



Iowa Central Community College

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Iowa Central Community College is located in Fort Dodge, Iowa. This community is experiencing a tremendous amount of economic growth due to the addition and expansion of several biotechnology companies in this area. These companies include Boehringer-Ingelheim, Cargill, CJ Bio-America, Valero and POET. The biotechnology program at Iowa Central Community College is working to increase the number of people who are trained to work in these facilities either as laboratory technicians or process operators. There are also a number of food processing facilities that employ graduates from this program to work as quality assurance technicians. The placement rate from this program is 95% with an average starting salary of about \$40,000 per year.

The biotechnology program focuses on three major areas:

The first of these is basic analytical chemistry. The goal is to train students on how to properly use, calibrate and maintain analytical balances, pipets, spectrophotometers, pH meters and HPLC systems. Additionally, we cover topics like titration, moisture analysis, calibration charts, control charts, lab safety, basic microbiology, aseptic technique and HACCP.

The second area is molecular biology. This covers the topics of DNA, proteins, lipids, carbohydrates and the role each of these biomolecules plays in living cells. The student learns how to do protein measurement using the Bradford method, UV absorbance, IEP electrophoresis and ELISA. They also gain experience on how to manipulate DNA. This includes extraction of DNA, the use of restriction enzymes, gel electrophoresis, PCR, Real Time-PCR and the transformation of living cells. The properties of enzymes are studied so the student understands the role they play in orchestrating metabolism and their use in industry. Particular emphasis is placed on the enzymes that degrade carbohydrates like starch and cellulose for production of fuel grade ethanol. Lipids are studied for the synthesis of biodiesel fuel.

The final area is fermenter operations. Here the student learns the basic principles of how fermenters work. Topics covered in this section include control systems that can be used to maintain sterility, temperature, pH, and dissolved oxygen. It also covers various methods to control foaming and how steam delivery systems should be maintained to remove air, condensate and debris. Students learn what to look for in piping and instrument diagrams and also learn how to fine tune a PID loop.

A recurring theme in all of the classes deals with the social implications of biotechnology. There are many new technologies that could have both good and bad implications for our species. These include stem cells, bio-fuels, GMO foods, gene therapy, artificial chromosomes, DNA microarrays, bio-printing, RNA interference, the CRISPR/Cas system, Optogenetics and synthetic biology. Educating people about these technologies will hopefully result in society making better decisions as it implements ever more sophisticated applications of biotechnology.

Contact Information

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