National Library of Medicine
Network of the National Library of Medicine
NNLM Training Office
Phone: (801) 587-3518
https://nnlm.gov/nto

Bioinformatics and Biology Essentials for Librarians:

Databases, Tools, and Clinical Applications

Course overview, modules, and activities

Overview

This course is an introductory, online bioinformatics for librarians and information professionals. The course is taught by NLM, NNLM and subject experts at the National Center for Biotechnology Information (NCBI). The course is offered through the Moodle learning management system. It is a 14-week, self-paced course worth 30 hours of continuing education (CE) credit from the Medical Library Association. This course was designed both for librarians who offer, or intend to offer, bioinformatics services; and also for librarians who use bioinformatics information on a periodic or irregular basis to serve their patrons.

The course is offered twice a year:

- January – April
- August – December

Modules open progressively. Course content is provided in the form of videos, hands-on exercises, readings, discussion posts, and open book quizzes. Synthesis activities conclude the course with actual reference questions from the NCBI and the creation of a personal bioinformatics action plan. The Module Outline describes the pace and content of the course.

Due Dates

There are four major due dates. You can work ahead, but instructors may not review or comment until the date listed below. You must complete each major part by the following due dates:

- Pre-Work: End of week 2
- Part 1: End of week 6
- Part 2: End of week 10
- Part 3: End of week 14

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Module Outline

Pre-Work: Genetics Basics

The first week of the course consists of pre-work to orient you to molecular biology concepts you need to understand in order to use the bioinformatics databases effectively. We've framed the learning experience as an open book quiz with readings and activities and given you one week to work through the content and ask questions using the discussion board.

Part I (Intro to Bioinformatics and the NCBI Nucleotide Database)

Module 1: Bioinformatics and Librarianship

What is bioinformatics and what does it have to do with librarianship? In this module you'll learn the scope of bioinformatics and explore different roles for librarians by reading profiles of your colleagues and participating in a discussion.

Module 2: Molecular Biology Techniques

How do scientists acquire nucleotide sequences from organisms? In this module you'll explore some basic techniques for sequencing through an interactive website and open book quiz.

Module 3: NCBI Taxonomy

What species are included in NCBI databases? How do you link from species information to sequence and other data? In this module you'll use the NCBI Taxonomy database to explore data by species and groups of species.

Module 4: NCBI Nucleotide

The NCBI Nucleotide database is where you can find DNA and RNA sequences. This module explores the NCBI Nucleotide Database through videos, a hands-on exercise, and quiz.

Module 5: BLAST Sequence Similarity

This module uses videos and hands-on exercises to explore the Basic Local Alignment Sequence Tool (BLAST) to identify and compare sequences, and review the GenBank record.

Part II (Gene, Structure, and Protein Databases)

Module 6: NCBI Gene

The NCBI Gene Database pulls together data from many sources, to give you quick access to what is known about a gene. In this module you will learn about the NCBI Gene database through videos, a hands-on exercise, and quiz.

Module 7: Basics of Proteins

Before you delve into the NCBI Protein and Structure Databases, it's best to understand the structure and function of proteins. This module reviews the fundamentals through videos and an open book quiz.

Module 8: NCBI Protein and Structure Databases

This module shows how to use the Protein and Structure Databases through videos, hands-on exercises and quiz.

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Module 9: Clinical Applications

This module uses video and hands-on exercises to explore the NCBI databases MedGen, ClinVar and Genetic Testing Registry (GTR).

Part III (Challenges, Goals and the Future of Bioinformatics)

Module 10: Ethics and Policy in Bioinformatics

In this module, we discuss public policy and the ethical implications of bioinformatics data storage, access, and use through readings, videos and discussion posts.

Module 11: What's Next in Genomic Research

This module takes a look at advances in genomic research through readings, a quiz, and a PubMed literature search activity.

Module 12: Synthesis

You now have an opportunity to reflect on and apply what you've learned. Work through four synthesis activities based on actual questions that the NCBI has been asked, then reflect on your own next steps by creating a personal bioinformatics action plan. You have two weeks to work on the synthesis activities, then complete the evaluation to receive 30 hours of CE credit from the Medical Library Association.

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