

SYLLABUS

DATE OF LAST REVIEW:	09/2019
CIP CODE:	41.0303
SEMESTER	Departmental Syllabus
COURSE TITLE:	Techniques and Instrumentation for Biomanufacturing
COURSE NUMBER:	BMFR 0146
CREDIT HOURS:	3
INSTRUCTOR:	Departmental Syllabus
OFFICE LOCATION:	Departmental Syllabus
TELEPHONE:	Departmental Syllabus
OFFICE HOURS:	Departmental Syllabus
PREQUISITES	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: The Techniques and Instrumentation course provides students with exposure to various instruments. Students will learn the importance of equipment maintenance and calibration of pipette, pH meters, and balances. They will be able to maintain and use different types of centrifuges and their applications, cell culture incubator, bioreactor, HPLC, and gel systems. Students will also learn about safety, good documentation practices, and practice aseptic techniques.

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.

EXPECTED LEARNER OUTCOMES:

- A. Work in compliance with Environmental Health & Safety
- B. Work in compliance with cGMPs.
- C. Understand the theory of operation of a bioreactor.
- D. Understand the theory of operation of an HPLC equipment.
- E. Understand how cell culture incubator works.
- F. Monitor, maintain, and repair process or laboratory equipment.

- G. Monitor, maintain, and repair Plant utility systems (Bioreactor).
- H. Calibrate control system components.
- I. Maintain control systems, equipment and instrumentation.

COURSE COMPETENCIES:

- A. Work in compliance with Environmental Health & Safety
 - 1. Wear appropriate personal protective equipment
 - 2. Identify unsafe conditions and take corrective actions
 - 3. Access and utilize MSDS
 - 4. Assists with waste treatment operations

- B. Work in compliance with cGMPs.
 - 1. Follow SOPs for all operations
 - 2. Prepare required documentation for recording and notification of events and changes related to equipment maintenance logs and calibration
 - 3. Maintain equipment log books
 - 4. Control and receive parts and materials
 - 5. Maintain training documentation
 - 6. Maintain equipment and process utilities in a validated state

- C. Understand the theory of operation of a bioreactor.
 - 1. Setup and use the bioreactor
 - 2. Understand the concepts of Exponential growth of microorganisms in a bioreactor.
 - 3. Utilize log functions and graphs to analyze bacterial growth.
 - 4. Utilize HPLC, OD, and pH to monitor growth in a bioreactor.

- D. Understand how an HPLC equipment Functions.
 - 1. Setup and use an HPLC
 - 2. Understand the concepts of how an HPLC functions.
 - 3. Utilize TOF to analyze purity of samples.
 - 4. Utilize HPLC as part of the manufacturing process to achieve quality products.

- E. Understand how cell culture incubator works.
 - 1. Setup, use and maintain a cell culture incubator
 - 2. Utilize environmental monitoring to maintain aseptic environment
 - 3. Maintain and monitor fume hoods used for cell culture
 - 4. Maintain and monitor pumps for media aspiration

- F. Monitor, and maintain process or laboratory equipment.
 - 1. Monitor, and maintain bioreactor vessels and fluid handling systems including pumps, pipes and valves.
 - 2. Monitor, and maintain cell culture incubator
 - 3. Monitor, and maintain bioreactor heat transfer equipment.
 - 4. Monitor, maintain and repair process support equipment like pH meter and OD meter.
 - 5. Monitor, and maintain HPLC equipment.
 - 6. Maintain and calibrate balances, pH Meters and pipettes

- G. Monitor, and maintain bioreactor and HPLC utility systems.
 - 1. Understand pressure gauge readings
 - 2. Monitor and maintain air instruments, and process gases
 - 3. Respond to alarms per procedures
 - 4. Perform testing of air instruments.

- H. Calibrate control system components.
 - 1. Calibrate pressure, temperature, flow, weight, pH, DO, and other critical measurement devices and transmitters.
 - 2. Investigate, correct and document calibration failures.
 - 3. Use calibration reference standards and or the specialized equipment.

- I. Maintain control systems, equipment and instrumentation.
 - 1. Solve system/equipment problems using P & IDs, manuals, and other drawings as needed.
 - 2. Assist in insulation, modification, commissioning, and validation of equipment.
 - 3. Maintain spare parts inventory.
 - 4. Use computerized maintenance management system to schedule and track work orders for corrective and preventive maintenance.

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.

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.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the disabilities services office at (913) 288 -7664.