



 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Graduate Programs		UGPC Approval _____ UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____
	Department Ocean and Mechanical Engineering College College of Engineering and Computer Science <i>(To obtain a course number, contact erudolph@fau.edu)</i>		
Prefix BME Number 6105	<i>(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)</i> Lab Code	Course Title Biomaterials	
Credits <i>(Review Provost Memorandum)</i> 3	Grading <i>(Select One Option)</i> Regular <input checked="" type="radio"/> Sat/UnSat <input type="radio"/>	Course Description <i>(Syllabus must be attached; see Guidelines)</i> This course will cover the knowledge of biomaterials science and engineering. All kinds of biomedical materials as well as their applications in biomedical fields are extensively introduced and discussed.	
Effective Date <i>(TERM & YEAR)</i> Spring 2018		Prerequisites EGN 3365 Engineering Materials 1 or Graduate Standing	Corequisites Registration Controls <i>(Major, College, Level)</i> Eng., Chem., Biology, Matrl Sci. Graduate, Senior
Prerequisites, Corequisites and Registration Controls are enforced for all sections of course			
Minimum qualifications needed to teach course: Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)		List textbook information in syllabus or here David Williams, "Essential Biomaterials Science", 2014, Cambridge University Press, ISBN 978-0-521-89908-6	
Faculty Contact/Email/Phone Yunqing Kang/kangy@fau.edu/561-297-3943		List/Attach comments from departments affected by new course Computer and Electrical Engineering and Computer Science	

Approved by Department Chair  College Curriculum Chair  College Dean  UGPC Chair  Graduate College Dean _____ UFS President _____ Provost _____	Date 4/29/17 4/24/17 4/25/17 _____ _____ _____
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Email this form and syllabus to UGPC@fau.edu one week before the UGPC meeting.

**Department of Ocean and Mechanical Engineering
Florida Atlantic University
Under/Graduate Course Syllabus**

1. Course title/number, number of credit hours Biomaterials BME 6105 (3 Credits, 3 hours/week)
2. Course prerequisites, co-requisites, and where the course fits in the program of study Prerequisite: none
3. Course logistics Term: Spring Class hours: 3 hours This is a classroom lecture course; Class location and time: TBD.
4. Instructor(s) contact information Name: Dr. Yunqing (Kevin) Kang Office Address: Engineering West (EG-36), Room 177 Office Hours: Friday 3-5pm, other time is also available by email request. Telephone Number: (561) 297-3943 Email Address: kangy@fau.edu
5. TA contact information Name: None Office Address: None Office Hours: None Telephone Number: Email Address:
6. Course description <p>This course covers the knowledge of biomaterials science and engineering. All kinds of biomedical materials as well as their applications in biomedical fields are extensively introduced and discussed.</p> <p>This course will cover comprehensive introduction of materials science, biomaterials, tissue engineering and regenerative medicine, and drug delivery, diagnostic system. The content of this course will include preparation, characterization and biological evaluations of biomaterials. Specific biomaterials such as bioceramics, polymer, and hydrogel will be covered. Other topics including cell-biomaterial interaction, cell bioengineering, stem cells niches, drug delivery system and tissue regeneration will also be addressed. This course focuses on the application principles in tissue engineering and applications of all kinds of biomaterials in tissue regeneration and drug delivery system.</p>

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7. Course objectives/student learning outcomes/program outcomes

Course objectives:

The course is designed to introduce the students to the fundamental science of materials, biomaterials, applications in tissue engineering and drug delivery, and also to introduce preparation, characterization and their application of Biomaterials in tissue regeneration. Additionally, the goal of this course also aims at fostering students' scientific sense to design advanced biomaterials. At the same time, the objective is to develop graduate students' scientific written and communication skills.

Student learning outcomes

1. Students will be able to apply the basic principle of Tissue Engineering and Biomaterials to specific tissue regeneration.
2. They will be able to describe and review current biomaterials and can propose new functional biomaterials to solve some problems facing with clinic needs.
3. They can also obtain thoughts about how to design advanced biomaterials for potential application in biomedical fields

8. Course evaluation method

- 20% Home work (2 total)
- 30 % Midterm exam
- 40 % Final exam
- 10 % Paper discussion

9. Course grading scale:

A 92.5-100	C+ 77.5-80	D- 60-62.5
A- 90-92.5	C 72.5-77.5	<60 Don't Ask
B+ 87.5-90	C- 70-72.5	
B 82.5-87.5	D+ 67.5-70	
B- 80-82.5	D 62.5-67.5	

The minimum grade required to pass the course is C-

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

Late Submission will be accepted only if there is a valid reason (medical, family emergency etc.) that prevented the student from doing HWs, projects and term papers and from taking test. Similarly, an incomplete grade will be considered if the student has compelling reasons for not being able to complete the course requirements.

11. Special course requirements: N/A

Handouts on some topics

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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 Student Accessibility Services (SAS) located in Boca Raton campus, SU 133 (561) 297-3880 and follow all SAS 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 which places 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/chapter4/4.001_Code_of_Academic_Integrity.pdf

15. Required texts/reading

1. Lecture notes from the Instructor's presentations.
2. Textbook :
David Williams, 'Essential Biomaterials Science', 2014, Cambridge University Press.
ISBN 978-0-521-89908-6.

16. Supplementary/recommended readings

Allan S. Hoffman, Jack E. Lemons, 'Biomaterials Science: Introduction to Materials in Medicine/', Edited by Buddy D. Ratner, Third Edition, 2013 Academic Press. ISBN-13:978-0123746269

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

Week 1-2: Introduction of Biomaterials. Introduce the clinical need of biomaterials, the applications of biomaterials in medical fields, the examples of using biomaterials in clinics.

Week 3-4: Materials science and engineering. Discuss the fundamental science of materials, including polymer, metal, and ceramic. The processing methods are also covered. Discuss the relationship of structure and function of a materials.

Week 5-6: Biocompatibility. In this chapter, we will discuss the biocompatibility of biomaterials, including cell biocompatibility, tissue biocompatibility and hemocompatibility.

Week 7-8: Practical Biomaterials. In this chapter, all kinds of practical biomaterials will be discussed, including bioceramics, polymer, hydrogel, and biological biomaterials;

Week 9-10: Tissue engineering and Regenerative Medicine. In this chapter, we will talk about the principle of tissue engineering and regenerative medicine. The emphasis will be put on the role of biomaterials in Tissue Engineering. We will discuss bone/cartilage, tendon, intervertebral disc, cardiovascular system, blood vessel, heart valve, cardiac muscle tissue engineering and the applications of related biomaterials in these tissues.

Week 11-12: Controlled Drug Delivery System. In this chapter, we discuss the principle of drug delivery system and the application of nanobiotechnology and biomaterials in the drug delivery system.

Week 13: Bioreactor. The function and design of a bioreactor for cell culture are covered in this chapter

Week 14. Imaging diagnostic system. For the applications of nanoparticles in imaging diagnostic system, all kinds of nanoparticle biomaterials are discussed in this chapter.

In this course, two homework assignments are designed to develop the writing skills of students. One requests students to write an abstract, the other one requests students to write a one-page summary to describe the structure, function, and application of a particular biomaterial that the students are interested in.

In this course, the Instructor will give a paper to students. They read the paper and answer corresponding questions and submit their thoughts about the paper discussion. The paper is a review paper which reviewed the biomaterials application.

Canvas: Class notes, practice exercises and problems, and other administrative information will be posted on *Canvas*