

## **BSC 4434: Introduction to Bioinformatics, Section 05B7-Fall 2011 (3 credits)**

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MCB4934 (Section 05B7) is a lecture and computer laboratory hands-on course with emphasis on data-mining tools freely available in web-based resources that predict gene function from DNA, RNA and protein sequences.

**Student Learning Outcomes** – After successful completion of this course, students will be able to:

- 1) Retrieve information on genes and proteins from biological and genomic databases.
  - 2) Predict genes from DNA sequences.
  - 3) Identify promoters and regulatory elements in DNA sequences
  - 4) Analyze protein sequences
  - 5) Compare protein and DNA sequences
  - 6) Visualize and analyze protein structures
  - 7) Construct and interpret simple phylogenies
  - 8) Place a function in the context of a biological pathway
  - 9) Predict function using non-homology based tools
  - 10) Apprehend the problems in analyzing large datasets
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### **Lectures/Computer Lab**

Microbiology Room 1011 Tu periods 3 and 4, 9h35AM to 11h30 AM ; Th periods 3 and 4, 9h35AM to 11h30 AM.

**Instructor:** Dr. Valérie de Crécy-Lagard

**WebPage:** e-learning Sakai

**Prerequisite:** "C" grade or better in **Basic Biology of Microorganisms** (MCB3020, MCB3023) OR **Biochemistry** (BCH 4024 or CHM 3218)

### **Contact Information:**

➤ Dr. Valérie de Crécy-Lagard :

- **Email (the most efficient):** Use the Sakai e-mail in priority. (If you do not have access to Sakai platform and if emergency, use [vcrecy@ufl.edu](mailto:vcrecy@ufl.edu)).
- **Phone:** 392 9416 (please leave a message).
- **Office hours:** Tu 11h30 AM to 12h30 pm (or e-mail to make an appointment)

Microbiology and Cell Science Building, Room 1251

➤ **TAs:**

Crecy lab TAs

Basma El Yacoubi (BEY), and Patrick Thiaville (PT) will be teaching some of the sections of the class and will have an office hour in the Microbiology and Cell Science Building, Room 1251. Time TBA

**Required Textbooks:** "Essential bioinformatics" 2006, Authors: Jin Xiong Publisher: Cambridge University Press, ISBN -13:978-0-521-60082-8 **AND** "Bioinformatics for Dummies" 2<sup>nd</sup> edition 2006 Authors: Jean-Michel Claverie and Cedric Notredame, Publisher Wiley Publishing Inc, ISBN-13:978-0-470-08985-9

## Evaluation of learning

- **Homework**

Homework exercises to be completed before class will be assigned on a regular basis (10%)

- **Attendance and in class exercises**

Class attendance is required. Regular class exercises or short quizzes will be given in class to monitor attendance and/or understanding (10%)

- **Assignments**

Three projects will be conducted in an out of class

1. Mid-term at home paper (15%) due October 25
2. Group Journal Club (15%) presented in class November 22 and 29
3. Vitamin project (30 %) due December 6

- **Exams**

Final (20%) in class

- **Make-up policy.** Late assignments will be penalized by deducting -25% of the grade for each late day. Make-ups for the final exam will be given only under exceptional circumstances and organized on a case by case basis.

- **Grading:** Straight scale, follows the policies described here

<http://www.registrar.ufl.edu/catalog1011/policies/regulationgrades.html>

94.0-100%	A
90.0-93.9%	A-
87.0-89.9%	B+
84.0-86.9%	B
80.0-83.9 %	B-
77.0-79.9%	C+
74.0-76.9%	C
70.0-73.9%	C-
67.0-69.9%	D+
64.0-66.9%	D
60.0-63.9%	D-
<60%	E

The grading scale may be adjusted slightly, based on class performance.

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**Punctuality and class etiquette:** The class will begin at 9:35 am. Please be on time and in place. If you need to leave the class early, please notify me at the beginning of the class. Please do not forget to shut cell phones off.

**Recommendation letters:** Many of you need recommendation letters. Students who both achieve an A- or higher grade AND show active participation in and outside the class can request letters. Students requesting letters need to attend the last lecture of the semester with a folder containing a picture, resume and GPA, then contact the instructor by e-mail ([vcrecy@ufl.edu](mailto:vcrecy@ufl.edu) not the e-learning e-mail) DURING the 2012 spring semester to schedule an interview.

**Academic Honesty:** In 1995 the UF student body enacted an [honor code](#) and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code.

Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

**The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.**

On all work submitted for credit by students at the university, the following pledge is either required or implied: **"On my honor, I have neither given nor received unauthorized aid in doing this assignment."**

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior. Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office.

*(Source: 2010-2011 Undergraduate Catalog)*

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

**Software Use:** All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

**Campus Helping Resources:** Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

• *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,*

[www.counseling.ufl.edu/cwcl](http://www.counseling.ufl.edu/cwcl)

Counseling Services

Groups and Workshops

Outreach and Consultation

Self-Help Library

Training Programs

Community Provider Database

• *Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*

**Students with Disabilities:** The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

## Course calendar (can be modified during the semester)

Date	Instructors	Lecture	Textbook	Title
<b>W1</b>				
Tu-8/23	VDC	L1	EB1/BD1&14	Bioinformatics: Definition and overview
Th-8/25	VDC	L2	EB2/BD2	Biological databases
<b>W2</b>				
Tu-8/30	VDC	L3	UB3/BD3	Information retrieval from databases
Th-9/1	VDC	L4	UB3/BD4	Information retrieval from databases
<b>W3</b>				
Tu-09/06	VDC	L5	EB3-4/BD7-8	Pairwise alignment and database searching
Th-09/08	VDC	L6	EB3-4/BD7-8	Pairwise alignment and database searching
<b>W4</b>				
Tu-09/13	VDC	L7	EB5-7/BD9-10	Multiple Sequence Alignment; Remote Homology Detection
Th-09/15	VDC	L8	EB5-7/BD9-10	Multiple Sequence Alignment; Remote Homology Detection
<b>W5</b>				
Tu-9/20	VDC	L9	EB8-9/BD5	Genome browsers
Th-9/22	VDC/BEY	L10	EB8-9/BD5	DNA analysis I
<b>W6</b>				
Tu-9/27	BEY	L11	EB8-9/BD5	DNA analysis II
Th-9/29	BEY	L12	EB8-9/BD6-10	Protein analysis
<b>W7</b>				
Tu-10/04	HG	L13	EB10-11/BD13	Phylogeny Basics
Th-10/06	HG	L14	EB10-11/BD13	Phylogeny Basics
<b>W8</b>				
Tu-10/11	JJ	L15	EB12-13/BD11	Visualizing and comparing Protein structures
Th-10/13	JJ	L16	EB12-14/BD11	Visualizing and comparing Protein structures
<b>W9</b>				
Tu-10/18	VDC	L17	EB17	Linking gene and function & <b>Mid-term paper given</b>
Th-10/20	VDC	L18	EB17	Linking gene and function & <b>Vitamin Project starts</b>
<b>W10</b>				
Tu-10/25	VDC	L19	EB17	Linking gene and function & <b>Mid-term paper due</b>
Th-10/27	PT	L20	EB18	Microarray analysis
<b>W11</b>				
Tu-11/01	PT	L21	EB18	Microarray analysis
Th-11/03	VDC	L22	EB18	Mid-term paper correction & <b>Journal Club starts</b>
<b>W12</b>				
Tu-11/08	OF	L23	EB8	Identifying plant genes
Th-11/10	OF	L24		Plant post genomic resources
<b>W13</b>				
Tu- 11/15	VDC	L25		Vitamin Project and Journal Club preps
Th-11/17	VDC	L26		Vitamin Project and Journal Club preps
<b>W14</b>				
Tu-11/22	VDC	L27		<b>Journal Club presentations</b>
Th-11/24		<b>Thanksgiving</b>		<b>NO CLASS</b>
<b>W15</b>				
Tu-11/29	VDC	L28		<b>Journal Club presentations</b>
Th-12/01	VDC	L29		Vitamin project prep
<b>W16</b>				
Tu-12/06	VDC	L30		Q&A, debriefing & <b>Vitamin Project due</b>
<b>W17</b>				
<b>M 12/13</b>	<b>8h30-noon</b>			<b>Finals</b>

EB= Essential Bioinformatics ; BD : Bioinformatics for Dummies ; TBA : To Be Announced

VDC= Valerie de Crecy ; BEY=Basma El Yacoubi ; PT=Patrick Thiaville ; HG=Hasnain Ghulam ; JJ= Jennifer Joseph ;

OF= Oceane Frelin.