BIOL 4000: Bioinformatics (Summer 2015, CRN: 50872)

1. Course Information

- Course number and section: BIOL 4000 D
- Course name: Bioinformatics
- Hours of credit: 3
- Pre-requisites or co-requisites as listed in university catalogue: Prerequisite: BIOL 1107K, BIOL 1108K, BIOL 3200, and BIOL 3250 or permission of the instructor. The course focuses on two themes: **theoretical principles** underlying bioinformatics analysis and **hands-on analysis** using publicly available databases and software.
- Classroom location and room number: BC 2202 (BC 3018), MTWR 02:20 pm-03:45 pm
- Department, College, University: Department of Biology, College of Arts and Sciences, Valdosta State University

2. Instructor Information

- Instructor name: Dr. Jonghoon Kang
- Instructor contact: BC 2217, 229-333-7140, jkang@valdosta.edu
- Instructor office hours: MTWR 1:30 pm - 2:00 pm

3. Course Description

- Course description as printed in university catalogue: Selected topics in the biological sciences. May be repeated if the topic is different. This course does not include a laboratory.
- Required texts, resources, and materials: *Bioinformatics for Beginners* by Supratim Choudhuri from Elsevier (ISBN: 978-0-12-410471-6); Portable computer (laptop, iPad, etc).

4. Standards, Goals, Objectives, or Outcomes

- outcomes:

The departmental educational outcomes (listed in the university catalogue).
1. Develop and test hypotheses, collect and analyze data, and present the results and conclusions in both written and oral formats used in peer-reviewed journals and at scientific meetings.
3. Demonstrate an understanding of the cellular basis of life.
4. Relate the structure and the function of DNA/RNA to the development of form and function of the organism and to heredity.

- Course objectives or outcomes:
  - ✓ Recognize the importance of integrative approach in the study of biology
  - ✓ Acquire and enhance quantitative reasoning aptitude
  - ✓ Refresh knowledge on basic concepts in genomics
  - ✓ Learn basic principles of bioinformatics
  - ✓ Familiarize with public databases and analysis tools of bioinformatics

5. Course Policies

- Arrive on time. Attendance will be recorded in the first 10 minutes of the class. So, do not be late to class. In the event that a student misses a class with an excuse, s/he should email the instructor within 24 hours of the missed class. It is the instructor's prerogative to accept the excuse or not. Students are still responsible for all class content even if they received an excused absence.

- Cell phones are not allowed to be used in class.

- Email: Please email me only from a VSU email account. I am unable to respond to emails from non-VSU accounts.

-Academic integrity is the responsibility of all VSU faculty and students. Students are responsible for knowing and abiding by the Academic Integrity Policy as set forth in the Student Code of Conduct and the syllabus. All students are expected to do their own work and to uphold a high standard of academic ethics. Cheating (including plagiarism) will not be tolerated. The instructor reserves the right to dismiss you from the course without credit if you are caught cheating. You will be respectful of your instructor and your fellow students at all times, or you will be dismissed from the class and potentially the course.

- No arguments on final grade. You can check any mistake in the calculation of your grade but no any other arguments.

6. Assignments

- General description of the assignments: There will be one midterm exam, three presentations, and a final exam. The format of presentations will be provided in class.
- Policies for missed assignments, make-up assignments, late assignments, and/or extra credit: There will be no extra credit in this course.

7. Assessment or Evaluation Policy

- ✓ Attendance and class participation (20 pt)
- ✓ Presentation of Term Project Proposal (10 pt)
- ✓ Presentation of Specialized Databases (10 pt)
- ✓ Midterm Exam (20 pt)
- ✓ Presentation of Term Project (20 pt)
- ✓ Final (20 pt)

Total: 100 pt

Scale:

A >= 90%, B >= 80%, C >= 70%, D >= 60%, F < 60%

8. Schedule of Activities or Assignments, including university -scheduled final exam time (all schedule is tentative and may be subject to change)

Date	Chapter	Class
6/10	1	Fundamentals of Genes and Genomes; DNA
6/11	1	Fundamentals of Genes and Genomes; RNA, miRNA gene distribution
6/15	1	Fundamentals of Genes and Genomes; RNA, miRNA gene distribution
6/16	1	Fundamentals of Genes and Genomes; Protein & Genome
6/17	4	The Beginning of Bioinformatics
6/18	4	The Beginning of Bioinformatics
6/22		**Student Presentation of Term Project Proposal (10 pt)**
6/23	5	Primary Sequence Databases: GenBank
6/24	5	Secondary & Specialized Databases: UniProtKB
6/25	5	Data Retrieval
6/29	5	Data Retrieval
6/30	5	**Student Presentation of Specialized Databases (10 pt)**
7/1	5	Data Visualization and NCBI's Map Viewer
7/2		**Midterm Exam (20 pt)**
7/6	6	Sequence Alignment
7/7	6	Scoring Matrix
7/8	6	Database Search
7/9	7	Genome: Sequencing, Assembly, Annotation
7/13	7	Prediction of Promoters, TF-Binding Sites, TLN Initiation Sites, and the ORF
7/14	7	RNA Secondary Structure Prediction
7/15	8	Protein Structure in Detail
7/16	8	Prediction of Physicochemical Properties of Proteins
7/20	8	Protein Secondary Structure Prediction
7/21	8	Prediction of Domains and Motifs
7/22	8	Allergenic Protein Databases
7/23	8	Intrinsically Disordered Protein Analysis
7/27		**Student Presentation of Term Project (20 pt)**
7/28		**Student Presentation of Term Project (20 pt)**
7/29		**Final (20 pt) 3:00 pm -5:00 pm**