

 <b>FLORIDA ATLANTIC UNIVERSITY</b>	<b>NEW COURSE PROPOSAL</b> <b>Undergraduate Programs</b>		UUPC Approval <u>2-28-22</u> UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____
	<b>Department</b> Electrical Engineering and Computer Science  <b>College</b> Engineering and Computer Science <i>(To obtain a course number, contact <a href="mailto:erudolph@fau.edu">erudolph@fau.edu</a>)</i>		
<b>Prefix</b> CAP  <b>Number</b> 4543	<i>(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)</i>  <b>Lab Code</b>	<b>Type of Course</b> <div style="border: 1px solid red; padding: 2px;">Lecture</div>	<b>Course Title</b> Algorithms for Bioinformatics
<b>Credits</b> <i>(Review Provost Memorandum)</i>  3	<b>Grading</b> <i>(Select One Option)</i> <b>Regular</b> <input checked="" type="radio"/> <b>Pass/Fail</b> <input type="radio"/> <b>Sat/UnSat</b> <input type="radio"/>	<b>Course Description</b> <i>(Syllabus must be attached; Syllabus Checklist recommended; see Guidelines)</i> This course covers the data structures and algorithms commonly used in the field of bioinformatics. Emphasis will be placed on topics related to classical and modern techniques employed for biological sequence analysis.	
<b>Effective Date</b> <i>(TERM &amp; YEAR)</i>  Fall 2022	<b>Prerequisites, with minimum grade*</b> (COP 3530 or COP 3410) AND PCB 3063 (Genetics) with minimum grades of "C" or permission from instr		
		<b>Corequisites</b>	<b>Registration Controls</b> <i>(Major, College, Level)</i>
<b>*Default minimum passing grade is D-. Prereqs., Coreqs. &amp; Reg. Controls are enforced for all sections of course</b>			
<b>WAC/Gordon Rule Course</b> <input type="radio"/> Yes <input checked="" type="radio"/> No  <small>WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See <a href="#">WAC Guidelines</a>.</small>		<b>Intellectual Foundations Program (General Education) Requirement</b> <i>(Select One Option)</i>  None  <small>General Education criteria must be indicated in the syllabus and approval attached to the proposal. See <a href="#">GE Guidelines</a>.</small>	
<b>Minimum qualifications to teach course</b> PhD in CS, CE or EE or a related field			
<b>Faculty Contact/Email/Phone</b> Hanqi Zhuang, zhuang@fau.edu, 5612973413		<b>List/Attach comments from departments affected by new course</b>	
<b>Approved by</b> Department Chair _____ College Curriculum Chair <u>Hongbo Su</u> College Dean _____ UUPC Chair <u>Ethlyn Williams</u> Undergraduate Studies Dean <u>Daniel Meeroff</u> UFS President _____ Provost _____			<b>Date</b> 11/8/21  <u>2-12-22</u> 2-28-22 2-28-22 _____ _____

Email this form and syllabus to [mjenning@fau.edu](mailto:mjenning@fau.edu) seven business days before the UUPC meeting.

Department of Electrical Engineering and Computer Science  
Florida Atlantic University  
Course Syllabus

<b>1. Course title/number, number of credit hours</b>																									
Algorithms for Bioinformatics – CAP 4543	3 credit hours																								
<b>2. Course prerequisites, corequisites, and where the course fits in the program of study</b>																									
Prerequisites: (COP 3530 or COP 3410) AND PCB 3063 (Genetics) with minimum grades of "C" or permission from instructor																									
<b>3. Course logistics</b>																									
Term: TBD Class location and time:																									
<b>4. Instructor contact information</b>																									
Instructor's name Office address Office Hours Contact telephone number Email address	TBD																								
<b>5. TA contact information</b>																									
TA's name Office address Office Hours Contact telephone number Email address	TBD																								
<b>6. Course description</b>																									
This course covers the data structures and algorithms commonly used in the field of bioinformatics. Emphasis will be placed on topics related to classical and modern techniques employed for biological sequence analysis.																									
<b>7. Course objectives/student learning outcomes/program outcomes</b>																									
Course objectives	1. Understand core concepts of biological sequence analysis 2. Demonstrate proficiency in choosing optimal algorithms for bioinformatics problems 3. Identify and apply bioinformatics algorithms to high-throughput sequence datasets																								
Student learning outcomes & relationship to ABET 1-7 outcomes	TBD																								
<b>8. Course evaluation method</b>																									
Homework (5 total, 15% each)	75%																								
Final paper	25%																								
<b>9. Course grading scale</b>																									
<table style="width: 100%; text-align: center;"> <tr> <td>A</td><td>A-</td><td>B+</td><td>B</td><td>B-</td><td>C+</td><td>C</td><td>C-</td><td>D+</td><td>D</td><td>D-</td><td>F</td> </tr> <tr> <td>[90-100]</td><td>[87-90]</td><td>[83-87]</td><td>[80-83]</td><td>[77-80]</td><td>[73-77]</td><td>[70-73]</td><td>[67-70]</td><td>[63-67]</td><td>[60-63]</td><td>[51-60]</td><td>[0-51]</td> </tr> </table>		A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F	[90-100]	[87-90]	[83-87]	[80-83]	[77-80]	[73-77]	[70-73]	[67-70]	[63-67]	[60-63]	[51-60]	[0-51]
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F														
[90-100]	[87-90]	[83-87]	[80-83]	[77-80]	[73-77]	[70-73]	[67-70]	[63-67]	[60-63]	[51-60]	[0-51]														
<b>10. Policy on makeup tests, late work, and incompletes</b>																									
Late Assignments Policy –																									

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Course Syllabus**

Make-up Policy for Tests: Makeup tests are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student of participating in the exam.

Incomplete Grade Policy Incomplete grades are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation and the student is currently passing the class, incomplete grades will not be given.

**11. Special course requirements**

N/A

**12. Classroom etiquette policy**

To enhance and maintain a productive atmosphere for learning, personal communication devices such as cell phones are to be disabled during class sessions.

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

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 grade as a direct result of such absence.

**14. 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/](http://www.fau.edu/sas/).

**15. 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/>.

**16. 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 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

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individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#).

**17. Required texts/reading**

TBD

**18. Supplementary/recommended readings**

TBD

**19. Course topical outline (and associated readings)**

**Topics:**

1. High-throughput sequencing experiments and data
2. Sequence analysis (e.g., Knuth-Morris-Pratt, Burrows Wheeler Transform)
3. Pairwise sequence alignment (e.g., Needleman-Wunch, Smith Waterman)
4. Multiple sequence alignment (e.g., dynamic programming, hidden Markov models)
5. Genome assembly (e.g., de novo, mapping with a reference, de Bruijn graphs)
6. Structural variation detection (e.g., read-pair, split-read, read-depth, assembly)
7. Phylogeny construction (e.g., distance methods, parsimony, maximum likelihood)