**Graduate Programs—NEW COURSE PROPOSAL**

**DEPARTMENT:** CEECS  
**COLLEGE:** ENGINEERING AND COMPUTER SCIENCE

**RECOMMENDED COURSE IDENTIFICATION:**
- **PREFIX:** BME  
- **COURSE NUMBER:** 6334  
- **LAB CODE (L or C):** ___

*(TO OBTAIN A COURSE NUMBER, CONTACT MJENNING@FAU.EDU)*

**COMPLETE COURSE TITLE:** TISSUE ENGINEERING

**CREDITS:** 3

**TEXTBOOK INFORMATION:**

**GRADING (SELECTION ONE GRADING OPTION):**
- **REGULAR X**  
- SATISFACTORY/UNSATISFACTORY

**COURSE DESCRIPTION, NO MORE THAN THREE LINES:**
Principles and newest concepts of tissue engineering. Learning and studying molecular, cellular, and tissue culture aspects of TE and Laboratory work and high level of instrumentations that helps this Laboratory work to grow the tissues. Mechanical functions of the cells, extracellular matrix, types, quality, purposes of scaffolds as the supporters of 3-D tissue growth, discussed.

**PREREQUISITES:** NONE

**COREQUISITES:** NONE

**REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL):**
- GRADUATE STUDENTS IN COMPUTER SCIENCE, COMPUTER ENGINEERING, AND ELECTRICAL ENGINEERING (ENGINEERING). IF NOT, CONSENT OF INSTRUCTOR.

**MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:** PhD

Faculty contact, email and complete phone number: Mirjana Pavlovic, mpavlovic@fau.edu, 7-2348

Please consult and list departments that might be affected by the new course and attach comments.

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**Approved by:**
- Department Chair:
- College Curriculum Chair:
- College Dean:
- UGPC Chair:
- Graduate College Dean:
- UFS President:
- Provost:

**Date:** 11/27/13

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3. Consent from affected departments (attach if necessary)

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Email this form and syllabus to **UGPC@fau.edu** one week before the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

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FAUnewcourseGrad—Revised September 2013
1. Course title/number, number of credit hours

<table>
<thead>
<tr>
<th>Course title/number, number of credit hours</th>
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<tbody>
<tr>
<td>Tissue Engineering – BME 6334</td>
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2. Course prerequisites, corequisites, and where the course fits in the program of study

No prior Biology background assumed. Prior BME 5000 Introduction to Bioengineering will help.

3. Course logistics

| Term: TBA |
| This is a classroom lecture course with PP presentations |
| Class location and time: TBA |
| This course is conceptual. |

4. Instructor contact information

| Instructor's name | Dr. Mirjana Pavlovic, Adjunct Professor |
| Office address | Engineering East (EE-96) Bldg., Room 515 |
| Office Hours | TBA |
| Contact telephone number | 561-297-2348 |
| Email address | mpavlovic@fau.edu |

5. TA contact information N/A

6. Course description

Principles and newest concepts of tissue engineering: concise and comprehensive. Learning and studying molecular, cellular, and tissue culture aspects of TE and Laboratory work and high level of instrumentations that helps this Laboratory work to grow the tissues. Emphasis will be stressed on the mechanical functions of the cells, extracellular matrix, types, quality and purposes of scaffolds as the supporters of 3-D tissue growth and signaling molecules that “engineer” cellular events toward differentiation and integrative complexity of tissues. Stem cell research in its fundamental regenerative purposes will be considered. Tissue barriers to molecular and cellular transports, cell interaction with polymers, and case studies in Tissue Engineering will be discussed. The Computer aid TE with inventive Ink-jet printing methodology in connection with robotics and nanorobotics will be among the topics. For the time being there will be NO actual lab. However, conceptual experiments will be elaborated during the classes.

7. Course objectives/student learning outcomes/program outcomes

<table>
<thead>
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<th>Course objectives</th>
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<tr>
<td>• Understanding global and particular tissue development, architecture, control mechanisms and quantitatization in engineering procedures.</td>
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<tr>
<td>• Studying fundamental processes in signal transduction, related to sensorial tissues and organs, with emphasis on excitable tissues (muscle and neural tissues).</td>
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<tr>
<td>• Understanding basic principles of Tissue Engineering, at molecular, cellular and tissue level</td>
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8. Course evaluation method

<table>
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<th>Home Work - Power point presentations</th>
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<td>60% 20%</td>
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9. Grading scale

Grading Scale:

10. Policy on makeup tests, late work, and incompletes

Makeup tests are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student from participating in the exam. Makeup exam should be administered and proctored by department personnel unless there are other pre-approved arrangements. Late work is not acceptable. A grade of incomplete will be assigned only in the case of solid evidence of medical or otherwise serious emergency situation.

11. Special course requirements

Students have to perform 1 power point presentation per semester.

12. Classroom etiquette policy

University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.

13. Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton campus, SU 133 (561) 297-3880 and follow all OSD procedures.

14. Honor code policy

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at www.fau.edu/regulations/chapter/4.001_Code_of_Academic_Integrity.pdf

15. Required texts/reading


16. Supplementary/recommended readings

Good to have but not obligatory:
Upper Saddle River, NJ, 07458

17. Course topical outline, including dates for exams/quizzes, papers, completion of reading

Tissue Engineering BME 6XXX

Mirjana Pavlovic
Department of Computer and Electrical Engineering and Computer Science  
Florida Atlantic University  
Course Syllabus

Topics and approximate # of 1.5 hr classes

1. **CELLS AND TISSUES (32)**
   - Microscopy: scaling visual field
   - Elements of Embryology-Tissue Development
   - Tissue engineering fundamentals with sensorial system:
     - Cell differentiation
     - Describing cell differentiation mathematically
     - Cell Migration
     - Describing cell migration mathematically
   - Tissue engineering practice:
     - Approaches to Tissue Engineering
     - Case studies in Tissue Engineering
     - Scaling up ex vivo cultivation
     - Computer Aided Tissue Engineering

2. **SCAFFOLDS (7)**
   - Tailoring Biomaterials
   - Biomaterial scaffolds
   - Properties
   - Surface properties
   - Bulk properties
   - Mechanical Properties
   - Biological Properties

3. **SIGNAL MOLECULES (1)**
   - To be chosen and restricted to necessary

4. **TISSUE ENGINEERING STUDY PROBLEMS (4)**
   - Quantitative Cell and Tissue Biology
   - Cell and Tissue Characterization
   - Engineering methods and Designs in Autoimmune and Cancerous Diseases
   - Clinical Implementation

Student PP presentations (6)

Final Exam: TBA

Tissue Engineering BME 6XXX

Mirjana Pavlovic
Hello Dr. Zilouchian,

please find below the approval from the College of Science (Dr. David Binninger) regarding the two courses: BME 6324 and BME6334.

Thank you,
Mihaela Cardei

From: Zvi Roth
Sent: Friday, January 31, 2014 12:21 PM
To: Mihaela Cardei
Cc: Nurgun Erdol; Mirjana Pavlovic
Subject: FW: New Course Proposals BME6324 and BME6334

Are we late? It just came.
Zvi

Dr. Zvi S. Roth
Professor
Department of Computer & Electrical Engineering & Computer Science
Florida Atlantic University
Engineering East Building, Room 519
777 Glades Road
Boca Raton, FL 33431
561-297-3471

From: David Binninger [binninge@fau.edu]
Sent: Friday, January 31, 2014 12:15 PM
To: Zvi Roth
Subject: Re: New Course Proposals BME6324 and BME6334

Hi Zvi,

I hope this e-mail reaches you in time. I do not see any conflict with the proposed graduate courses and any graduate course offered in the biological sciences department. If you have questions or need additional information, please let me know.

Regards,
David
On Jan 30, 2014, at 4:44 PM, Zvi Roth <rothz@fau.edu> wrote:

Dear David,

Happy New Year! How are you?
We are trying to obtain catalog numbers to two Bioengineering courses developed by Dr. Mirjana Pavlović: Tissue Engineering, and Stem Cell Engineering.
The course proposals (with syllabi) are attached.
We need an e-mail of support from the College of Science (I guess from you, and I am so sorry for the last minute notice) to indicate that the two proposed courses don't create any conflict of offerings or any other concerns.
I believe that if such a support is received by tomorrow morning we can still get the courses approved now. Otherwise it will have to wait for a future meeting of the graduate committee.

Regards,
Zvi

Dr. Zvi S. Roth
Professor
Department of Computer & Electrical Engineering & Computer Science
Florida Atlantic University
Engineering East Building, Room 519
777 Glades Road
Boca Raton, FL 33431
561-297-3471

From: Mihaela Cardei
Sent: Thursday, January 30, 2014 4:33 PM
To: Zvi Roth
Cc: Mirjana Pavlović
Subject: FW: RE: New Course Proposals BME6324 and BME6334

Hi Zvi,

the two course proposals (including the syllabi) are attached.

BME 6334 Tissue Engineering
BME 6324 Stem Cell Engineering

Thank you,
Mihaela
From: Barbara Bebergal  
Sent: Wednesday, January 29, 2014 4:17 PM  
To: Nurgun Erdol; Zvi Roth  
Cc: Ali Zilouchian  
Subject: RE: New Course Proposals BME6324 and BME6334  

Good afternoon,

The UGC did not approve these two course proposals. The UGC wants a letter from the College of Science stating that there is no conflict of interest with their program. These cannot go forward until this letter is sent to Dr. Zilouchian. We only have until Friday morning to get this signed by Dr. Zilouchian and move it forward to Steering. If not, it will held until the next UGC meeting on Feb. 26.

Thank you

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Barbara Bebergal  
Administrator of Office Operations  
Division of Research & Graduate College  
Florida Atlantic University  
777 Glades Road, SU 80, Room 101  
Boca Raton, FL 33431-0991  
Tel: 561-297-0056  
Fax: 561-297-2117  
Email: bbebergal@fau.edu  
Website: www.fau.edu/graduate  
Website: http://www.fau.edu/research

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