FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Graduate Programs

Department Biology

College College of Science

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

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner _____
Catalog _____

Prefix PCB

Number 6047

(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)
Lab Code

Type of Course
Lecture

Course Title
Recent Advances in Ecology and Evolution

Credits *(See Definition of a Credit Hour)*
3

Effective Date *(TERM & YEAR)*
Spring 2026

Grading *(Select One Option)*
Regular ◯
Sat/UnSat ◯

Course Description *(Syllabus must be attached; see Template and Guidelines)*

This course will provide an in depth exploration of emerging topics at the cutting edge of contemporary ecological or evolutionary research. The topics covered in this course will be diverse and dynamic from year to year. The course will be founded around a recently published book, edited volume, or collection of published papers on an emerging topic of interests.

Prerequisites
None

Prerequisites, Corequisites and Registration Controls are enforced for all sections of course.

Academic Service Learning (ASL) course ☐
Academic Service Learning statement must be indicated in syllabus and approval attached to this form.

Corequisites

Registration Controls *(For example, Major, College, Level)*
Biological Sciences

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

Faculty Contact/Email/Phone
Michael McCoy/mccoym@fau.edu/772-242-2621

List/Attach comments from departments affected by new course
Course will not impact courses taught in other departments.

Approved by	***Date***
Department Chair Sarah L. Hutton	9-22-25
College Curriculum Chair	9/22/2025
College Dean	9/22/2025
UGPC Chair	10/14/2025
UGC Chair	10/14/2025
Graduate College Dean	10/15/2025
UFS President	
Provost	

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.

PCB 6047
Recent Advances in Ecology and Evolution

3 credits

Prof. Michael McCoy
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Course Description

This course will provide an in-depth exploration of emerging topics at the cutting edge of contemporary ecological or evolutionary research. The topics covered in this course will be diverse and dynamic from year to year. The course will be founded around a recently published book, edited volume, or collection of published papers on an emerging topic of interests.

Instructional Method
The course will include lectures/presentations and paper discussions. The course will be offered in person.

Prerequisites/Corequisites
None.

Textbook and Required Readings:
No required textbook. All readings will be provided

Course Objectives/Student Learning Outcomes

Student Learning Outcomes:

Students will gain an in depth understanding of a contemporary topic important to their academic discipline.

In the end, students will be able to:

1. Describe the basic tenets of relevant theory and key findings of empirical research on an emerging topic in ecology and evolution.
2. Identify gaps in knowledge and describe directions for future research development on an emerging topic.
3. Understand how to read, interpret, critique, and synthesize contemporary research concepts and or methods.
4. Create and present a lecture or professional presentation on recent scientific literature
5. Describe the historical context of why an emerging topic is important and identify the big unanswered questions that remain in the field.
6. Demonstrate the ability to work collaboratively

Objectives:

- Introduce students to current theory and advanced concepts in contemporary ecology and evolution.
- Demonstrate the etymology of idea development and promote the development of a deep understanding for the conceptual basis of current ideas about how natural processes affect individuals, populations, communities, and ecosystems.
- Promote the development and expression of critical and independent thinking about ecological and evolutionary research
- Establish future leaders and professionals with an in-depth state of the field understanding of major ecological and evolutionary concepts
- Educate future leaders and professionals with specialized skills by teaching methods of collecting, interpreting, analyzing, and presenting scientific data both orally and written
- Enable future leaders and professionals to contribute to the profession through practical skills development

Course Evaluation Method

- Participation and discussion: 30%
- Weekly reading responses and peer reviews: 10%
- Research paper or modeling project: 20%
- Presentations: 40%

Code of Academic Integrity

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.

Attendance Policy Statement

Students are expected to attend all 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 nonattendance. 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.

Religious Accommodation Policy Statement

In accordance with the rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs regarding admissions, registration, class attendance, and the scheduling of examinations and work assignments. University Regulation 2.007, Religious Observances, sets forth this policy for FAU and may be accessed on the FAU website at www.fau.edu/regulations. Any student who feels aggrieved regarding religious accommodations may present a grievance to the executive director of The Office of Civil Rights and Title IX. Any such grievances will follow Florida Atlantic University's established grievance procedure regarding alleged discrimination.

Time Commitment Per Credit Hour

For traditionally delivered courses, not less than one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out of class student work for each credit hour. Equivalent time and effort are required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

Course Grading Scale

Letter Grade	Numeric Grade (%)
A	94 - 100%
A-	90 - 93%
B+	87 - 89%
B	83 - 86%
B-	80 - 82%
C+	77 - 79%
C	73 - 76%
C-	70 - 72%
D+	67 - 69%
D	63 - 66%
D-	60 - 62%
F	Below 60

Grade Appeal Process

You may request a review of the final course grade when you believe that one of the following conditions apply:
• There was a computational or recording error in the grading.
• The grading process used non-academic criteria.
• There was a gross violation of the instructor's own grading system. University Regulation 4.002 of the University Regulations contains information on the grade appeals process

Policy on Make-up Tests, Late work, and Incompletes

Please contact me in advance if you will not be able to attend class, or complete assignments and I will work with you. Because this is a discussion-based course, non-attendance should be rare and only if completely unavoidable.

Special Course Requirements

Curiosity, an open mind, and an insatiable desire to understand.

Policy on the Recording of Lectures

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

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. [Policy 12.16 Artificial Intelligence] 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: 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 https://fau.edu/ai/citation

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 therapy, group therapy, and crisis services, to name a few - offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

Student Support Services and Online Resources

Center for Learning and Student Success (CLASS)
Counseling and Psychological Services (CAPS)
FAU Libraries
Math Learning Center
Office of Information Technology Helpdesk
Center for Global Engagement
Office of Undergraduate Research and Inquiry (OURI)
Science Learning Center
Speaking Center
Student Accessibility Services
Student Athlete Success Center (SASC)
Testing and Certification
Test Preparation
University Academic Advising Services
University Center for Excellence in Writing (UCEW)
Writing Across the Curriculum (WAC)

Topical Outline

Topic Specific Example – Thermal Ecology

This course explores the role of temperature in shaping ecological processes across levels of biological organization—from molecular physiology to ecosystems. Emphasis will be placed on organismal responses to temperature, and climate variability, including the physiological, behavioral, and evolutionary mechanisms that mediate thermally regulated interactions in ecological contexts.

Learning Objectives:

By the end of this course, students should be able to:

1. Explain the physical principles of heat transfer and their ecological implications.
2. Describe how temperature affects physiological processes across taxa.
3. Critically evaluate primary literature in thermal ecology.
4. Apply quantitative models to predict organismal and ecological responses to temperature.
5. Design experiments or studies to test hypotheses related to thermal ecology and climate change.

Topical Outline

Week	Topic	Key Concepts	Suggested Readings
1	Introduction to Thermal Ecology	Scope, history, relevance; overview of temperature effects on life	(Elmore et al., 2017; Huey & Kingsolver, 1989; Ward & Stanford, 1982)
2	Principles of Heat Transfer	Conduction, convection, radiation, evaporation	
3	Thermal Performance Curves	Ectotherm vs. endotherm performance; performance breadth	(Angilletta Jr, 2006; Dell et al., 2011)
4	Thermal Adaptation and Acclimation	Phenotypic plasticity, acclimatization, reaction norms	(Seebacher et al., 2015; Stillman, 2003)
5	Behavioral Thermoregulation	Movement, microhabitat selection, costs and trade-offs	(Kearney et al., 2009)
6	Metabolic Theory and Scaling	Metabolic rate, temperature dependence, ecological implications	(Brown et al., 2004; Gillooly et al., 2001; McCoy & Gillooly, 2008)
7	**Thermal Limits and Tolerance**	Critical thermal limits, lethal temperatures, survival models	(Jørgensen et al., 2022; Lutterschmidt & Hutchison, 1997; Sunday et al., 2011, 2012; Verberk et al., 2021)
8	**Nighttime Warming and Diurnal Asymmetry**	Ecological implications of warming nights, stress accumulation, altered diel cycles	(Sheridan & Bickford, 2011; Speights et al., 2017; Zhao et al., 2014)
9	Thermoregulation in Endotherms	Energy budgets, homeostasis, thermogenesis	(Angilletta et al., 2010; Clarke & Pörtner, 2010; Kronfeld-Schor & Dayan, 2013; McKechnie & Wolf, 2010)
10	**Trophic Interactions and Thermal Mismatch**	Predator-prey dynamics, phenological shifts, thermal sensitivity mismatches	(Davidson et al., 2021, 2024; Dell et al., 2014; O'Connor et al., 2012; Sentis et al., 2012)

Week	Topic	Key Concepts	Suggested Readings
11	Evolutionary Responses to Temperature	Local adaptation, experimental evolution, climate gradients	(Faillace et al., 2021; Gardner et al., 2011; McGaughran et al., 2021; Zarzyczny et al., 2024)
12	Climate Change and Organismal Responses	Warming impacts, range shifts, extinction risk	(Deutsch et al., 2008; Sunday et al., 2012; Tewksbury et al., 2008)
13	Thermal Ecology in Aquatic Systems	Thermal stratification, oxygen solubility, aquatic ectotherms	(Fathy, 2024)
14	Urban Thermal Ecology	Heat islands, urban wildlife, thermal niche shifts	(Diamond et al., 2020; Diamond & Martin, 2021)
15	Modeling Thermal Environments	Biophysical models, species distribution modeling	(Buckley et al., 2010; Davidson et al., 2024; Kearney & Porter, 2009)

References

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Brown, J. H., Gillooly, J. F., Allen, A. P., Savage, V. M., & West, G. B. (2004). Toward a metabolic theory of ecology. *Ecology*, *85*(7), 1771–1789.

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Clarke, A., & Pörtner, H. (2010). Temperature, metabolic power and the evolution of endothermy. *Biological Reviews*, *85*(4), 703–727.

Davidson, A. T., Hamman, E. A., McCoy, M. W., & Vonesh, J. R. (2021). Asymmetrical effects of temperature on stage-structured predator–prey interactions. *Functional Ecology*, *35*(5), 1041–1054.

Davidson, A. T., Stunkle, C. R., Armstrong, J. T., Hamman, E. A., McCoy, M. W., & Vonesh, J. R. (2024). Warming and top-down control of stage-structured prey: Linking theory to patterns in natural systems. *Ecology*, *105*(1), e4213.

Dell, A. I., Pawar, S., & Savage, V. M. (2011). Systematic variation in the temperature dependence of physiological and ecological traits. *Proceedings of the National Academy of Sciences*, *108*(26), 10591–10596.

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Fathy, R. F. (2024). Divergent perspectives on the synergistic impacts of thermal-chemical stress on aquatic biota within the framework of climate change scenarios. *Chemosphere*, *355*, 141810.

Gardner, J. L., Peters, A., Kearney, M. R., Joseph, L., & Heinsohn, R. (2011). Declining body size: A third universal response to warming? *Trends in Ecology & Evolution*, *26*(6), 285–291.

Gillooly, J. F., Brown, J. H., West, G. B., Savage, V. M., & Charnov, E. L. (2001). Effects of size and temperature on metabolic rate. *Science*, *293*(5538), 2248–2251.

Huey, R. B., & Kingsolver, J. G. (1989). Evolution of thermal sensitivity of ectotherm performance. *Trends in Ecology & Evolution*, *4*(5), 131–135.

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Kearney, M., & Porter, W. (2009). Mechanistic niche modelling: Combining physiological and spatial data to predict species' ranges. *Ecology Letters*, *12*(4), 334–350.

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Kronfeld-Schor, N., & Dayan, T. (2013). Thermal ecology, environments, communities, and global change: Energy intake and expenditure in endotherms. *Annual Review of Ecology, Evolution, and Systematics*, *44*(1), 461–480.

Lutterschmidt, W. I., & Hutchison, V. H. (1997). The critical thermal maximum: History and critique. *Canadian Journal of Zoology*, *75*(10), 1561–1574.

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