هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

# Course Specification
(Bachelor)

| | |
|---|---|
| **Course Title:** | **Biotechnology** |
| **Course Code:** | **BIOC1404** |
| **Program:** | **Bachelor of Science in Biochemistry & Bachelor of Science in Biology** |
| **Department:** | **Biochemistry** |
| **College:** | **Faculty of Science** |
| **Institution:** | **University of Tabuk** |
| **Version:** | |
| **Last Revision Date:** | **8 October 2023** |

## Table of Contents

## A. General information about the course:

### 1. Course Identification

| 1. Credit hours: | | | | | |
|---|---|---|---|---|---|
| 3 credit hours (3 Theoretical) | | | | | |
| **2. Course type** | | | | | |
| **A.** | ☐ University | ☐ College | ☒ Department | ☐ Track | ☐ Others |
| **B.** | ☒ Required | | ☐ Elective | | |
| **3. Level/year at which this course is offered:** | | | | | |
| (Level 7/4th year) | | | | | |
| **4. Course general Description:** | | | | | |
| The biotechnology course will enable the student to learn about the science behind biotechnology while also looking at how to succeed in a career in the industry. This course is designed to produce graduates who have the comprehensive understanding of science and technology required to exploit technological advances in a competitive environment. | | | | | |
| **5. Pre-requirements for this course** (if any)**:** | | | | | |
| For Biochemistry program BIOC1310,<br>For Biology program BIO1309 | | | | | |
| **6. Co-requirements for this course** (if any)**:** | | | | | |
| NA | | | | | |
| **7. Course Main Objective(s):** | | | | | |
| 1. Illustrating the technology of the fermentation process.<br>2 .Demonstrating antibiotic production, vaccine biotechnology, and gene therapy<br>3. Providing the skills to create biofertilizer.<br>4. Encouraging the students to understand the principle of gene therapy.<br>5. Discovering how these technologies are used for specific applications and placing emphasis on aspects of biotechnology. | | | | | |

### 2. Teaching mode (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | Traditional classroom | 45 | 100% |
| 2 | E-learning | | |
| 3 | Hybrid | | |

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| | • Traditional classroom<br>• E-learning | | |
| 4 | Distance learning | | |

### 3. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1. | **Lectures** | 45 |
| 2. | **Laboratory/Studio** | |
| 3. | **Field** | |
| 4. | **Tutorial** | |
| 5. | **Others (specify)** | |
| **Total** | | **45** |

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| **1.0** | **Knowledge and understanding** | | | |
| 1.1 | Define the basic terminology in biotechnology. | K1 | Lecture and self-learning | Participation - exams – assignment |
| 1.2 | Illustrate the main concepts in fermentation biotechnology. | K2 | Lecture, self-learning and Group discussion | Participation - exams – assignment |
| 1.3 | Describe the biotechnology of antibiotic production and vaccines. | K3 | Lecture, self-learning and Group discussion | Participation - exams – assignment |
| **2.0** | **Skills** | | | |
| 2.1 | Analyze the major concepts underlying | S2 | Lecture and self-learning - Project | Participation - exam - |

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| | recombinant DNA technology and gene therapy. | | | assignment-Report-project |
| 2.2 | Communicate effectively, both written and oral during the classroom of the biotechnology. | S3 | Lecture and Active-learning -Group-discussion | participation, project ،Report |
| 2.3 | Create different biotechnological techniques and the reasons behind utilizing them. | S5 | Lecture and Active-learning -Group discussion- | Participation ,Exams, project |
| **3.0** | **Values, autonomy, and responsibility** | | | |
| 3.1 | Adopt high levels of responsibility and time management to perform the task on time. | V2 | Group discussion- | Presentation - Participation- Project |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1. | Introduction of Biotechnology | 3 |
| 2. | Fermentation biotechnology, its principles, and dairy products | 3 |
| 3. | Biofuel technology | 3 |
| 4. | Production of biofertilizer | 3 |
| 5. | Antibiotic biotechnology, classification, and generation | 3 |
| 6. | Biosynthesis of penicillin | 3 |
| 7. | industrial production of penicillin | 3 |
| 8. | Technology of insulin production | 3 |
| 9. | Technology of growth hormone production | 3 |
| 10. | Vaccine classification | 3 |

| | | |
|---|---|---|
| 11. | biotechnology of vaccine production | 3 |
| 12. | Basic approaches of human gene therapy | 3 |
| 13. | Types of gene therapy | 3 |
| 14. | Cell therapy and genome editing. | 3 |
| 15. | Animal cloning technology (Dolly Sheep). | 3 |
| **Total** | | **45** |

## D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|---|---|---|---|
| **1.** | Quiz | During semester | 10% |
| **2.** | First periodic exam | 7 | 20% |
| **3.** | Second Periodic Exam | 12 | 20% |
| **4.** | Homework | During semester | 5% |
| **5.** | Class discussion | During semester | 5% |
| **6.** | Final Exam | 17 | 40% |

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

| | |
|---|---|
| **Essential References** | W.T. Godbey: Biotechnology and its Applications: Using Cells to Change the World, 2nd Edition, Elsevier, 2021 |
| **Supportive References** | Firdos Alam Khan: Biotechnology Fundamentals, Third Edition, CRC, 2020 . ISBN : 9781138612082 |
| **Electronic Materials** | Saudi digital Library<br>https://sdl.edu.sa/SDLPortal/ar/Publishers.aspx |
| **Other Learning Materials** | Multimedia associated with the text book and the relevant |

## 2. Required Facilities and equipment

| Items | Resources |
|---|---|
| **facilities**<br>(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | Classrooms |
| **Technology equipment**<br>(projector, smart board, software) | Projector, smart board |
| **Other equipment**<br>(depending on the nature of the specialty) | None |

## F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| Effectiveness of teaching | Students<br>Students | Direct (Exams)<br>Indirect (Survey) |
| Effectiveness of Students assessment | Students<br>Course coordinator | Indirect (Survey)<br>Direct (Report) |
| Quality of learning resources | Students<br>Faculty members | Indirect (Survey)<br>Indirect (Survey) |
| The extent to which CLOs have been achieved | Students<br>Faculty | Indirect (Survey)<br>Direct (Annual report) |
| Other | | |

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

## G. Specification Approval

| | |
|---|---|
| **COUNCIL /COMMITTEE** | **PROGRAMS AND PLANS COMMITTEE** |
| **REFERENCE NO.** | |
| **DATE** | **8 OCTOBER 2023** |