

# FLORIDA ATLANTIC UNIVERSITY™

## Graduate Programs—NEW COURSE PROPOSAL<sup>1</sup>

UGPC APPROVAL \_\_\_\_\_  
 UFS APPROVAL \_\_\_\_\_  
 SCNS SUBMITTAL \_\_\_\_\_  
 CONFIRMED \_\_\_\_\_  
 BANNER POSTED \_\_\_\_\_  
 CATALOG \_\_\_\_\_

DEPARTMENT CHEMISTRY AND BIOCHEMISTRY

COLLEGE OF SCIENCE

RECOMMENDED COURSE IDENTIFICATION (TO OBTAIN A COURSE NUMBER, CONTACT [NMALDONADO@FAU.EDU](mailto:NMALDONADO@FAU.EDU))

PREFIX CHM COURSE NUMBER 6352 LAB CODE (L or C) \_\_\_\_\_

COMPLETE COURSE TITLE: **STRUCTURAL BIOCHEMISTRY**

### EFFECTIVE DATE

(first term course will be offered)

SUMMER 2016

### CREDITS<sup>2</sup>

3

### TEXTBOOK INFORMATION

1. *Introduction to protein structure*; C. Branden & J. Tooze.  
ISBN-10: 0815323050.
2. *Introduction to Proteins: Structure, Function, and Motion*; A. Kessel & N. Ben-Tal.  
ISBN-10: 1439810710.
3. *Lehninger Principles of Biochemistry*; D. L. Nelson & M.M. Cox. ISBN-10: 0716743396.

GRADING (SELECT ONLY ONE GRADING OPTION): REGULAR  SATISFACTORY/UNSATISFACTORY \_\_\_\_\_

### COURSE DESCRIPTION, NO MORE THAN THREE LINES:

THIS COURSE PLACES EMPHASIS ON COMPUTER-BASED APPROACH TO TEACH STRUCTURAL BIOCHEMISTRY. IT USES HANDS-ON EXPERIENCE TO DEVELOP ESSENTIAL SKILLS FOR UNDERSTANDING OF RELATIONSHIPS BETWEEN STRUCTURE AND FUNCTION OF BIOMOLECULES. CLASSES WILL BE HELD IN COMPUTER LABS. STATE-OF-THE-ART SOFTWARE FOR VISUALIZATION, MANIPULATION AND SIMULATION OF VARIOUS BIOMOLECULES IS USED THROUGHOUT.

### PREREQUISITES\*

CHM2210, MINIMUM GRADE C

### COREQUISITES\*

### REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)\*

\* PREREQUISITES, COREQUISITES AND REGISTRATION CONTROLS WILL BE ENFORCED FOR ALL COURSE SECTIONS.

### MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:

PH.D. IN CHEMISTRY OR BIOCHEMISTRY


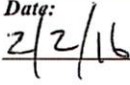
MEMBER OF THE GRADUATE FACULTY OF FAU AND HAS A TERMINAL DEGREE IN THE SUBJECT AREA (OR A CLOSELY RELATED FIELD).

Faculty contact, email and complete phone number:

Maciej Stawikowski  
 Assistant Scientist  
 Department of Chemistry and Biochemistry  
 Florida Atlantic University  
 777 Glades Road, Boca Raton, FL 33431  
 PS-55 Bldg, Room PS 310  
 Email: [mstawikowski@fau.edu](mailto:mstawikowski@fau.edu)  
 Tel: +1-561-297-4871

Please consult and list departments that might be affected by the new course and attach comments.<sup>3</sup>

Department of Biological Sciences

<p><b>Approved by:</b>  Department Chair: <b>Gregg B. Fields</b>   College Curriculum Chair: _____  College Dean: _____  UGPC Chair: _____  Graduate College Dean: _____  UFS President: _____  Provost: _____</p>	<p><b>Date:</b>    _____  _____  _____  _____  _____</p>	<p><b>1. Syllabus</b> must be attached; see guidelines for requirements:  <a href="http://www.fau.edu/provost/files/course_syllabus.2011.pdf">www.fau.edu/provost/files/course_syllabus.2011.pdf</a></p> <p><b>2. Review Provost Memorandum: Definition of a Credit Hour</b>  <a href="http://www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf">www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf</a></p> <p><b>3. Consent</b> from affected departments (attach if necessary)</p>
---	---	---

Email this form and syllabus to [UGPC@fau.edu](mailto:UGPC@fau.edu) **one week before** the University Graduate Programs Committee meeting.

# Syllabus Checklist

- 1. Course title/number, number of credits
- 2. Prerequisites, corequisites, where course fits in program of study (if applicable)
- 3. Course logistics (term, class location and time)
- 4. Instructor contact information (name, office address, office hours, phone, email)
- 5. TA contact information (if applicable)
- 6. Course description
- 7. Course objectives/student learning outcomes
- 8. Course evaluation method (breakdown of graded course components and their weight in determining the overall course grade)
- 9. Course grading scale (optional)
- 10. Policy on makeup tests, late work, and incompletes (if applicable)
- 11. Special course requirements (if applicable)
- 12. Classroom etiquette policy (if applicable)
- 13. Disability Policy statement
- 14. Code of Academic Integrity statement
- 15. Required texts/readings
- 16. Supplementary/recommended readings (if applicable)
- 17. Course topical outline (dates for exams/quizzes, papers, completion of readings)

## Structural Biochemistry (CHM 6352) Syllabus

**Number of credit hours:** 3

**Time:** TBD

**Location:** TBD

**Instructor:** Dr. Maciej Stawikowski  
Department of Chemistry and Biochemistry  
PS-55, PS310  
Office Phone 561-297-4871  
E-mail: mstawikowski@fau.edu

**Office Hours:** TBD

**Texts:**

1. *Introduction to protein structure; 2<sup>th</sup> edition*, C. Branden & J. Tooze. ISBN-10: 0815323050. *Recommended.*
2. *Introduction to Proteins: Structure, Function, and Motion*; A. Kessel & N. Ben-Tal. ISBN-10: 1439810710. *Recommended.*
3. *Lehninger Principles of Biochemistry; 4<sup>th</sup> edition*, D. L. Nelson & M.M. Cox. ISBN-10: 0716743396. *Recommended.*
4. *UCSF Chimera User's Guide*.  
<https://www.cgl.ucsf.edu/chimera/docs/UsersGuide/>  
*Recommended.*

**Prerequisite:** CHM 2210, Minimum grade of C.

**Course description:**

This course is an introduction to structural biochemistry with an emphasis on computer-based approach, hands-on experience to develop essential skills for understanding of relationships between structure and function of biomolecules. A workshop format (introductory lecture followed by hands-on practice) will be carried out throughout all sessions. Classes will be held in computer labs. Each session will be composed of 1h of lecture and 2h of hands-on training.

**Course objectives / learning outcomes:**

We will use state-of-the-art software that will allow for visualization, manipulation and simulation of various biomolecules including proteins, nucleic acids, lipid membranes

**Structural Biochemistry (CHM 6352) 2016 Syllabus**

and their interactions. Students will learn how to identify and describe molecular interactions at different levels. We will work with different biological databases to obtain different data: from sequence to 3-dimensional structures. Participants will learn how use various computer programs to manipulate 3D structures, create publication-quality molecular images to be incorporated in scientific presentations and literature reports. State-of-the-art 3D printing technique will be incorporated into the teaching giving student better perspective on three-dimensional aspect of biomolecular architecture. During this course students will be involved in 3D printing of molecular models (upon availability of 3D printer).

**Course evaluation method:**

Graduate students will be required to practice the use of various programs at home before class meets. Written and electronic reports along with the final exam are the basis for grading.

The exam will consist of short answer questions (essay and word problems) and results of analysis of computer molecular models/problems.

The grade in this course will be determined as follows:

7 written/electronic reports	(70% total)
Final exam	30%

No extra credit assignments will be given to an individual student as a means of improving the grade. Giving such credit is unfair to the rest of the class. Furthermore, a student who was not able to master the class material cannot be expected to successfully complete additional, higher level assignments.

Graduate students will be evaluated based on all assignments. Additionally each graduate student will be required to:

1. Present two research papers related to structural biochemistry (Graduate report 1 & 2).
2. Make scientific presentation at the end of the course that will include advanced visualization techniques, application of available biomolecular software including movies and animations (Graduate report 3).

The grading of graduate students will be determined as follows:

7 written/electronic reports	40%
Presentation of research papers	20%
Final scientific presentation	20%
Final exam	20%

*All grades will be posted on blackboard.*

**Course grading scale:**

A	93.0-100%
A-	89.0-92.9%

## Structural Biochemistry (CHM 6352) 2016 Syllabus

<b>B+</b>	85.0-88.9%
<b>B</b>	82.0-84.9%
<b>B-</b>	78.0-81.9%
<b>C+</b>	74.0-77.9%
<b>C</b>	70.0-73.9%
<b>C-</b>	67.0-69.9%
<b>D+</b>	63.0-66.9%
<b>D-</b>	60.0-62.9%
<b>F</b>	0-59.9%

### **Class policies:**

- Attendance is required. Students must attend all scheduled sessions.
- Due to workshop course format there will be no make-up sessions.
- An unexcused absence will result in 'zero' points for the particular session.
- Students with 3 or more unexcused absences will automatically earn the "F" grade for the course.
- An excused absence requires appropriate documentation for either (1) participation in University approved activities or (2) health reasons.
- Written reports are due on a timely manner as requested by the instructor.
- Missing or past-due reports will result in 'zero' points.
- The grade will be calculated as the average of all class sessions and final exam result.

### *Plagiarism policy:*

Students are encouraged to work together in the exchange of ideas and in general discussion of their assignments and experimental results. However, all data is to be obtained on an individual basis. It is also expected that the work of analyzing data and writing reports will be done individually.

In the event that it is clear that a report or data has been copied from another student, **both** students will receive a mark of zero on that exam, test, report or assignment.

### *Cheating:*

Student cheating on an assignment or a lab report will receive a mark of zero on that assignment or report. Student cheating for the second time on an assignment or a lab report will receive an F for the course.

Make up exam will not be given unless a written and verifiable reason is approved either prior to the exam or within 48 hours of the exam date. Unexcused absence from an exam will result in a zero score being recorded. If a student is unable to complete the required coursework for health or family reasons, an incomplete may be issued.

### **Withdrawal:**

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

### **Incomplete Grade Policy:**

Please refer to the FAU's graduate Catalog for the policy on "I" grades.

**LAB 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 and pagers, are to be disabled in class sessions."

**Disability policy statement:**

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with the Office for Student Accessibility Services (SAS) - in Boca Raton, SU 133 (561-297-3880) – and follow all SAS procedures.

**Honor Code policy statement:**

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, 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 at [http://www.fau.edu/ctl/4.001\\_Code\\_of\\_Academic\\_Integrity.pdf](http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf)

**Anti-Discrimination and Anti-Harassment Policy:**

Students, faculty and staff at Florida Atlantic University are expected to abide by the published anti-discrimination and anti-harassment policy:  
<http://www.fau.edu/regulations/chapter5/Reg%205.010%206-2015.pdf>

**Class 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 and pagers, are to be disabled in class sessions."

- *The use of cell phones or other communication devices for talking or texting is disruptive, and is therefore prohibited during class. A ringing or vibrating phone is just as bad, turn it off before class begins.*
- *Students are permitted to use personal computers during class for note-taking and other class-related work only.*
- *No food, drinks, chewing gums, snacks or similar items are permitted in class.*
- *Bringing-in visitors to the computer lab is not acceptable.*

Structural Biochemistry (CHM 6352) 2016 Syllabus

**Class Schedule:**

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

Date/Week	In Class	Homework Assignments
1	Amino acids and protein primary structure. Introduction to UCSF Chimera software.	
2	Non-covalent interactions in biomolecules.	
		Assignment-Report 1.
3	Protein secondary structures.	
4	Protein tertiary and quaternary structure. Protein Domains and Motifs.	
		Assignment-Report 2.
5	Nucleotides and nucleic acids.	
		Assignment-Report 3.
6	Carbohydrates and glycoproteins.	
	Graduate report 1 (research paper presentation)	Assignment-Report 4.
7	Structure and organization of biological membranes. Membrane proteins.	
8	Biomolecular structure determination methods.	
9	Protein-protein interactions. Case studies.	
10	Protein-ligand interactions. Case studies.	
	Graduate report 2 (research paper presentation)	Assignment-Report 5.
11	Computational methods for structure prediction.	
12	Protein stability and dynamics.	
		Assignment-Report 6.
13	Biomolecular software – showcase and demonstration. Biological databases and data mining.	
14	Molecular structure description: analysis of literature examples; from writing to making molecular movies; creating stunning presentations; Practice examples.	
	Graduate report 3 (final presentation)	Assignment-Report 7.
	Final exam	

**Required course materials:**

USB flash drive – 16GB or more.



**Subject:** Re: Structural Biochemistry course

**Date:** Tuesday, January 19, 2016 at 3:36:21 PM Eastern Standard Time

**From:** David Binninger

**To:** Maciej Stawikowski

**CC:** Rodney Murphey, Gregg Fields, Jerome Haky

Good afternoon,

While a few topics on the syllabus overlap with material offered in some of our courses such as *Bioinformatics* or *Molecular and Cell Biology*, it is minimal. Some of our students would benefit from this course and I hope it is approved.

Let me know if you have questions or need additional information.

Regards,  
David

David Binninger, PhD  
Associate Professor and Associate Chair  
Biological Sciences Department  
and  
Center for Molecular Biology and Biotechnology  
Charles E Schmidt College of Science  
Florida Atlantic University  
777 Glades Road  
Boca Raton, FL 33431  
[\(561\) 297-3323](tel:5612973323)

On Jan 19, 2016, at 3:26 PM, Maciej Stawikowski <[mstawikowski@fau.edu](mailto:mstawikowski@fau.edu)> wrote:

Dear Chairs,

The Chemistry and Biochemistry Department would like to propose a new combined undergraduate/graduate elective course entitled "Structural Biochemistry". This course is intended to be run in Chemistry and Biochemistry Department by Dr. Maciej Stawikowski.

Attached please find proposed syllabus for this course.

We would like to find out if the proposed course does not interfere with any other courses from your Department.

Sincerely,

**Maciej Stawikowski, Ph. D.**  
Assistant Scientist  
Department of Chemistry and Biochemistry  
Florida Atlantic University  
777 Glades Road, Boca Raton, FL 33431  
PS-55 Bldg, Room PS 310  
Email: [mstawikowski@fau.edu](mailto:mstawikowski@fau.edu)  
Tel: +1-561-297-4871