FAU

FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Undergraduate Programs

Department Ocean & Mechanical Engineering

College COECS

*(To obtain a course number, contact **erudolph@fau.edu**)*

UUPC Approval 4-26-21
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

Prefix BME **Number** 4100	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture	**Course Title** Biomaterials

Credits *(Review Provost Memorandum)*: 3

Effective Date *(TERM & YEAR)*: Fall 2021

Grading *(Select One Option)*: (•) Regular ( ) Pass/Fail ( ) Sat/UnSat

Course Description *(Syllabus must be attached; Syllabus Checklist recommended; see Guidelines)*

This course will cover comprehensive introduction of biomaterials science, the properties of biomaterials, the classes of biomaterials, and the applications of biomaterials in medicine. The content of this course will include preparation, characterization and biological evaluations of biomaterials. Specific biomaterials such as bioceramics, polymers, and hydrogels will be covered.

Prerequisites, with minimum grade*	**Corequisites**	**Registration Controls** *(Major, College, Level)*
None		

Default minimum passing grade is D-.* ***Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course*

WAC/Gordon Rule Course

( ) Yes (•) No

WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See WAC Guidelines.

Intellectual Foundations Program (General Education) Requirement *(Select One Option)*

None

General Education criteria must be indicated in the syllabus and approval attached to the proposal. See GE Guidelines.

Minimum qualifications to teach course

Ph.D Degree in mechanical or Biomedical Engineering and equivalent

Faculty Contact/Email/Phone

Dr. Kevin Kang/Kangy@fau.edu, 297-3943

List/Attach comments from departments affected by new course

Approved by	***Date***
Department Chair Manuel Cruz	4-2-21
College Curriculum Chair Daniel Meeroff	4-15-21
College Dean Fred Bloetscher	4-15-21
UUPC Chair Jerry Haky	4-26-21
Undergraduate Studies Dean Edward Pratt	4-26-21
UFS President	
Provost	

Email this form and syllabus to mjenning@fau.edu seven business days before the UUPC meeting.

Department of Ocean and Mechanical Engineering, Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
Biomaterials/ BME 4100	3 credit hours

2. Instructional Method

This class consists of lectures which will be conducted in-class and/or live using WebEx or Zoom, and recorded so students can watch the lectures at a later time and date. . Students will be accommodated as much as possible with their needs during the pandemic.

You will need to have a computer (or laptop), a reliable WIFI access, and a webcam and micro-phone connected to your computer for this course.

In the event you might not have a computer, there is a Laptop Loaner Program at FAU for first-generation, low-income students.
https://www.fau.edu/newsdesk/articles/fau-announces-laptop-loaner-program.php

In the event you might not have reliable internet access remotely, you may use the internet connection on campus. You may use the classroom (GS118) during the live course times for watching lectures, and taking quizzes and exams. Note that there are only reduced seating capacities in the classroom, and only those who do not have reliable internet access should use the classroom. Social distancing must be strictly followed in the classroom at all times. You will need to make reservation for your seating every week on Canvas. The instructions for the reservation are provided at the following link:
https://fau.edu/oit/instructional/support/files/seatReservationTool_student.pdf

After two full weeks of face to face instruction with consecutive 'no show' of any students in person section in the classroom, the modality of this course section may be changed to remote instruction only at the discretion of the university.

3. COVID 19 Statement

All students in face-to-face classes are required to wear masks during class, and students must sanitize their own workstations upon entering the classroom. Taking these measures supports the safety and protection of the FAU community. Students who do not adhere to these rules will be asked to leave the classroom and/or be removed from the course. Students experiencing flu-like symptoms (fever, cough, shortness of breath), or students who have come in contact with an infected person should immediately contact FAU Student Health Services (561-297-3512).

4. Course pre-requisites, co-requisites, and where the course fits in the program of study

List Prerequisites, Co-requisites:
None

If students have not completed the required prerequisites for the course and do not inform their course instructor and advisor, they will be dropped from the course. If this occurs after the first week of the semester, they will be fee liable to the University.

5. Course logistics

Term: Fall 2021/Spring 2022
Time, Location, Mode of Delivery for Lectures (and Labs if applicable):
Lectures: WF 4:00-5:20pm, (WebEx, or GS118 with limited seating capacity)

6. Instructor contact information

Instructor's name	*Dr. Yunqing (Kevin) Kang*
Office address	*Engineering West (EW36- 177)*
Office Hours	*One-to-one virtual meeting by WebEx, available time M-F 10am-6pm.*
Contact telephone number	*(561) 297-3943*
Email address	kangy@fau.edu

Department of Ocean and Mechanical Engineering, Florida Atlantic University
Course Syllabus

7. TA contact information	
TA's name	Enze Qian
Office address	
Office Hours	*One-to-one virtual meeting by WebEx, available time M-F 10am-6pm.*
Contact telephone number	
Email address	*eqian2016@fau.edu*

8. Course description

This course will cover comprehensive introduction of biomaterials science, the properties of biomaterials, the classes of biomaterials, and the applications of biomaterials in medicine. The content of this course will include preparation, characterization and biological evaluations of biomaterials. Specific biomaterials such as bioceramics, polymers, and hydrogels will be covered. Other topics including cell-biomaterial interaction, cell bioengineering, stem cells niches, drug delivery system and tissue engineering will also be addressed. This course focuses on all kinds of biomaterials and their applications in medicine.

9. Course objectives/student learning outcomes/program outcomes

Course objectives	The course is designed to introduce the students to the fundamentals of biomaterial science, and also to introduce biomaterial preparation, characterization, properties, and their applications in medicine. 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 presentation skills.
Student learning outcomes & relationship to ABET 1-7 objectives	1. Students will be able to know the classes and properties of biomaterials. (1) 2. Students will be able to describe and review current biomaterials and their applications in medicine (2). 3. Student can also obtain thoughts about how to choose the appropriate biomaterials for a specific medical application and also design new biomaterials to address biomedical issues (3).

10. Course evaluation method

- Quizzes (twice) 20% (10% each)
- Midterm exam 25 %
- Final Exam 40 %
- Short essay (undergraduate) or Oral Presentation (Graduate) 15 %

11. Course grading scale

A 92.5-100	C+ 77.5-79.9	D- 60-62.4
A- 90-92.4	C 72.5-77.4	<60 Don't Ask
B+ 87.5-89.9	C- 70-72.4	
B 82.5-87.4	D+ 67.5-69.9	
B- 80-82.4	D 62.5-67.4	

- The minimum grade required to pass the course is C.

12. 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 before the tests that prevented the student of participating in the exam. Makeup exams should be administered and proctored by department personnel unless there are other pre-approved arrangements.

***Late work* without verifiable justification will NOT be graded.**

Incomplete grades are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation incomplete grades will not be given.

13. Special course requirements

- No watches, cell-phones, i-pads capable of taking pictures or communicating with others via emails and text messages are allowed during the quizzes and exams.

14. 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, are to be turned off in class sessions.

15. Attendance Policy Statement

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance.

Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

16. Disability Policy Statement

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at *www.fau.edu/sas/*

17. Counseling and Psychological Services Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau,edu/counseling/

18. Code of Academic Integrity Policy Statement

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/chapter4/4.001_Code_of_Academic_Integrity.pdf

Cell phones are not allowed during exams. If cell phones are detected during any exam periods, this will result in a **grade of "zero" on that exam and a note in the student's academic file.**

19. Required texts/reading/Lab kits

1. Lecture notes

2. textbook "Introduction to Biomaterials". 2nd Edition
Jeffrey O. Hollinger(CRC Press Published ,ISBN 9781439812563 - CAT# K10637,
Series: Biomedical Engineering)

20. Supplementary/recommended readings

- Read papers from academic journals
- Recommended Textbook 'Essential Biomaterials Science' by David Williams, ISBN-139781139026086.

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

Course Topics:

1. Introduction of Biomaterials
2. Materials science and engineering
3. Classes of Biomaterials: Bioceramics, Polymers, Hydrogels, and biological Biomaterials;
4. Controlled Drug Delivery System; Nanobiotechnology and biomaterials.
5. Tissue engineering and regenerative medicine including bone/cartilage, tendon, intervertebral disc; Cardiovascular system: blood vessel, heart valve; cardiac muscle;
6. Cell-biomaterials, tissue-biomaterials interaction;
7. Implanted devices and diagnostic systems;
8. 3D Bioreactor for tissue culture.

Quizzes

No dates are scheduled for the two quizzes at this moment, but the date for each quiz will be announced in 1-week advance.

Exam Dates

1. Tentative Midterm:
2. Final Exam:

CANVAS: Class notes, practice exercises, quiz/exam date/time, and other administrative information will be posted/announced in *CANVAS*.