FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Undergraduate Programs

Department of Chemistry and Biochemistry

College of Science

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

UUPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

Prefix CHS **Number** 4623	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture	**Course Title** Introduction to Coding for Life Sciences

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

Effective Date *(TERM & YEAR)*
Spring 2027

Grading *(Select One Option)*
Regular ◉
Sat/UnSat ○

Course Description *(Syllabus must be attached; see Template and Guidelines)*
This course covers the basics of Linux, shell scripting, and PERL. Students will learn to write codes to analyze big data, such as data mining and bioinformatics, which is highly relevant to structural biology, biophysics, and biochemistry.

Prerequisites, with minimum grade*	**Corequisites**	**Registration Controls** *(Major, College, Level)*
None. Designed for upper level undergraduate students with little to no prior programming experience.	None	Chem/Biochem/Bio/Neurosci/Related Life Sciences, College of Science, Undergraduate

***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 Intellectual Foundations Guidelines.

Minimum qualifications to teach course

Ph.D. in Chemistry, Biophysics, or a related Life Sciences field with expertise in computational methods and coding (Linux/Perl).

Faculty Contact/Email/Phone

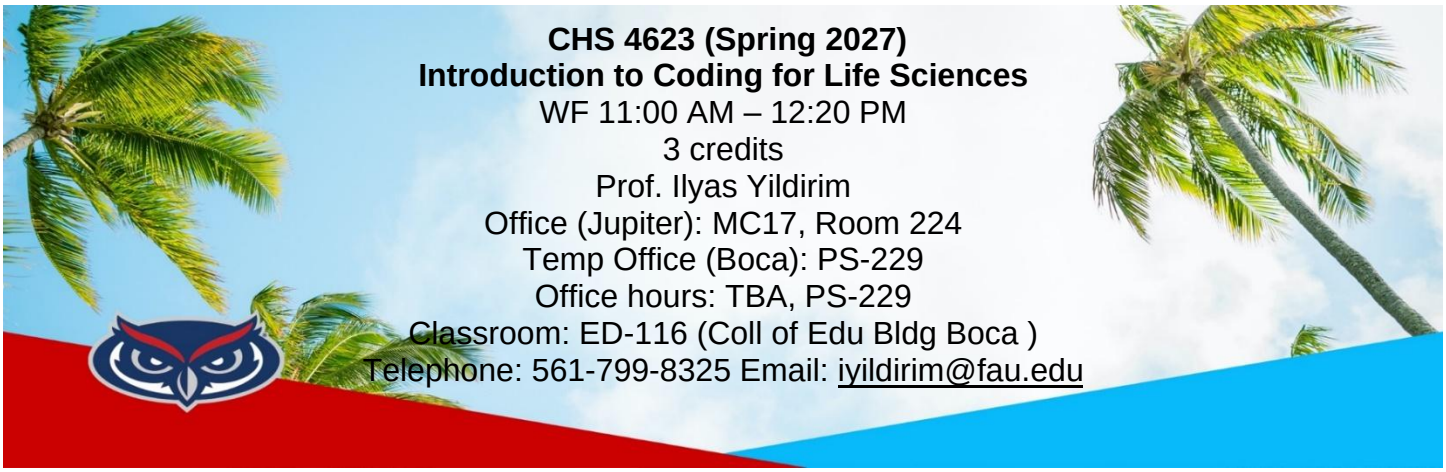
ILYAS YILDIRIM/iyildirim@fau.edu/561-799-8325

List/Attach comments from departments affected by new course

Course concept previously reviewed and supported by the Dean of the College of Scien

Approved by	***Date***
Department Chair Andrew Tsenkin.	1/15/2026
College Curriculum Chair	3/20/26
College Dean	3-20-26
UUPC Chair	
Undergraduate Studies Dean	
UFS President	
Provost	

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



CHS 4623 (Spring 2027)
Introduction to Coding for Life Sciences
WF 11:00 AM – 12:20 PM
3 credits
Prof. Ilyas Yildirim
Office (Jupiter): MC17, Room 224
Temp Office (Boca): PS-229
Office hours: TBA, PS-229
Classroom: ED-116 (Coll of Edu Bldg Boca)
Telephone: 561-799-8325 Email: iyildirim@fau.edu

Catalog Course Description
This course covers the basics of Linux, shell scripting, and PERL. Students will learn to write codes to analyze big data, such as data mining and bioinformatics, which is highly relevant to structural biology, biophysics, and biochemistry.

Extended Course Description
This course provides a hands-on introduction to the essential coding tools powering modern research in **genomics**, **structural biology**, and **big data** analytics. Students will master the Linux command line and Perl programming to automate complex tasks like **genomic sequencing analysis**, **drug discovery workflows**, and **protein structure data mining**, tasks that are impossible to perform manually. Designed as a **career accelerator**, this course bridges the gap between experimental biology and computational methods, equipping students with the most sought-after skills in **biotech**, **pharma**, and **academic research labs**.

Instructional Method
This class is designated 'Primarily Classroom'. Attendance in person is required.

Prerequisites/Corequisites
None. Designed for upper-level undergraduate science majors with little to no prior programming experience.

Course Objectives/Student Learning Outcomes Advancement in computer technology opened doors to analyzing Big Data in a reasonable time using computational codes. The course described in this syllabus will help students understand the syntax and semantics of Linux environment, and Perl language so that they can write computational codes in their undergraduate research. The proposed course should benefit any student in Life Sciences. The first part of the course will describe the Linux environment, and scripting, which we will actively utilize in our Perl scripting. The second part will deal with Perl, where we will study how one can develop various types of codes in Perl. This will include utilization of different data structures such as scalar variables, arrays and hashes, loops, regular expressions, files and data, and subroutines. We will write in-house codes to solve different problems throughout the course. The FAU High Performance Cluster (HPC) might be utilized to run the scripts. At the end of the course, students will be able to:

1. Successfully utilize the Linux terminal and write shell scripts to automate research workflows.
2. Apply computational skills to real-world datasets in fields such as **neuroscience**, **biochemistry**, and **molecular engineering**.
3. Enhance their research competitiveness by combining experimental observables with automated data extraction and analysis.
4. Utilize Perl to debug code and manage the "Big Data" challenges common in modern life science careers.

This course is an excellent opportunity for undergraduate students who are doing research in **structural biology**, **biophysics**, **biochemistry**, **biomolecular engineering**, and **neuroscience**. The knowledge the students will gain in this course will give them power to combine experimental observables with computational methods.

Course Schedule and Evaluation Method

Homework assignments will generally consist of assigned problem sets to be completed by specified dates. There will be at least 10 homework sets. They must compile cleanly and display solutions to the problems. Late submission of homework assignments will incur a penalty.

A workshop format will be used to give lectures. Thus, students will be expected to follow several tutorials before meeting in the class. There will be a final written report for a project, and I will provide students with a list of projects to choose from, or they can propose their own projects directly related to their ongoing research.

This project serves as a **significant CV builder**, allowing students to demonstrate a tangible "in-house" coding application to future employers. This is an excellent opportunity for undergraduate students who have already started working with a research group to utilize computer languages with their ongoing research projects.

Attendance	10%
Homework	60%
Final Report	30%

All grades will be posted on Canvas.

Course Grading Scale

A	93.0-100%
A-	89.0-92.9%
B+	85.0-88.9%
B	82.0-84.9%
B-	78.0-81.9%
C+	74.0-77.9%
C	70.0-73.9%
C-	67.0-69.9%
D+	63.0-66.9%
D-	60.0-62.9%
F	0-59.9%

Policy on Makeup Tests, Late Work, and Incompletes

- Attendance is required. Students must attend all scheduled sessions.
- Students are **strongly** encouraged to work together to exchange ideas and practice skills taught in the lectures.
- An excused absence requires appropriate documentation for either (1) participation in university approved activities or (2) health reasons.
- The grade will be calculated according to the "**Course Evaluation Method**" described above.

Withdrawal. Please check the official FAU website regularly for the most up to date information on the last day to withdraw without a "W" & last day to withdraw without an "F" grade.

Incomplete Grade Policy. Please refer to the FAU Undergraduate Catalog for the policy on "I" grades.

Classroom Etiquette Policy

University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones, are to be silenced or turned off in class sessions."

- Students are permitted to use personal computers during class for note-taking and other class-related work only.

Policy on Recording 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.

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 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.

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 with 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/

Disability Policy

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/.

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's 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.

Required Texts/Readings and Materials

Students are required to bring a laptop to the lectures because of the structure of the course. Linux command line interface (CLI) is the terminal to write the codes and scripts. We will install Windows Subsystem Linux (WSL2) to Windows machines. Apple Mac can utilize its own Linux terminal.

Supplementary/Recommended Readings

We will learn PERL data processing language to write in-house codes. The following books are good references for learning PERL. Older versions of the book can be used, too.

- Learning Perl: Making Easy Things Easy and Hard Things Possible by Randal L. Schwartz, Brian D. Foy, and Tom Phoenix. O'Reilly Media, 7th edition (2016). (*Electronically available for free on Internet Archive*)

  https://www.amazon.com/Learning-Perl-Making-Things-Possible/dp/1491954329

- Beginning Perl for Bioinformatics. An Introduction to Perl for Biologists by James Tisdall. O'Reilly Media (2009).

  https://www.amazon.com/Beginning-Perl-Bioinformatics-James-Tisdall/dp/0596000804

If portions of textbooks or other instructional materials contain concepts that are not consistent with Florida Statutes covering content in undergraduate courses, these portions are neither required nor recommended reading and there are no assignments associated with those concepts.

Course Topical Outline

Below is the tentative schedule, which is subject to change due to environmental, pedagogical, or other factors deemed appropriate by the instructor.

Week	In Class	Assignments
1	Coding in Life Sciences: Why important.	
2	Unix Command-line, Part 1.	
3	Unix Command-line, Part 2.	
		Assignment - Report 1.
4	Linux Scripting.	
5	Awk and the usage of pipe.	
		Assignment - Report 2.
6	Art of Programming and our first Perl code	
		Assignment - Report 3.
7	Scalar Data	
		Assignment - Report 4.
8	Lists and Arrays	
		Assignment - Report 5.
9	Subroutines	
		Assignment - Report 6.
10	Input and Output	
		Assignment - Report 7.
11	Hashes	
		Assignment - Report 8.
12	Regular Expressions	
		Assignment - Report 9.
13	Logical Operators, and Loops	
		Assignment - Report 10.
14	Some examples utilizing the data structures we learned	
		Project Reports Due

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.

AI Language Specific to This Course AI Flexible:

The use of AI to assist in work assigned in this specific course is permitted only for specific assignments as indicated by the instructor. Use must be properly documented and cited per instructor guidelines (https://fau.edu/ai/citation).