

Biotechnology Intensive Post-baccalaureate Certificate

Certificate

Biotechnology & Electron Microscopy Program Cluster

Center for Agriscience and Technologies

Courses offered at Madison Campus

For information contact Lisa Seidman, Ph.D.,
Lseidman@matcmadison.edu, (608) 246-6204 (800) 322-6282
Ext. 6204 or 4307

About the Certificate

This certificate program was designed in collaboration with industry partners for individuals who already have a Bachelor's Degree in a biological science and want to improve their employability in the biotechnology industry. *The intensive program is offered full-time, 8:30 – 2:30 daily, in the spring semester. It provides practical, advanced laboratory skills and an introduction to the business of biotechnology.* Admission is competitive and participants must agree to participate fully in all activities and field trips. The curriculum is project-based and team oriented to simulate a biotechnology company environment. Each student will also complete an independent project that is presented in a poster fair to colleagues and potential employers.

Participants will learn:

- Basic lab skills for a regulated workplace
- The requirements of a cGMP/cGLP environment
- Recombinant DNA methodologies
- Mammalian cell culture (possibly including human embryonic stem cell lines)
- Bioseparations
- Bioinformatics (survey)
- Microarrays (survey)

Unique Requirements for Admission

- Bachelor's degree in a biological science
- Consent of program director
- Two semesters of college chemistry
- Microbiology course with laboratory (strongly recommended)
- Two semesters of general biology
- Cell biology or genetics course

Curriculum

Courses	Credits	Hrs/week	
		Lec	Lab
10-007-103 Biotechnology Laboratory Skills for a Regulated Workplace.....	3	.....	1-6
10-007-122 Protein Bioseparation Methods	3	.....	1-6
10-007-123 Cell Culturing	3	.....	1-6
10-007-124 Molecular Biology 1	3	.....	1-6
10-007-136 Laboratory Math for Biotechnology	1	.....	1-0
10-102-134 Business Organization and Management	2	.....	2-0
Total	15		

Note: the classes need to be taken concurrently.

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.



Certificate Courses

10-007-103 Biotechnology Laboratory Skills for a Regulated Workplace 3 credits

Covers basic concepts and techniques necessary to work effectively in a biotechnology lab. The importance of quality regulations and standards and the role of the technician in producing quality results is emphasized. Students learn basic techniques including: measuring, weighing, mixing solutions, following and writing procedures, keeping records, making observations, and using instrument manuals and catalogues. Principles of metrology (measurement) are introduced and students practice using, calibrating, and verifying the performance of instruments.

10-007-122 Protein Bioseparations Methods 3 credits

Introduces the strategies to purify proteins as part of a biotechnology process. Methods include: specific activity assays for enzymes, extraction of proteins from bacterial cells, salting out, dialysis, ion exchange chromatography and polyacrylamide gel electrophoresis.

10-007-123 Cell Culturing 3 credits

Covers the basic techniques of plant and animal cell culture. Plant unit includes media preparation isolation of explants and establishment of callus from suspension cultures, growth factor bioassays, regeneration of whole plants from tissue and plant genetic engineering techniques. Mammalian cell unit includes media preparation, maintenance of cultured cells, transfection of cultured cells, cloning, monoclonal antibody production, and ELISA assays.

10-007-124 Molecular Biology 1 3 credits

Introduces modern molecular biology techniques including basic recombinant DNA techniques and nucleic acid analysis and purification. The polymerase chain reaction, DNA sequence analysis, and DNA fingerprinting are also covered.

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10-007-136 Lab Math for Biotechnology 1 credit

Introduces mathematical tools that are used in the biotechnology laboratory. Students apply mathematical concepts to solve problems such as: calculating amounts of chemicals required to make solutions, graphing and interpreting data, and calibrating instruments. Basic statistical concepts may also be introduced.

10-103-134 Business Organization and Management 2 credits

This survey course imparts an understanding of the economic and legal environment in which businesses operate, as well as an understanding of the organization and management of business enterprises. An emphasis is placed on business terminology and concepts. No lab.

Career Potential:

- Research Scientists
- Entry Level Scientists
- Associate Scientists
- Process Scientists
- Laboratory Manager
- Quality Assurance
- Laboratory Supervisor
- Team Leader

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.

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