

# Bioinformatics and Biology Essentials for Librarians:

## Databases, Tools, and Clinical Applications

### Course overview, timeline, and activities

#### Overview

This class is an introductory, online bioinformatics course for librarians using 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. See timeline for the pace of topics.

#### 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

#### Timeline/Agenda

##### Pre-Work

##### *Weeks 1 & 2: Genetics Basics*

The first two weeks of the course consist 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 two weeks to work through the content and ask questions using the discussion board.

## Part 1: Intro to Bioinformatics and the NCBI Nucleotide Database

### *Week 3: 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 and participate in a discussion.

### *Week 4: 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.

### *Week 5: NCBI Nucleotide*

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

### *Week 6: 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 2: Gene, Structure and Protein Databases

### *Week 7: 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.

### *Week 8: 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.

### *Week 9: NCBI Protein and Structure Databases*

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

### *Week 10: Clinical Applications*

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

## Part 3: Challenges, Goals, and the Future of Bioinformatics

### *Week 11: 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.

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*Week 12: What's Next in Genomic Research*

This module takes a look at advances in genomic research through readings in Genetics Home Reference and a PubMed literature search activity.

*Week 13: 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.

*Week 14: Synthesis and Evaluation*

Take an additional week to finish up your synthesis activities, then complete the evaluation to receive 30 hours of CE credit from the Medical Library Association.