

FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—NEW COURSE PROPOSAL

UGPC APPROVAL _____
 UFS APPROVAL _____
 SCNS SUBMITTAL _____
 CONFIRMED _____
 BANNER POSTED _____
 ONLINE _____
 Misc _____

DEPARTMENT NAME: Basic Science **COLLEGE OF:** Charles E. Schmidt College of Biomedical Science

RECOMMENDED COURSE IDENTIFICATION:
 PREFIX BMS COURSE NUMBER 6604 LAB CODE (L or C) _____
 (TO OBTAIN A COURSE NUMBER, CONTACT ERUDOLPH@FAU.EDU)
 COMPLETE COURSE TITLE Macromolecules & Human Disease

EFFECTIVE DATE
 (first term course will be offered)

 FALL 2010

CREDITS: 3

TEXTBOOK INFORMATION: Textbook of Structural Biology by Anders Liljas, Jure Piskur & Lars Liljas.
 World Scientific Publishing Co. Inc. ISBN-13:9789812772084

GRADING (SELECT ONLY ONE GRADING OPTION): REGULAR X PASS/FAIL _____ SATISFACTORY/UNSATISFACTORY _____

COURSE DESCRIPTION, NO MORE THAN 3 LINES:
 Structure and function of biological macromolecules will be explored with emphasis on DNA, RNA, and proteins.

PREREQUISITES W/MINIMUM GRADE:*
 BCH 3033 Biochemistry 1 or
 PCB 4023 Molecular & Cell
 Biology or equivalents. Minimum
 Grades: B-

COREQUISITES:

OTHER REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL):
 Graduate Students Only

PREREQUISITES, COREQUISITES & REGISTRATION CONTROLS SHOWN ABOVE WILL BE ENFORCED FOR ALL COURSE SECTIONS.
 *DEFAULT MINIMUM GRADE IS D-

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:
Ph.D.

Other departments, colleges that might be affected by the new course must be consulted. List entities that have been consulted and attach written comments from each. Department of Biology; Department of Chemistry and Biochemistry

Keith Brew, Ph.D, kbrew@fau.edu, tel: 297-0407
 Faculty Contact, Email, Complete Phone Number

SIGNATURES

Approved by: _____
 Department Chair: _____
 College Curriculum Chair: _____
 College Dean: _____
 UGPC Chair: _____
 Dean of the Graduate College: _____

Date: 3-16-10

3-16-10

3-16-10

SUPPORTING MATERIALS

Syllabus—must include all details as shown in the UGPC Guidelines.
 Written Consent—required from all departments affected.
 Go to: <http://graduate.fau.edu/gpc/> to download this form and guidelines to fill out the form.

Macromolecules and Human Disease

Course Number: BMS 6604

Credits: 3

Prerequisite: permission of course director - given to those with adequate prior experience/course work in biochemistry or molecular biology of proteins and nucleic acids.

Co-requisite: None

Location: Biomedical Science Center (BC71) Room 130

Instructors:

Dr. Keith Brew
BC-71 #341
(561) 297-0407
kbrew@fau.edu

Dr. Zhongwei Li
BC-71 #308
(561) 297-3178
zli@fau.edu

Dr. Li is course director; general or administrative questions should be addressed to him. Questions about individual lectures and in class activities should be addressed to the appropriate instructor. Individual instructors are available during their posted office hours barring unforeseen circumstances. Appointments can be made to meet at other times.

Required Textbook:

Liljas, Liljas, Piskur, Lindblom, Nissen, Kjeldgaard Textbook of Structural Biology, World Scientific Publishing Company, 2009.

Bibliography:

Books:

Petsko, Gregory A. and Dagmar Ringe. Protein Structure and Function, New Science Press Ltd., 2004.

Sample Literature:

Brodsky, B and Baum, J. Modelling collagen diseases: Structural Biology. (2008) *Nature* 453, 998-999

Chamberlain, AK., Receveur, V., Spencer, A., Redfield, C., and Dobson, CM. Characterization of the structure and dynamics of amyloidogenic variants of human lysozyme by NMR spectroscopy. (2001) *Protein Sci.* 10 2525–2530.

Ecroyd H, Carver JA. Unraveling the mysteries of protein folding and misfolding. (2008) *IUBMB Life.* 60 769-74.

Guindo, A. Fairhurst, RM, Doumbo, OK, Wellems, TE, and Diallo, DA. X-Linked G6PD Deficiency Protects Hemizygous Males but Not Heterozygous Females against Severe Malaria. (2007) *PLoS Med.* 4: e66

Isken O, Maquat LE. (2007) Quality control of eukaryotic mRNA: safeguarding cells from abnormal mRNA function. *Genes Dev.* 21:1833-1856.

Kiani, F. Schwarzl, S, Fischer, S, and Efferth, T. Three-Dimensional Modeling of Glucose-6-phosphate Dehydrogenase-Deficient Variants from German Ancestry. (2007) *PLoS ONE*. 2 e625

Li and Kollipara (2007) RNA metabolism and human diseases. In *Current topics in human diseases*, eds. Deng et al., World Scientific, page 581-616.

Marini JC, Forlino A, Cabral WA, Barnes AM, San Antonio JD, Milgrom S, Hyland JC, Körkkö J, Prockop DJ, et al. Consortium for Osteogenesis Imperfecta Mutations in the Helical Domain of Type I Collagen: Regions Rich in Lethal Mutations Align With Collagen Binding Sites for Integrins and Proteoglycans. (2007) *Human Mutat.* 28, 209-221

Orr et al. (2009) DNA unstable nucleotide repeat and human disorders. *J. Biol. Chem.* 284:7405-7423.

Tost J. (2010) DNA methylation: an introduction to the biology and the disease-associated changes of a promising biomarker. *Mol. Biotechnol.* 44:71-81.

Wittenhagen and Kelley (2003) Impact of disease-related mitochondrial mutations on tRNA structure and function. *TRENDS in Biochemical Sciences* 28:605-611.

Zhao J, Bacolla A, Wang G, Vasquez KM. (2010) Non-B DNA structure-induced genetic instability and evolution. *Cell Mol Life Sci.* 67:43-62.

Websites:

Human genetic diseases: <http://www.ncbi.nlm.nih.gov/omim>

Macromolecule structures: <http://www.ncbi.nlm.nih.gov/Structure/index.shtml>

Glycobiology: <http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=glyco2>

Course Description:

Structure and function of biological macromolecules will be explored with emphasis on DNA, RNA, and proteins.

Instructional objectives:

After taking this course, the students are expected to understand the chemistry and three-dimensional structures of DNA, RNA, proteins and glycans. The students will gain up-to-date knowledge on how sequence and structural variations affect the functional properties of these macromolecules, which may lead to the development of various human diseases. The students are expected to learn (1) DNA replication, unstable repeats, different helical structures, methylation; (2) RNA synthesis, processing and folding, RNA-protein interactions, decay of normal and abnormal RNA, siRNA and miRNA; (3) protein synthesis, protein folding, misfolding and degradation; (4) structural variation and biological functions of glycans (5) roles and inter-relationships of glycosyltransferases. Students who successfully complete the course work will be prepared to study macromolecular structure, function and related human diseases at advanced levels.

Assessment:**Exams**

40 points (20 from each instructor)

Written exams will be given after each section of the course and will count for 15 points each.

Problem/Participation 30 points (15 from each instructor)

Each student will participate before class by completing assigned readings and in class by asking pertinent questions and engaging in scientific dialogue with instructor and classmates. Throughout the course there will be interactive components requiring additional involvement.

Student Presentation 30 points (15 from instructor, 15 from peers)

Details of the assignment will be provided separately.

Reading Comprehension 0 points.

To assist students improve reading comprehension skills, some lectures will include a brief in class reading assignment and multiple choice questions based on the text, similar to those seen on MCAT exams. This activity is being "Beta tested" and will not be graded.

Total 100 points

Course Schedule

Class	Day	Inst	Topic	Group
1	T	ZL	Introduction	
2	R	ZL	Basics of nucleic acid structures	
3	R	ZL	Metabolism of DNA: replication and recombination	
4	T	ZL	DNA repair	1
5	T	ZL	Problem session	
6	R	ZL	Current topics in DNA structure	2
7	T	ZL	Evolution of biomacromolecules	3
8	R	ZL	An overview of RNA	4
9	T	ZL	Transcription and translation	5
10	R	ZL	RNA processing	6
11	T	ZL	RNA stability, siRNA and miRNA	7
12	R	ZL	Problem session	
13	T	ZL	Genomics and bioinformatics studies of macromolecules	8
4	R	ZL	EXAM 1	
15	T	KB	Review of protein structure; proteins and disease	
16	R	KB	Stability and folding	
17	T	KB	Problem session	

18	R	KB	Instability and erythrocyte disorders I	
19	T	KB	Instability and erythrocyte disorders II	9
20	R	KB	Collagen folding and processing diseases	10
21	T	KB	Protein misfolding and degradation	11
22	R	KB	Amyloid and amyloidoses	12
23	T	KB	Prions	13
24	R	KB	Problem session	
25	T	KB	Introduciton to glycobiology	14
26	R	KB	Roles of glycans in eukaryotes and prokaryotes	15
27	T	KB	Glycosyltransferases; diseases of glycosylation	
	R		No class, Thanksgiving recess	
28	T	KB	EXAM 2	
	R		Final exam week	

Grading Criteria:

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
F	<70

Make-up tests and assignments:

Only absences that meet FAU criteria will be considered.

Extra Credit:

None

Attendance Policy:

Attendance is required. 1 point will be deducted from final grade for each absence, except those excused by FAU policy. One additional absence may be excused.

Electronic Devices:

No electronic devices may be used during class or exams without permission of instructor. Disruptions to class, including those caused by cell phones or other electronic devices, may be reflected in the participation grade.

Academic Honor Code:

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.

The FAU Honor Code requires a faculty member, student, or staff member to notify an instructor when there is reason to believe an academic irregularity is occurring in a course. The instructor must pursue any reasonable allegation, taking action where appropriate. The following constitute academic irregularities:

1. The use of notes, books or assistance from or to other students while taking an examination or working on other assignments, unless specifically authorized by the instructor, are defined as acts of cheating.
2. The presentation of words or ideas from any other source as one's own is an act defined as plagiarism.
3. Other activities that interfere with the educational mission of the University.

For full details of the FAU Honor Code, see University Regulation 4.001 at www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf.

Students With Disabilities

In compliance with the American Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) – in Boca Raton, SU 133 (561-297-3880); in Davie, MOD 1 (954-236-1222); in Jupiter, SR 117 (561-799-8585); or at the Treasure Coast, CO 128 (772-873-3305) – and follow all OSD procedures.

Julie Sivigny

From: Julie Sivigny [jsivigny@fau.edu]
Sent: Friday, March 12, 2010 4:02 PM
To: 'Jerome E Haky'
Subject: Biomedical Science New Course Proposal - Macromolecules & Human Disease
Attachments: macromolecules & human disease syl ncp.doc

Dear Dr. Haky,

Biomedical Science is submitting a New Course Proposal for the course, Macromolecules and Human Disease, taught by Drs. Keith Brew and Zhongwei Li. We have offered this course under the special topics course number and would like to have it made permanent by adding it to the course inventory system.

The Department of Chemistry and Biochemistry was identified as a department that might be affected by this new course. Could you please review the attached syllabus for any potential conflicts? We appreciate your help with this matter.

Please contact me if you need any additional information.

Thank you.

*Julie A. Sivigny
Academic Program Specialist
Charles E. Schmidt College of Biomedical Science
Florida Atlantic University
(561) 297-2216*

Julie Sivigny

From: David Binninger [binninge@fau.edu]
Sent: Wednesday, March 17, 2010 11:47 AM
To: Julie Sivigny
Cc: Rodney Murphey
Subject: Fwd: Biomedical Science New Course Proposals

Good morning,

I circulated the syllabi for the new courses listed in your e-mail (see below) to the faculty who could make comments. I did not receive any responses that raised questions or noted a significant overlap with any of our graduate courses. Please let me know if you have any questions.

I hope this is helpful and good luck with the remainder of the process toward approval of the courses.

Regards,
David

David M. Binninger, Ph.D.
Associate Professor and Associate Chair
Department of Biological Science
and
Center for Molecular Biology and Biotechnology
Florida Atlantic University
777 Glades Road
Boca Raton, FL 33431 USA
Phone: (561) 297-3323
FAX: (561) 297-2749

Begin forwarded message:

From: Julie Sivigny <jsivigny@fau.edu>
Date: March 15, 2010 1:38:27 PM EDT
To: 'David Binninger' <binninge@fau.edu>
Subject: Biomedical Science New Course Proposals

Dear Dr. Binninger,
Thank you for your assistance with this process. We are submitting a total of 10 new course proposals and 2 changes. All syllabi were forwarded to Dr. Murphey but in multiple batches so if you are missing any please let me know and I'll send to you immediately.

Biomedical Science New Course Proposals:
Host Defense & Inflammation – Dr. Yoshimi Shibata
Molecular Neuropsychopharmacology – Drs. Igor and Tao
Macromolecules and Human Disease – Drs. Brew and Li
Adult Neurogenesis – Dr. Jianning Wei
Molecular Basis of Disease & Therapy – Dr. Caputi

Tumor Immunology – Dr. Vijaya Iragavarapu
Molecular Genetics of the Cell – Dr. Kantorow
Molecular Basis of Human Cancer – Dr. Lu
Problem-based Immunology – Dr. Nouri-Shirazi
Fundamentals of General Pathology – Dr. Levitt

The integrated morphology courses will be processed as changes. We previously offered two 3-credit courses: Human Gross Anatomy – Trunk and Human Gross Anatomy – Extremities. We are changing these to 4-credit courses with the titles *Integrated Morphology I and II* taught by Drs. Willis Paull, Rainald Shmidt-Kastner and Deborah Cunningham.

The graduate college submission deadline is Wednesday March 17th at noon. I apologize for the lateness of some of these requests and appreciate your effort to assist us.

Please let me know if I can provide any additional information.
Thank you.
Julie

Julie A. Sivigny
Academic Program Specialist
Charles E. Schmidt College of Biomedical Science
Florida Atlantic University
(561) 297-2216

From: David Binninger [<mailto:binninge@fau.edu>]
Sent: Monday, March 15, 2010 11:16 AM
To: Julie Sivigny
Cc: Rodney Murphey; Jay Lyons
Subject: Fwd: Biomedical Science New Course Proposal - Macromolecules & Human Disease

Good morning Julie,

I forwarded the syllabi for the new courses to the appropriate faculty last week. It's my opinion that there will not be any issues or conflicts. So far, I have had only one response and that was that there were no concerns. Please confirm the full list of new courses and when you need a statement from me.

I hope this is helpful and please let me know if you have any questions.

Regards,
David

David M. Binninger, Ph.D.
Associate Professor and Associate Chair
Department of Biological Science
and
Center for Molecular Biology and Biotechnology
Florida Atlantic University
777 Glades Road
Boca Raton, FL 33431 USA
Phone: (561) 297-3323
FAX: (561) 297-2749