

 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Undergraduate Programs		UUPC Approval _____ UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____
	Department Biological Sciences College College of Science (To obtain a course number, contact erudolph@fau.edu)		
Prefix ZOO Number 4373	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) Lab Code _____	Type of Course Lecture	Course Title Introduction to Animal Locomotion
Credits (Review Provost Memorandum) 3	Grading (Select One Option) Regular <input checked="" type="radio"/> Pass/Fail <input type="radio"/> Sat/UnSat <input type="radio"/>	Course Description (Syllabus must be attached; Syllabus Checklist recommended; see Guidelines) This course explores animal movement over a range of species and environments. We will explore modes of locomotion taking into account anatomy and mechanics of both skeletal and muscular systems, and the media through which an animal moves. Topics will be presented through lecture material and readings from the primary literature and text.	
Effective Date (TERM & YEAR) Fall 2020			
Prerequisites, with minimum grade* BSC 1010 (C); BSC 1011 (C)	Corequisites NA	Registration Controls (Major, College, Level)	
*Default minimum passing grade is D-. Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course			
WAC/Gordon Rule Course <input type="radio"/> Yes <input checked="" type="radio"/> 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 PhD, biology, physics, engineering			
Faculty Contact/Email/Phone Porter / mporte26@fau.edu / 7-1288		List/Attach comments from departments affected by new course chairs contact in Biological Sciences and Ocean Engineering	
Approved by Department Chair <u>Sarah L. North</u> College Curriculum Chair <u>[Signature]</u> College Dean <u>[Signature]</u> UUPC Chair <u>[Signature]</u> Undergraduate Studies Dean <u>Edward Pratt</u> UFS President _____ Provost _____		Date 4-22-2020 <u>9/15/20</u> 9-8-2020 <u>9/15/20</u> 9-15-20	

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

Introduction to Animal Locomotion

Course: ZOO 4373 (3 credits)

Semester: Fall 2020

Instructor: Dr. Marianne Porter

Email: me.porter@fau.edu

Office: Sanson 211;

Phone: 561-297-1288

Hours: Monday and Wednesday, 2:00-3:30 pm

Course schedule:

Time: Monday and Wednesday; 4:00 – 5:20 pm

Location: PS 113

Prerequisites: BSC 1010 and 1011; with a grade of C or better.

Course description:

This course explores animal movement over a range of species and environments. We will explore modes of locomotion taking into account anatomy and mechanics of both skeletal and muscular systems, and the media through which an animal moves. Topics will be presented through lecture material and readings from the primary literature and text.

Textbook: "Animal Locomotion, 2nd edition" by A.A. Biewener and S.N. Patek (2018). Oxford University Press

Course objectives:

This course will expose students to the fundamentals of animal locomotion. How do animals move? How do different aspects of an animal's environment affect their movement? What techniques can we use to study locomotion? Students will learn about the physics of locomotion and motion analysis, and knowledge will be culminated in an end of the semester symposium presentation. Students will be expected to demonstrate their understanding for major concepts by answering questions in weekly discussions.

Content: This course is designed to have a significant student presentation / peer engagement component. Class discussions will focus on contemporary issues in animal locomotion through presentations and discussions of assigned readings. The course is comprised of the following assignments:

Class participation (10%): The level of participation exhibited by each student during class discussions and activities determines part of the final grade. *A significant portion of your grade will be based upon your class participation in these discussions for the duration of the course. It is the responsibility of each student in the class to critically review each paper and raise their questions to the group.*

Lead paper discussions (10%): Each students will be required to lead the discussion of 2 papers during the semester. *Please remember, it is the duty of discussion leaders to only answer technical questions about the papers and to keep the discussion moving along.* For example, has the author formally stated a hypothesis or question? Is the methodology correct or appropriate? Are the data

adequate and have the appropriate statistical analyses been performed? Do the data justify the author's conclusions?

Peer review (20%): Students will be required to provide a written peer-review of the final student symposium presentations. Part of your grade is determined by the constructive feedback you provide to your peers. Does the presenter provide adequate background information to understand the big picture? Does the presenter clearly articulate the question, goals, and hypotheses? Does the presenter describe the methods to be used and provide citations? Grading rubrics will be distributed and turned in for each talk.

Abstracts (30%): Each week two papers from the primary literature will be discussed. Undergraduates will write a **one-page summary** for each paper; that includes a statement of the paper goals, methods used, findings, and implications of the study.

Symposium presentation (30%): A presentation on an animal locomotion topic of the student's choosing will be presented in class during the student symposium at the end of the semester. These presentations are meant to be a project proposal. Students will do a literature search to find and read four relevant papers to this project. If you had unlimited resources, what animal (real or imaginary) locomotion question would you explore. Students must provide background information from the primary literature, clearly articulate questions, goals, and hypotheses. Students must describe which methods will be used, again using citations from the primary literature. Presentations end with students describing what data they will collect (dependent and independent variables), and how this project will further the study of animal locomotion. In the past students have proposed projects that would examine movement in various extant animals, extinct animals, and mythical animals such as the Loch Ness Monster and various types of dragons. The talk will not exceed 15 minutes, including time for questions and answers. *Each student will choose a topic in consultation with the instructor, deadlines for final presentation check-ins are in the schedule.*

Undergraduate evaluation:		Course grading scale:	
Class participation	10	A	90-100
Lead paper discussions	10	B	80-89.9
Peer review	20	C	70-79.9
Abstracts	30	D	60-69.9
Symposium presentation	30	E	<60.9
Total	100		

Attendance policy: 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 at least two-weeks notice prior to any anticipated absences and as soon as practical 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.

Make up policy: Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. *Students must inform the instructor at least two weeks in advance of any absence for a University-approved activity.* In the event of unscheduled absences or missed work, please email Dr. Porter as soon as practical and come to her next available office hours to discuss late work. Grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances.

Religious accommodation: Reasonable accommodation will be made for students participating in a religious observance. These requests should be made well in advance of a missed class.

Disability Policy Statement: In compliance with the Americans with Disabilities Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with the Office of 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.

Academic Integrity 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 an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](https://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf). https://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf

Counseling and Psychological Services (CAPS) 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>

Credit Hour Policy: Excess Hours Surcharge^{SEP} [Florida Statute 1009.286](http://www.fla.edu/statute/1009.286) defines “excess hours” as credit hours that exceed the completion requirements for a baccalaureate degree program at state universities. For students enrolling in a state university or a Florida State College System institution for the first time in or after the fall 2009 semester, a tuition rate surcharge will be applied for excess hours. The surcharge is assessed only on the tuition portion of the semester hour cost, not on the fees. The amount of the surcharge and the allowable “excess hours” are determined by the initial term of entry as indicated in the catalog. For the complete Policy see <http://www.fau.edu/academic/registrar/FAUcatalog/academics.php#excess>.

Don't waste your time and money! Use the below tips to get and stay on track for a timely graduation.

- 1) Learn how to navigate the “**MY FAU**” web portal. Familiarize yourself with features available through “**FAU Self-Service**” located within the “**Home**” tab as well as the features available in the “**Students**”, “**Money Matters!**” and “**Success Network**” tabs.
- 2) Use the **flight plans** available on the FAU website to build your own academic plan. The

flight plans are suggested four-year course schedules leading to completion of the **Biology B.A.** or the **Biology B.S.** (blueprints for graduation within four years!). For Biology majors who wish to apply to a medical or professional program upon graduation, a suggested **Pre-Health** version of the Biology B.S. flight plan is also available.

- 3) Use the “**Departmental Schedule**” (not the “Searchable Schedule”) to see **all** courses available (by department) within a given semester when working to schedule your classes.
- 4) Use the **Degree Audit Reporting System (DARS)** to keep track of which requirements you still need to fulfill in order to graduate. When running your degree audit, you may audit your progress against the catalog year in which you first entered FAU (provided that you have maintained continuous enrollment) OR the current catalog year. You may also select alternate degree options to see if you are closer to completing one degree than another compare the Biology B.S. with the Biology B.A.).

*****Please note the above excess credit hour policy. It is your responsibility to work with your academic advisor to minimize additional costs to you associated with the completion of excess credits.**

Limitations on Number of Withdrawals

Undergraduate students may not withdraw from more than **two** courses at the lower-division level (1000- and 2000-level courses) and from more than **three** courses at the upper-division or higher level (3000- and 4000-level courses) within the course of their degree program at FAU. Zero- and one-credit courses and exceptional Circumstance Withdrawals, which carry the “WM” grade, are excluded from these limitations

Reading assignments – the instructor reserves the right to reassign the order of the lectures. TBA:
Primary literature associated with the chapters will be posted on Canvas.

Date	Topic
24, 26 August	Go over syllabus Scientific reading Symposium template Ch 1, Physical and Biological Properties and Principles
31, 2 August/ September	Finish Ch 1 Ch 2, Muscles and skeletons: the building blocks of animal movement
7, 9 September	NO Classes on September 7 Ch 2 literature: – Body condition impacts blood and muscle oxygen storage capacity of free-living beluga whales (<i>Delphinapterus leucas</i>) https://jeb.biologists.org/content/222/11/jeb191916 – Muscle fibers bear a larger fraction of passive muscle tension in frogs compared with mice https://jeb.biologists.org/content/221/22/jeb182089
14, 16 September	Ch 3, Energetics of locomotion Literature: – Fish swimming in schools save energy regardless of their spatial position https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4293471/ – Energetic costs of locomotion in bears: is plantigrade locomotion energetically economical? https://jeb.biologists.org/content/221/12/jeb175372
21, 23 September	Ch 4, Movement on Land Literature: – Comparative locomotor costs of domestic dogs reveal energetic economy of wolf-like breeds https://jeb.biologists.org/content/220/2/312 – Compliant legs enable lizards to maintain high running speeds on complex terrains https://jeb.biologists.org/content/222/6/jeb195511
28, 30 September	Ch 5, Movement on Water Literature: – Function of the heterocercal tail in sharks: quantitative wake dynamics during steady horizontal swimming and vertical maneuvering https://jeb.biologists.org/content/205/16/2365 – Pectoral fin kinematics and motor patterns are shaped by fin ray mechanosensation during steady swimming in <i>Scarus quoyi</i> https://jeb.biologists.org/content/223/2/jeb211466

5, 7 October	<p>Ch 6, Movement in Air</p> <p>Literature:</p> <ul style="list-style-type: none"> – Gliding for a free lunch: biomechanics of foraging flight in common swifts (<i>Apus apus</i>) https://jeb.biologists.org/content/221/22/jeb186270.abstract – Nathusius' bats optimize long-distance migration by flying at maximum range speed https://jeb.biologists.org/content/222/4/jeb176396.abstract
12, 14 October	<p>Ch 7, Jumping, climbing, and suspensory locomotion</p> <p>Literature:</p> <ul style="list-style-type: none"> – Comparison of spatiotemporal gait characteristics between vertical climbing and horizontal walking in primates https://jeb.biologists.org/content/222/2/jeb185702 – The biomechanics of leaping in gibbons https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.21329
19, 21 October	<p>Ch 8, Neuromuscular control of movement</p> <ul style="list-style-type: none"> – students develop and articulate talk questions in groups
26, 28 October	<p>Ch 8 Literature:</p> <ul style="list-style-type: none"> – Neuromuscular control of hovering wingbeat kinematics in response to distinct flight challenges in the ruby-throated hummingbird, <i>Archilochus colubris</i> https://jeb.biologists.org/content/216/22/4161.full – Neuromuscular control of locomotion is altered by tail autotomy in geckos https://jeb.biologists.org/content/221/18/jeb179564.full – students develop hypothesis and identify dependent and independent variables in groups
2, 4 November	<p>Ch 9, Evolution of Locomotion</p> <p>Literature:</p> <ul style="list-style-type: none"> – Locomotor Patterns in the Evolution of Actinopterygian Fishes https://academic.oup.com/icb/article/22/2/329/2015957 – Fossils, feet and the evolution of human bipedal locomotion https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1571304/
9, 11 November	<p>Literature</p> <p>NO Classes; Veteran's Day (Nov 11)</p> <ul style="list-style-type: none"> – students give a 5 minute pitch their topics, what are questions, hypotheses, and variables; peer review rubric

16, 18 November	Literature
23, 25 November	Literature (Monday) Work day for papers and presentations (Wednesday)
30, 2 November /December	Last day of classes is December 2; Student presentations; peer review
9 December	4:00-6:30; Student presentations; peer review
