|  |  |
| --- | --- |
|  | FORMAN CHRISTIAN COLLEGE (A Chartered University)BIOT-201: Introduction to BiotechnologyCourse Outline Spring 2023 |

|  |
| --- |
| Instructor Information |
| Name | Dr Muhammad Irfan |
| Email | muhammadirfan@fccollege.edu.pk |
| Mode of online instructions | MS team will be used for online lectures. The lecture sides (**No recorded lectures**) will be uploaded on Moodle  |
| Office Hours | Monday and Thursday 11:00-12:30 |
| Course Material/Announcements | Will be shared via Institutional Learning Management System (Moodle) |
| **Course Information** |
| LectureLab | Section (A): Mon, Wed: 12:00-12:50; S-425Section (A): Wednesday: 2:00-3:50; S-329 |
| **Course contents**This course will introduce students to the expanding field of biotechnology, including, industrial, agricultural, medical, and environmental biotechnology. The course will also include discussions on Basic tools of biotechnology, recombinant DNA technology, Genetically Modified Organisms (GMOs), Commercialization of biotechnology, Issues related to biosafety and biosecurity and its further development as a cornerstone in human welfare |
| **Course Objectives** This course illustrates the basics of biotechnology. It helps:1. To have an introduction to biotechnology and to elucidate its multidisciplinary nature.
2. To give information regarding its applications to agriculture, health, industry and environment.
3. To have an idea of the future developments and its role in human life.
4. Be able to effectively integrate scientific knowledge related to biotechnology with other disciplines.
5. To provide opportunity to work in groups to develop sense of responsibility, respect and sharing.

**Student Learning Outcomes:****By the end of the course students will be able to Students will be able to** * Explain the basic principles and the core scientific issues in biotechnology.
* Determine the commercial value of biotechnology in the field of agriculture, medicine, industry and the environment to protect and sustain our natural resources.
* To solve society problems by means of biotechnology.
* Understand the legal and ethical issues to biotechnology products with special emphasis to genetically modified organisms
 |
|  |
| **Text Books & Reference Material** Texts and reference materials will be provided to students on an ongoing basis:Recombinant DNA and Biotechnology; Helen Kreuser and Adrianne Massey, Americian society for microbiology, Washington DC(Any other introductory book on biotechnology). |
| **Course Policies & Important things to know** |
| **:****Attendance**80% attendance is required in lectures as well as in lab, if a student fail to fulfill the requirement, he/she will not be allowed to appear in final examination. Attendance will be marked at the start of class. Mid-term will be objective and subjective while final term will comprise objective, subjective and essay type questions. No tolerance for cheating / plagiarism (University policy will be followed).**Quizzes and Assignments**.There will be two quizzes, 1 midterm exam and 1 final exam, 1 Group Presentation, Group assignment &/project. Rubrics of assignments, presentation and oral exam is given at the end of this document. To appear in quizzes and presentations at specified dates is necessary and no makeup will be arranged. In case of absence zero mark will be given in the missed activity. In the blended mode of education if a student missed an online quiz/exam/any other activity. **Makeup of the missed activity will be arranged if a student provides enough evidence. This make up will be face to face on campus not online**. Mobile Phone:Students are advised to silence their mobiles during lecture and labs. |
|

|  |  |
| --- | --- |
| **Activity to be Assessed** | **Weight age (%age)** |
| Final Exam  | 35 |
| Mid-Term Examination | 25 |
| Lab Exam | 15 |
| Assignments | 10 |
| Attendance  | 5 |
| Class quizzes | 10 |
| Total | 100 |

**Assessment Criteria** |
| **Technology Requirements:**Online lectures require the students to have a laptop having a web cam and headphone with speakers and mic. The minimum available hard disk space on C-drive should be at least 10 GB for video streaming. **The students must be familiar with ZOOM application and MS team office installed on their laptops.**  |
| **Technology Etiquettes:*** It is recommended to log in at least 10 minutes before the start of the session to do the necessary checks
* Be sure to name yourself for your slot on the screen. It will make it easy to get a report of the students’ attendance. If your slot carries a different name, to rename click 3 dots near your video window OR in the participants’ list, hover over your name, and click “rename” to make the change
* Please stay muted when not speaking,
* If you face a bandwidth issue, please turn off your video.
* If allowed to speak, be mindful of your tone and expressions during the session. This is not an anonymous session. Your voice and video are viewed by all who are participating in the session
* Remember you are on camera and live. The advantage of video conferencing is that you can take advantage of facial expressions, inflection, and tone of voice.
* Remember to think before you respond to make your thoughts and ideas clear and coherent to the other participants.
* Please be mindful of the time, keep your contributions brief and to the point
* Be respectful of others’ opinion Allow other participants/students time and opportunities to contribute to the discussion and share their ideas with the group.
 |
| **Teaching-Learning Activities:**In blended teaching three categories of students are there (in-class, simultaneously online, and asynchronous learners). To make sure Synchronous learning on campus students will attend lectures/activities on the allocated time in allocated classrooms. Online students will be able to join Live Video-Audio through the provided MS team link. Link of every class will be uploaded regularly on the Moodle. There will be no online lab every lab activity will be repeated.**Learning Material** (Off-campus and offline):For communication email will be used. Learning material, lecture slides will be uploaded on the Moodle on regular basis. Students will submit their assignments through Moodle. |

**Distribution of course contents:**

|  |  |  |
| --- | --- | --- |
| **Wks Date** | **Contents** | **Laboratory Work** |
| 1 | Introduction to biotechnology | Orientation to laboratory and Safety measures |
| 2 | Basic tools of biotechnology | Sterilization techniques |
| 3 | Basic tools of biotechnology | Microbiological media preparation |
| 4 | Agricultural Biotechnology | Aseptic techniques and establishing pure cultures |
| 5 | Agricultural Biotechnology | Aseptic techniques and establishing pure cultures |
| 6 | Role of Biotechnology in Health Care | Growth curve |
| 7 | Role of Biotechnology in Health Care | Gram staining |
| 8 | Environmental Biotechnology | Spore staining |
| 9 | Environmental Biotechnology |  |
| 10 | Application of Biotechnology in Industry | Plasmid isolation |
| 11 | Application of Biotechnology in Industry | Purification and quantification of DNA |
| 12 | Application of Biotechnology in Industry |  |
| 13 | Issues related to biosafety and biosecurityBioethics and biotechnology | Gel electrophoresis |
| 14 | Issues related to biosafety and biosecurity | Group presentation |
| 15 | Bioethics and biotechnology | Group presentation |
| 16 | Commercialization of biotechnology | Group presentation |
|  | Review and discussion | Final Lab exam |
|  | **Final Exam** |  |

# Disclaimer

Considering the situation of the country, the course instructor reserves the right to modify the above plan as needed during the course of the class; however, it won't be done impetuously. Any changes that would be incorporated will be informed well in advance.

|  |
| --- |
| **RUBRIC (Presentation)** |
| **Excellent****90-100%** | **Good****75-90%** | **Average****65-75%** | **Satisfactory****60-65%** |
| * Covered all the aspects of the topic in depth
* Well designed with good flow and appropriate use of pictures and graphs
* Confident delivery style with clear voice
* Good spoken English
* Excellent eye content

 with the audience | * Covered most of aspects of the topic nicely
* Well designed with appropriate use of pictures and graphs, but uniformity in the slides absent
* Normal confidence in delivery
* Good spoken English
* Good eye contact with the audience
 | * Covered some aspects of the topic
* Not so well designed.
* Uniformity in the slides absent. Inappropriate use of pictures and graphs
* Poor confidence and voice not clear.
* Spoken English not so good
* Normal eye contact with the audience
 | * Covered the topic superficially
* Poor design without use of any pictures and graphs. Only written slides
* No confidence in delivery.
* Voice not audible.
* No eye contact with the audience
* Poor spoken English
 |

|  |
| --- |
| **RUBRIC (Assignment)** |
| **Excellent****90-100%** | **Good****75-90%** | **Average****65-75%** | **Satisfactory****60-65%** |
| * Covered all the points of the assigned topics in depth
* Sufficient number of latest and appropriate references cited
* Key concepts clearly specified and explained technically
* Formatting is according to the provided guidelines
 | * Covered all the points of the assigned topics superficially
* Latest and appropriate references cited but not sufficient in number
* Key concepts specified and explained technically
* Formatting is according to the provided guidelines
 | * Few points of the assigned topics are missing
* Latest and appropriate references cited but not sufficient in number
* Key concepts specified but not explained technically
* Formatting is partially according to the provided guidelines
 | * Most points of the assigned topics are missing
* Insufficient references
* Key concepts not clearly specified and explained
* Formatting is not according to the provided guidelines
 |

|  |
| --- |
| **RUBRIC (Oral Exam)** |
| **Excellent****90-100%** | **Good****75-90%** | **Average****65-75%** | **Satisfactory****60-65%** |
| * Good understanding of the question
* Demonstrates deep knowledge, answer almost all the questions with

explanations * Answer confidently and use perfect scientific vocabulary
 | * Fair understanding of the question
* Adequate knowledge of most topics; answer most of the questions but fails to elaborate.
* Most of the answers are technically correct but confidence not very good
* Use 75-80% correct scientific vocabulary
 | * Normal understanding of the question
* Superficial knowledge of topic; only able to answer basic questions.
* Few of the answers are technically correct but confidence is not good
* answers not to-the-point
 | * Poor understanding of the question
* Superficial knowledge of topic; only able to answer few basic questions
* Poor technically knowledge of the subject and low on confidence
* Vague answers
 |