Course Outline
This course provides an introduction to Bioinformatics. It introduces fundamental problems, concepts, methods, and applications in Bioinformatics. The underlying algorithms behind some widely used Bioinformatics tools and databases will be discussed. The course is logically divided into three major areas of Bioinformatics: 1) Phylogenetics; 2) Sequence Analysis; and 3) Structural Bioinformatics. Various computational and data-driven approaches to analyze, model and solve fundamental problems in life sciences and biomedical research will be introduced. Students will have an opportunity to experiment with Bioinformatics tools and techniques and apply them to a selected problem in the context of a final project, present the results and document the findings in the form of a final report.

Location: 226 Jabara Hall

Class Schedule: 5:30 pm - 6:45 pm Tuesdays and Thursdays

Instructor: Debswapna Bhattacharya
Office: 237 Jabara Hall
Email: db279@mail.missouri.edu
Telephone: (316)-978-3156
Office Hours: 3:30 pm - 4:30 pm Tuesdays and Thursdays

Prerequisites
The official prerequisites for this course are:
1. Introduction to Programming (CS 211 or equivalent)
2. Data Structures and Algorithms I (CS 300 or equivalent)

A minimum grade of C is required in the prerequisite courses. At a higher level, the course requires the students to have good programming knowledge, and familiarity with algorithms and data structures. No prior knowledge of biology is required. A strong desire to learn, hard-working attitude and inclination towards the subject of bioinformatics may make up for a lack of official prerequisites.

Textbook
This course does not mandate any textbook. The lecture slides and other materials provided by the instructor will be sufficient, serving as the
primary reference. In addition, the students are recommended to refer to the following reference books:

Introduction to Bioinformatics  
Author: Arthur M. Lesk  
Publisher: Oxford University Press Edition: 4th edition

Structural Bioinformatics  
Editors: Jenny Gu and Phillip E. Bourne  
Publisher: Willey Blackwell Edition: 2nd edition

**Grading**  
- Class Participation (5%)  
- Homeworks (40%)  
- Midterm (25%)  
- Final Project (30%)

**Tentative Schedule**  
Introduction, Evolution and Phylogeny (2 weeks)  
- Distance-Based Phylogeny  
- Feature-Based Phylogeny

Sequence Analysis (5 weeks)  
- Sequence Similarity and Sequence Alignment  
- Pairwise Sequence Alignment  
- Statistical Significance of Sequence Alignment  
- BLAST  
- Multiple Sequence Alignment  
- Applications of Multiple Sequence Alignment

Structural Bioinformatics (6 weeks)  
- RNA Folding  
- Protein Folding  
- Structural Alignment and Classification  
- Molecular Visualization  
- Genome Folding

Final Project (2 weeks)  
- Presentation  
- Project Report
Disability Accommodations
If you have a physical, psychiatric/emotional, or learning disability that may impact your ability to carry out assigned course work, I encourage you to contact the Office of Disability Services (DS). The office is located in Grace Wilkie Annex, room 150, or you can call 316-978-3309 (voice) or 316-854-3032 (videophone). DS will review your concerns and determine, with you, the academic accommodations that are necessary and appropriate for you. All information and documentation of your disability is confidential and will not be released by DS without your written permission.

Course policy on academic dishonesty and plagiarism
Any evidence of academic dishonesty (or plagiarism), including copying of homework or programming assignments, cheating during quizzes or exams will be treated with utmost seriousness. First offense will result in a zero on the quiz/homework/assignment/project/exam in question. Those who are involved the second time will automatically receive an F grade for the course; this applies to ALL the parties involved (including the ones who help/show). It is your responsibility to protect your computer files (by setting appropriate access protection) and printouts. Students are responsible for knowing and following the Student Code of Conduct and the Student Academic Honesty policy. The University Academic Honesty Policy can also be found in the WSU Student Handbook.