

 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Undergraduate Programs		UUPC Approval <u>9/8/25</u> UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____	
Department Biomedical Engineering College COECS <i>(To obtain a course number, contact erudolph@fau.edu)</i>				
Prefix BME Number 4323	<i>(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)</i> Lab Code	Type of Course Lecture	Course Title Stem Cell Engineering: Research and Clinical Application	
Credits <i>(See Definition of a Credit Hour)</i> 3 Effective Date <i>(TERM & YEAR)</i> Spring 2026	Grading <i>(Select One Option)</i> Regular <input checked="" type="radio"/> Sat/UnSat <input type="radio"/>	Course Description <i>(Syllabus must be attached; see Template and Guidelines)</i> This course will focus on the stem cell's research and engineering/ application in its endeavor to clarify the nature of these cells; their sources, categories; engineering of these cells for different purposes, their role as novel cellular therapeutic approach (A), reprogramming of ordinary cells into stem cells- all of that through an exciting combination of readings (A-C), penetrating discussions, and animation of new techniques and tools (short movies).		
Prerequisites, with minimum grade* Permission by an instructor		Corequisites N/A	Registration Controls <i>(Major, College, Level)</i> BME, COECS, Senior	
*Default minimum passing grade is D-. Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course				
WAC/Gordon Rule Course <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See WAC Guidelines .		Intellectual Foundations Program (General Education) Requirement <i>(Select One Option)</i> None General Education criteria must be indicated in the syllabus and approval attached to the proposal. See Intellectual Foundations Guidelines .		
Minimum qualifications to teach course PhD in Science, Engineering, or Medicine				
Faculty Contact/Email/Phone Javad Hashemi/ jhashemi@fau.edu / 561.297.3438		List/Attach comments from departments affected by new course		
Approved by Department Chair <u>Javad Hashemi</u> College Curriculum Chair <u>Galan Liu</u> College Dean <u>Korey Sorge</u> UUPC Chair <u>Dan Meeroff</u> Undergraduate Studies Dean _____ UFS President _____ Provost _____			Date <u>3/31/25</u> <u>8/28/25</u> <u>8/28/2025</u> <u>9/8/25</u> <u>9/8/25</u> _____ _____	

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

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1. Course title/number, number of credit hours	
Stem Cell Engineering: Research and Clinical Application BME 4323	# of credit hours:3
2. Course prerequisites, co-requisites, and where the course fits in the program of study	
Permission of instructor	
3. Course logistics	
<p><i>Term:</i> Summer 2026 This is a classroom lecture course with recording <i>Time:</i> Tue, Thurs 9-45 AM-12.55 PM <i>Course Delivery Mode:</i> Live virtual lectures will be held via MDR in CM # 128. <i>Exams</i> will be given online, only at the scheduled times. No make-up, except in documented emergencies. Short quizzes may be randomly given throughout the semester. Other logistics include:</p> <ul style="list-style-type: none"> • Canvas registration is required. • The instructor will regularly post materials/announcements/Homework, on Canvas. It is the student's responsibility to regularly check Canvas and their FAU and Canvas email for the most recent information. • No hard-copied handouts will be provided. Copies and notes will be posted in files on Canvas • Attendance is encouraged. All classes will be recorded via MDR. You are expected to participate in all sessions or at least listen to records and keep up with the material. You are not expected to be a distraction in class. Final grades will be reduced by one full letter for class disruption (as determined by the instructor). • Participation in University-approved activities or religious observances, with prior notice, will not be penalized. • Students need a reliable internet condition capable of streaming MDR lectures, taking exams on Canvas, etc. To function properly, Canvas needs: cable modem, DSL, satellite broadband, T1, etc. The minimum Internet connection speed to access Canvas is a consistent 1.5 Mbps (megabits per second) or higher. Recommended: Broadband Internet connection with a speed of 4 Mbps or higher. • Students should have an operational computer system equipped with Windows 10 or macOS Sierra (or higher), Microsoft Office, web browser, a webcam, speakers, and microphone, which should be compatible with the most recent version of Lock Down Browser, Respondus Monitor, Cisco, etc. 	

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- There will be 4-6 HomeWorks (dependent on the pace of the course), one Presentation and one Exam in the course.
- HomeWorks/Assignments will contain conceptual and calculative questions regarding the topics heard during the lectures. They will be loaded on Canvas regularly, answered at home, and submitted into Gradebook in Canvas at particulate date, determined by instructor. Final presentation will be created on the special chosen topic, on 5 slides with voice recorded on PP and submitted in Canvas as other Assignments. The Exam is at the end of semester, open book, multiple choice type, online, in Canvas.
- The exam will be held using Lock Down Browser and Respondus Monitor, or similar features, as determined by the instructor. More information will be provided as we get closer to the exam. You must be able to scan answers and upload them to Canvas during tests. Please test this BEFORE the exam. This is subject to change as technology changes.
- All questions will be sent publicly through Canvas, so other students also benefit from the answers. Only personal or confidential matters should be sent via email to the professor, all others will be ignored

These are the links where you can find the steps to use your cell phone as a webcam.

For Android:

<https://helpdesk.fau.edu/TDClient/2061/Portal/KB/ArticleDet?ID=104057>

For iPhone or iPad

<https://helpdesk.fau.edu/TDClient/2061/Portal/KB/ArticleDet?ID=104056>

More details will be announced throughout the semester. It is students' responsibility to review and follow communications posted by the instructor.

Note you need both. Cell phones can be used in place of a camera on the computer. Directions can be found here:

For Android:

<https://helpdesk.fau.edu/TDClient/2061/Portal/KB/ArticleDet?ID=104057>

For iPhone or iPad

<https://helpdesk.fau.edu/TDClient/2061/Portal/KB/ArticleDet?ID=104056>

4. Instructors contact information

<i>Instructor's name</i>	Mirjana D. Pavlovic, MD, PhD
<i>Office address</i>	EE-96 # 514
<i>Office Hours</i>	Tue, Thrs: 1PM-3PM
<i>Contact telephone number</i>	561-542-3953 cell
<i>Email address</i>	561-297-2348 office mpavlovi@fau.edu ; Pmirjana@aol.com

5. TA contact information

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TA's name		None
6. Course description		
This course will focus on the stem cell's research and engineering/application in its endeavor to clarify the nature of these cells; their sources, categories; engineering of these cells for different purposes, their role as novel cellular therapeutic approach (A), reprogramming of ordinary cells into stem cells- all of that through an exciting combination of readings (A-C), penetrating discussions, and animation of new techniques and tools (short movies).		
7. Course objectives/student learning outcomes/program outcomes		
Course objectives	The lectures will cover both conceptual and practical aspects. Furthermore, this course will help each student to develop further logical thinking, balanced skepticism, tolerance for ambiguity and uncertainty, and a knowledge and appreciation of the stem cell world in all its richness, complexity and cryptic nature. Students will understand that it is at the intersection of disciplines where grand challenges are found, and differences resolved. They will realize that stem cell engineering is the basic aspect of integral thinking in biomedical engineering as a novel, modern, scientific field. The goal is to show them that it requires integral knowledge and involves essential principles of basic sciences including biology, medicine, physics, chemistry and mathematics.	
Student learning outcomes & relationship with ABET a-k objectives: We believe that our course addresses all the ABET sub-criteria (a-k)	<p>At the completion of this course, each student will be able to:</p> <ul style="list-style-type: none">• Better understand scientific, engineering, therapeutic views of stem cell phenomenology, including recent theories of complexity in their cellular therapies in scientific community.• Understand and be able to apply models of dynamics, evolution, engineering and reprogramming within stem cell entities.• Compare similarities and differences between stem cell renewal and differentiation and be able to design and conduct experiments and analyze the data• Consider and reflect upon the ethical and social consequences of the various sources/ models used in cellular treatments and apply them in practice• Consider and reflect upon the implications of the mobilization, harvesting, stem cell transplant and engraftment in this system• Name principles and practice of stem cell cryopreservation• Know the basics of cancer stem cell concepts and engineering of targeted cancer stem cell therapy <p>Recognize the need for, and be able to engage in life-long learning Get some knowledge on contemporary issues on this subject Gain ability to use the techniques, skills and modern stem cell engineering tools necessary for the practice Improve individual and team work and get ideas on many laboratory-related techniques</p>	
8. Course evaluation method		
Projects -	20%	Note: The minimum grade required to pass the course is C.
Homework -	60 %	
Final Examination -	20 %	

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9. Course grading scale	
Grading Scale: 90 and above: "A", 87-89: "A-", 83-86: "B+", 80-82: "B", 77-79: "B-", 73-76: "C+", 70-72: "C", 67-69: "C-", 63-66: "D+", 60-62: "D", 51-59: "D-", 50 and below: "F." <i>*This scale can be slightly modified dependent on overall success.</i>	
10. Policy on makeup tests, late work, and incomplete	
Exams will be given only at the scheduled times. No one is exempt from the final examination. <i>Makeup exams</i> are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student from participating in the exam. <i>Late work</i> is not acceptable. <i>Incomplete grades</i> are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency, incomplete grades will not be given. <i>Attendance</i> to class is encouraged.	
11. Special course requirements	
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/chapter4/4.001_Code_of_Academic_Integrity.pdf	
15. Required texts/reading	
N/A	
16. Supplementary/recommended readings	

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1. Mirjana Pavlovic and Bela Balint: Stem Cells and Tissue Engineering (Springer Briefs in Electrical and Computer Engineering), NY, Heidelberg, 2013

ISSN: 2191-8120 (electronic)

ISBN: 978-1-4614-5505-9 (printed)
2. Mirjana Pavlovic and Bela Balint : Bioengineering and Cancer Stem Cell Concept (Springer Briefs in Electrical and Computer Engineering), NY, Heidelberg, 2015
ISBN: 978-3-319-25668-2 (printed)

ISBN: 978-3-319-25670-2 (e Book)
3. Mirjana Pavlovic and Ksenija Radotic : Animal and Plant stem cells. Concepts, propagation and engineering. Springer International Publishing AG 2017 Cham, Switzerland, ISBN: 978-3-319-47781-9 (printed) ISBN: 978-3-319-47763-3

Will be also given at class, dependent on student's interest

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

Weeks-Modules (approximation):

- 1. Introduction**
Stem Cell Concept
Embryonic Stem Cells
Adult (Tissue's) Stem cells
Cord blood Stem cells
- 2. Hematopoietic Stem cells**
Ethical aspects of stem cell research
Stem Cell Renewal and Differentiation
Stem Cell Sources, Harvesting and Clinical Use
- 3. HLA Typing: Choice of Donors**
Peri-transplant blood component therapy
Engraftment: homing and use of genetic markers
- 4. Principles and practice of stem cell cryopreservation**
Cord Blood cryopreservation
Current status and perspectives in Stem cell research : The Concept of Cancer stem cell
Glycolysis and Respiration within stem cells
- 5. Stem cell therapy: optimization, regeneration, reprogramming , Tissue Engineering (TE)**
Concept of cancer stem cell
Cellular therapy/engineering
Cancer stem cell therapy
Diseases and stem cell therapy
- 6. Nuclear Reprogramming**
Nuclear reprogramming, I, II, III
Induced Pluripotent stem cells and their significance in Biomedical Engineering
Cloning organisms
Final Exam M

**Slight modification is possible dependent on circumstances.*

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18. 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.

19. 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/>

20. Artificial Intelligence Preamble

FAU recognizes the value of generative AI in facilitating learning. However, output generated by artificial intelligence (AI), such as written words, computations, code, artwork, images, music, etc., for example, is drawn from previously published materials and is not your own original work. FAU students are not permitted to use AI for any course work unless explicitly allowed to do so by the instructor of the class for a specific assignment.

Class policies related to AI use are decided by the individual faculty. Some faculty may permit the use of AI in some assignments but not others, and some faculty may prohibit the use of AI in their course entirely. In the case that an instructor permits the use of AI for some assignments, the assignment instructions will indicate when and how the use of AI is permitted in that specific assignment. It is the student's responsibility to comply with the instructor's expectations for each assignment in each course. When AI is authorized, the student is also responsible and accountable for the content of the work. AI may generate inaccurate, false, or exaggerated information. Users should approach any generated content with skepticism and review any information generated by AI before using generated content as-is.

If you are unclear about whether or not the use of AI is permitted, ask your instructor before starting the assignment.

Failure to comply with the requirements related to the use of AI may constitute a violation of the Florida Atlantic Code of Academic Integrity, [Regulation 4.001](#).

Proper Citation:

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If the use of AI is permitted for a specific assignment, then use of the AI tool must be properly documented and cited. For more information on how to properly cite the use of AI tools, visit www.fau.edu/ai/citation.

Official national holidays: Independence Day, July 4th