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|---|--|-----------------------------------|----------------------------------|---|---|---|---|---|---|----|
| <b>Dept Number</b>  | <b>CS 438</b>  | <b>Course Title</b>               | <b>Bioinformatics Algorithms</b> |   |   |   |   |   |   |    |
| <b>Semester Hours</b>   | <b>3</b>   | <b>Course Coordinator</b><br>SP15 | <b>Dunren Che</b>                |   |   |   |   |   |   |    |
| <b>Catalog Description</b>  | This course is an introductory course on bioinformatics algorithms and the computational ideas that have driven them. The course includes discussions of different techniques that can be used to solve a large number of practical problems in biology. |                                   |                                  |   |   |   |   |   |   |    |
| <b>Textbooks</b>  |  |                                   |                                  |   |   |   |   |   |   |    |
| <i>An Introduction to Bioinformatics Algorithms</i> , Jones, Neil C. and Pavel A. Pevzner MIT Press, 2004.<br>ISBN: 9780262101066.  |  |                                   |                                  |   |   |   |   |   |   |    |
| <b>References</b>   |  |                                   |                                  |   |   |   |   |   |   |    |
| <b>Course Learning Outcomes</b>   |  |                                   |                                  |   |   |   |   |   |   |    |
| <ul style="list-style-type: none"> <li>To learn basic concepts in molecular biology.</li> <li>To learn the basic algorithms used in bioinformatics applications.</li> </ul> |  |                                   |                                  |   |   |   |   |   |   |    |
| <b>Assessment of the Contribution to Student Outcomes</b>   |  |                                   |                                  |   |   |   |   |   |   |    |
| <b>Outcome →</b>  | 1  | 2                                 | 3                                | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <b>Assessed →</b>   | X  | X                                 | X                                |   |   |   |   |   |   |    |
| <b>Prerequisites by Topic</b>   |  |                                   |                                  |   |   |   |   |   |   |    |
| CS 330 with a grade of C or better.   |  |                                   |                                  |   |   |   |   |   |   |    |

**Major Topics Covered in the Course**

1. Molecular Biology Primer {7 classes}
2. Exhaustive Search {6 classes}
3. Greedy Algorithms {3 classes}
4. Dynamic Programming Algorithms {6 classes}
5. Divide-and-Conquer Algorithms {3 classes}
6. Graph Algorithms {6 classes}
7. Clustering and Trees {6 classes}
8. Randomized Algorithms {3 classes}