%

Points in each category will be totaled and weighted as described above to arrive at a final grade using the standard grading scale: A = 90-100%; B = 80-89%; C = 70-79%; D = 60-69%; E = 50-59%. If warranted, a curve based on the distribution of final scores may be applied to adjust final grades. If used, the curve will make only small adjustments based on

the statistical distribution of overall scores. Scores grouped near the top will receive As, the next major grouping gets Bs, *etc*.

Attendance

Regular attendance at class meetings is strongly encouraged, because students will be held responsible for all material presented in class (in addition to the text readings, any handouts, etc.). The instructors reserve the right to record the class roll if attendance becomes an issue.

Attendance, class involvement, and attitude will also be considered in determining the final grade. These factors will be used to change (or not change) the final grades given for "borderline" cumulative course scores.

Examinations

Three exams will be given during the semester and one (non-comprehensive) during finals week. These closed book exams will take place during the normal class time on September 24, October 17, and November 17, with the fourth exam during the final exam time of December 17 at 1:00 p.m.

Group Project

Each group will select a specific medical device/technology of mutual interest. Your team will then investigate the clinical need for the device/technology, parameters that affected design of the device, any associated patents that grant exclusive rights to the inventor(s), and the development device/technology from concept to final production. The topic should be confirmed with the instructor no later than September 19.

Your findings will be reported in an oral presentation that can be in the form of a video or narrated PowerPoint slides (with appropriate citations). Keeping in mind that this is a team project, all members must participate in both preparing and presenting the report. Final presentations must be uploaded to Blackboard by 8:00 a.m. on December 8. Late reports will be penalized 10% per day.

Each student will submit a confidential evaluation of him/herself and his/her partners when the final report is due. These evaluations will be considered when determining the final grades.

Homework Assignments

A limited number of homework assignments will be used to supplement content covered during class. They are an opportunity for students to assess their understanding of basic concepts at relatively little risk to their final grade. Although discussion of homework questions is permissible, students are required to independently write their solutions. Assignments are due at the beginning of class. Late assignments will be penalized 10%/day.

Textbook

Introduction to Biomedical Engineering, J. Enderle and J. Bronzino, Academic Press, Third Edition, 2012.

Other materials may be provided by individual faculty members, as needed.

Mid-term Grade

Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (http://www.uky.edu/Registrar/AcademicCalendar.htm).

Make-up Policy

Students who fall ill, or who know they will be missing an exam for a valid reason (see Excused Absences) are encouraged to notify the instructor by phone or e-mail prior to the exam, if at all possible. Students missing an exam without a valid excuse will receive a grade of 0 for that exam. The make-up exam time will be scheduled as needed. Missed quizzes and other assignments will also be accepted with an excused absence.

Excused Absences

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class.

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense

against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of Student Rights and Responsibilities (http://www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiarism.

Written assignments you turn in may be submitted to SafeAssign via Blackboard for comparison with a collection of other previously submitted works and those available on public web sites.

Accommodations Due to Disability

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Classroom Behavior

Students are expected to maintain professional standards of decorum in the classroom. The use of cellphones (including texting), tablets and laptops during lectures should not be necessary, and will be permitted only in exceptional circumstances (e.g., phone availability in case of family emergency). No devices (other than approved calculators) may be out during quizzes and exams.

BME 301

Fundamentals of Biomedical Engineering

Fall 2014

Class Schedule

Week of	Monday	Wednesday	Friday
August 25		Block 1	
September 1		Block 1	Block 2
September 8	Block 2		
September 15	Block 3		
September 22	Block 3	**Exam 1**	Block 4
September 29	Block 4		
October 6	Block 5		
October 13	Block 5		**Exam 2**
October 20	Block 6		
October 27	Block 6		
November 3	Block 7		
November 10	Block 7		
November 17	**Exam 3**	Block 8	
November 24	Block 8		
December 1	Block 8	Block 9	
December 8	Block 9		
December 15		**Exam 4** (1:00 p.m.)	

Block 1: Introduction, Historical Perspective, Moral and Ethical Issues

Block 2: Anatomy and Physiology

Block 3: Bioelectric Phenomena

Block 4: Physiological Modeling

Block 5: Biomedical Sensors

Block 6: Biosignal Processing

Block 7: Medical Imaging and Biomedical Optics

Block 8: Biomechanics and Rehabilitation Engineering

Block 9: Biomaterials and Tissue Engineering