

Certificate

Biotechnology and Electron Microscopy Program Cluster
 and Information Technology Program Cluster
 School of Agriscience and Technologies
 Courses offered at Madison Campuses

For information call: (608) 243-4307 or
 (800) 322-6282 Ext. 4307

About the Certificate

Bioinformatics is the application of information technology to the management and analysis of biological data. This certificate is designed for individuals with a college background in the life sciences in order to prepare them to effectively use the tools and methods of bioinformatics to enhance their work. The certificate curriculum was created in consultation with local industry professionals to provide scientists and technicians with the ability to analyze and interpret the increasing deluge of biological data generated through the use of new technologies.

Unique Requirements for Admission

The student is expected to have an AAS degree in the Biotechnology Lab Technician Program OR a four-year degree in a life science discipline OR equivalent experience in the biotechnology industry. The student is also expected to have basic experience in operating a personal computer.

Certificate Application Process

To apply, see: Apply Online (on the Madison College website). [Create an ApplyWeb account](#) and follow the [instructions](#) to complete the [Online Certificate Application](#) before the [application deadline](#). Submit the \$15 non-refundable fee (payable by credit card, debit card or electronic check) with your application. Applicants may submit more than one certificate application per term using the Online Certificate Application; the same fees apply for each additional application.

Unique Requirements for Completion

The certificate will be awarded upon completion of the requirements with a minimum of a 2.0 grade average and no course grade lower than a C. The certificate will be awarded when completion of all requirements is verified after the semester the last course has been completed.

Curriculum

		Hrs/week	
		Credits	Lec-Lab
FIRST YEAR			
First Semester			
10-007-180	Introduction to Bioinformatics	3	2-2
10-152-109	<u>Python Programming*</u>	3	2-2
Semester Total		6	
Second Semester			
10-007-182	<u>Bioinformatics Algorithms and Techniques</u>	3	2-2
Semester Total		3	
SECOND YEAR			
10-007-181	<u>Advanced Bioinformatics</u>	3	2-2
Semester Total		3	

Note: All Information Technology courses require a grade of C or better in order to receive the certificate.

* Other programming languages may be substituted for Python Programming with consent of program director.



Courses

10-007-180 Introduction to Bioinformatics 3 credits

This survey course is an introduction to the concepts and tools used in bioinformatics. The fundamentals of sequence alignment, data mining and microarray data analysis will be discussed. This course will also provide the student with an overview of the computing tools used for bioinformatics, such as Unix, Perl, and file structure and management. Mastery of these tools is not expected in this course; rather, the student is given a practical introduction to the Perl Programming language in the Unix operating system environment.

Prerequisite: Acceptance into certificate program.

10-152-109 Python Programming 3 credits

This course is an introductory course in the Python programming language. Topics and projects covered will be aligned with other courses in the certificate. Prerequisite:

Working knowledge of Microsoft Windows (computer Literacy, proficiency with a mouse, file management).

10-007-182 Bioinformatics Algorithms and Techniques 3 credits

This course provides an introduction to the major algorithms of sequence analysis, structure prediction, and pattern recognition. These techniques are utilized in array data processing, NextGen sequencing, target discovery, and assay development. This includes dynamic programming, hidden markov models, graph algorithms, and clustering algorithms.

Prerequisites: grade of C or better in 10-007-180 and 10-152-109 or equivalent programming language, or consent of instructor.

10-007-181 Advanced Bioinformatics 3 credits

This capstone course in Bioinformatics provides the student with experience in the design and implementation of basic programming concepts applied to bioinformatics problems. Using the skills gained in previous certificate courses, the student designs and completes an independent project.

Prerequisites: grade of C or better in 10-007-180, 10-152-109, and 10-007-182.

More detailed and updated information on this program may be available at: madisoncollege.org. The college reserves the right to make changes in the regulations and courses announced in this publication without notice.

Madison Area Technical College provides equal opportunity in education and employment.

Rev. 03/12

Other Recommended Courses

Courses that may also be of interest to bioinformatics certificate students include the following:

10-152-120 Website Development-HTML5 3 credits

10-152-125 Relational Database Coding – Oracle/SQL 3 credits

20-804-240 Basic Statistics 4 credits

10-152-190 Linux Server 3 credits

10-007-124 Molecular Biology 3 credits

10-007-125 Research Methods Biotechnology 3 credits