

SYLLABUS

DATE OF LAST REVIEW:	09/2019
CIP CODE:	41.0303
SEMESTER	Departmental Syllabus
COURSE TITLE	Survey of Biomanufacturing
COURSE NUMBER	BMFR0100
CREDIT HOURS	3.0
INSTRUCTOR	Departmental Syllabus
OFFICE LOCATION	Departmental Syllabus
OFFICE HOURS	Departmental Syllabus
TELEPHONE	Departmental Syllabus
EMAIL:	DEPARTMENTAL SYLLABUS KCKCC-issued email accounts are the official means for electronically communicating with our students.
PREREQUISITES	Meet qualifying scores on Accuplacer Accuplacer Reading score 240

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, <http://www.kckccbookstore.com/>, for the required texts for your particular class.

COURSE DESCRIPTION:

This survey course provides students with basic training on the field of biomanufacturing production. Students are introduced to an understanding of the career opportunities and basic technical skills required in high-demand, high-skill careers in bio-manufacturing. This course will include an introduction to the local Life Science industry and related career opportunities and employment requirements; the basic math and technical skills required of an entry-level position; and basic knowledge of documentation, safety, and bioprocess requirements in a biomanufacturing facility. Upon completion of this course, the students will earn an OSHA-10 Safety card.

METHOD OF INSTRUCTION:

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:

- I. Overview of Life Science Industry
- II. Basic technical skills required of an entry level biomanufacturing position
- III. Biomanufacturing processes
 - A. Documentation
 - B. Safety
 - C. Aseptic techniques
- IV. Biomanufacturing tools
- V. Career opportunities and workplace realities

EXPECTED LEARNER OUTCOMES

- A. The learner will be able to discuss the status of the regional Life Science Industry.
- B. The learner will perform basic math calculation required at the entry technician level.
- C. The learner will demonstrate the appropriate use of measuring devices and laboratory equipment.
- D. The learner will be able to describe the basics of cGMP documentation and the regulations that govern them.
- E. The learner will demonstrate a basic understanding of microbes, their function and processes used to control or eliminate the presence of microbes in a manufacturing area.
- F. The learner will be able to discuss proper aseptic techniques to apply so as not to contaminate a biological product as it is being manufacturing.
- G. The learner will describe the basics of a bioprocess operation in a biomanufacturing company.
- H. The learner will be able to discuss basic safety procedures in an industry environment.
- I. The learner will be able to identify professional behavior in the workplace.

COURSE COMPETENCIES

- A. The learner will be able to discuss the status of the regional Life Science Industry
 1. Identify the major regional Life Science industries and products and/or services in the region.
 2. Identify potential career paths and associated recommended education or experience.
- B. The learner will perform basic math calculation required at the entry technician level
 3. Convert volumes using microliters, milliliters, liters, and kiloliters.
 4. Convert micrograms, milligrams, grams and kilograms.
 5. Express numbers in scientific notation and use both negative and positive exponents, base 10.
 6. Solve word problems using proportions.
 7. Determine values with respect to the decimal point.
 8. Determine percentages and convert between percentages and decimal entities.
 9. Work problems in the following format (where a is 10):
 - a. $a^m \times a^n = a^{m+n}$
 - b. $a^m/a^n = a^{m-n}$
 - c. $(a \times 10^m)(b \times 10^n) = (a \times b)(10^{m+n})$
 - d. $(a \times 10^m) + (c \times 10^m) = (a + c) \times 10^m$
- C. The learner will demonstrate the appropriate use of measuring devices and laboratory equipment
 10. Convert weights and volumes in the metric system.
 11. Choose and utilize the appropriate scale for weighing specific amounts of a reagent.
 12. Choose and utilize the appropriate method for measuring volumes accurately from microliter to liter.

13. Demonstrate proper usage of a pH meter, centrifuge, pipettes, etc.
- D. The learner will be able to describe the basics of cGMP documentation and the regulations that govern them
14. Discuss and demonstrate the application of cGMPs
 15. Describe the importance of 21 CFR.
 16. Record and maintain data appropriately.
 17. Describe the role of proper equipment documentation, qualification, and validation.
- E. The learner will demonstrate a basic understand of microbes, their function and processes used to control or eliminate the presence of microbes in a manufacturing area.
18. Describe the basic differences among bacteria, viruses , and fungi.
 19. Perform a gram stain and correctly focus a microscope on the stain.
 20. Aseptically inoculate vials and plates for bacterial growth.
 21. Discuss the relationship of killing or inactivation of microbes with disinfectant contact time and heat.
 22. Discuss how bacteria and cells are used in the Bio-manufacturing industry.
 23. Describe the basic phases of a bacterial growth curve.
 24. Describe the role of recombinant DNA in the Bio-manufacturing industry.
- F. The learner will be able to discuss proper aseptic techniques to apply so as not to contaminate a biological product as it is being manufacturing.
25. Identify and discuss sources and causes of contamination.
 26. Discuss basic principles to apply during aseptic manufacturing.
 27. Describe the methods of prevention and removal of contaminants.
 28. Describe meanings of clean, sanitized, disinfected and sterilized.
 29. Demonstrate the basics of proper gowning for aseptic processing.
- G. The learner will describe the basics of a bioprocess operation in a bio-manufacturing company.
30. Identify the proper use of SOPs and Batch records.
 31. Describe the role of cGMPs.
 32. Describe the process flow starting with receipt of raw materials to packaging of final product.
 33. Describe proper control of materials during the manufacturing process.
 34. Discuss the proper use of documents during the manufacturing process.
- H. The learner will be able to discuss basic safety procedures in an industry environment.
35. Articulate the role of OSHA.
 36. Articulate the documents and regulations that govern OSHA.
 37. Identify where guidelines must be followed in the industry.
 38. Understand proper labeling of chemicals and the meaning of the labels.
 39. Understand proper handling of cylinders and other containers under pressure.
 40. Understand proper handling of radioactive material.
 41. Understand basic safety precautions when working with bloodborne pathogens.
 42. Understand the type and role of personal protective equipment required in various circumstances.

- I. The learner will be able to identify professional behavior in the work place.
43. Professional interaction with management.
 44. Professional behavior with peers.
 45. Articulate integrity and ethical behavior in the industry.

ASSESSMENT OF LEARNER OUTCOMES MAY INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

Student progress is evaluated by means that include, but not limited to exams, written assignments, and class participation.

SPECIAL NOTES:

This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student's progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college's policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the Director of the Academic Resource Center, in Rm. 3354 or call at: 288-7670.

All enrolled students at Kansas City Kansas Community College are subject to follow all rules, conditions, policies and procedures as described in both the Student Code of Conduct as well as the Student Handbook. All Students are expected to review both of these documents and to understand their responsibilities with regard to academic conduct and policies. The Student Code of Conduct and the Student Handbook can be found on the KCKCC website.

