



# Program Specification

## (Postgraduate Programs)

Program Name: **Master of Science in Applied Biology**

Program Code (as per the Saudi Standard Classification of Educational Levels and Specializations): **051102**

Qualification Level: **7**

Department: **Biology**

College: **Science**

Institution: **Imam Mohammad Ibn Saud Islamic University**

Program Specification: **New** ☒ **updated\*** ☐

Last Review Date: **-**

\*Attach the previous version of the Program Specification.

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## A. Program Identification and General Information:

### 1. Program's Main Location:

Main Campus (Male and Female)

### 2. Branches Offering the Program (if any):

None

### 3. System of Study:

☐ Coursework & Thesis

☒ Coursework

### 4. Mode of Study:

☒ On Campus

☐ Distance Education

☐ Other .....(specify)

### 5. Partnerships with other parties (if any) and the nature of each:

- Partnership Arrangement: None

- Type of Partnership: None

- Duration of Partnership: None

### 6. Professions/jobs for which students are qualified:

#### -Laboratories:

-Medical

-Forensic

-Agricultural

-Research

-Educational

-Quality control

#### Teaching

**Agricultural professions**

**Environmental professions**

### 7. Relevant occupational/ Professional sectors:

-Health sector

-Education sector

-Industrial sector (Food and dairy industries)

-Agricultural sector

-Environmental conservation sector





### 8. Major Tracks/Pathways (if any):

| Major track/pathway                                              | Credit hours<br>(For each track) | Professions/jobs<br>(For each track)                                                                                                                                                                                       |
|------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.Cell and Molecular Biology                                     | 42                               | 213103 إخصائي بيولوجي<br>213111 إخصائي أحياء عام<br>213108 إخصائي وراثية<br>213113 إخصائي خلايا حية<br>213115 إخصائي مختبرات طبية<br>213117 إخصائي مختبر علمي<br>235906 باحث أكاديمي                                       |
| 2.Biodiversity, Wildlife Conservation and Management:            | 42                               | 213103 إخصائي بيولوجي<br>213111 إخصائي أحياء عام<br>235906 باحث أكاديمي<br>213301 إخصائي بيئي<br>226301 إخصائي حماية بيئية<br>213306 اختصاصي التنوع الأحيائي<br>213307 اختصاصي أحياء فطرية<br>213309 اختصاصي محميات طبيعية |
| 3.Industrial and Environmental Biotechnology and Sustainability: | 42                               | 213103 إخصائي بيولوجي<br>213111 إخصائي أحياء عام<br>235906 باحث أكاديمي<br>213117 إخصائي مختبر علمي<br>213105 إخصائي تقنية حيوية<br>213113 إخصائي خلايا حية<br>213114 إخصائي علوم أحياء دقيقة<br>213114 إخصائي تلوث هواء   |

### 9. Total credit hours: (126)



## B. Mission, Goals, and Program Learning Outcomes

### 1. Program Mission:

The mission of the program is to equip students with practical and in-depth knowledge in outstanding biology disciplines, namely: Cell and Molecular Biology; Biodiversity, Wildlife Conservation and Management; and Industrial and Environmental Biotechnology and Sustainability. Graduates of the program will be well-equipped with practical skills that will enable them to make significant contributions to scientific research and community services and meet the demands of the labour market.

### 2. Program Goals:

- 1-To be one of the distinguishable biology programs that follow the recent procedures in science education in compliance with the Kingdom's major strategies and plans as well as the standards of reference universities.
- 2 -To be one of the outstanding contributors to enhancing creation and innovation in the field of biology.
- 3- To equip the students with recognizable and applicable knowledge that allows them to practice biosciences professionally.
- 4 -To allow the students to acquire distinct practical skills that enable them upon successful completion of the program to compete for professions and jobs.
- 5 -To provide the students with wide knowledge and reliable technical skills that constitute the essential base for them to be admitted to one of the Ph.D. programs in local or international universities.
- 6 -To be one of the profound resources that provide the community with highly qualified graduates to meet the demands of the labour market and the various community sectors including educational, health, industrial, and agricultural sectors.
- 7 -To be one of the outstanding resources that provides the scientific community with competent researchers who possess the recognizable experience to share effectively in the progress of biology research.
- 8- To build effective local and international partnerships in terms of collaborative research work and reciprocal activities.

### 3. Program Learning Outcomes:\*

#### A. Cell and Molecular Biology

##### Knowledge and Understanding:

|    |                                                                                                                                                                                        |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K1 | Describe the cell compartments with the corresponding functions in prokaryotic and eukaryotic cells and the regulating mechanisms of the various cellular bioactivities.               |
| K2 | Explain the underlying molecular mechanisms of the diverse cellular biological processes relevant to genetics, epigenetics, cell signalling, cancer development, and immune disorders. |
| K3 | Discuss the topics of cell biology and molecular mechanistic pathways of the cells in conjunction with a wide range of cellular biochemical activities                                 |
| K4 | Clarify the molecular basis of disorders and disease conditions including those related to carcinogenesis, mutations, and cell metabolic defects.                                      |

##### Skills:

|    |                                                                                                                                                                      |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S1 | Relate between the concepts of molecular biology and cell chemistry in the corresponding research applications to answer questions in the discipline of cell biology |
| S2 | Write a proposal and design a plan to conduct experimental research work using modern molecular techniques to test the generated hypotheses.                         |
| S3 | Interpret, evaluate and analyze the research data by employing critical thinking, reasoning, and the appropriate statistical analytical methods                      |

##### Values, Autonomy, and Responsibility:

|    |                                                                                                                                                                                           |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V1 | Demonstrate responsibility, accountability, and independence in performing experimental work, and actively collaborate in teamwork to achieve common research goals                       |
| V2 | Participate effectively in scientific sessions, communicate information professionally, and present research data clearly via oral presentations and written formats to a varied audience |
| V3 | Adhere to research principles and the relevant ethical rules while performing research work in the field of cell and molecular biology                                                    |

\* \* Add a table for each track (if any)



## B. Biodiversity, Wildlife Conservation and Management

### Knowledge and Understanding:

|    |                                                                                                          |
|----|----------------------------------------------------------------------------------------------------------|
| K1 | Outline the facts, concepts, principles, theories, and processes related to Biodiversity and ecosystems. |
| K2 | Illustrate the structural and functional aspects of biodiversity and the need for its conservation.      |
| K3 | Identify the procedures of wildlife conservation and its management                                      |

### Skills:

|    |                                                                                                                                                                   |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S1 | Apply critical and creative thinking to answer questions in different complex and familiar contexts in biodiversity, and wildlife conservation and its management |
| S2 | Formulate a proposal and use modern tools and appropriate field techniques to conduct research work safely in the area of wildlife conservation.                  |
| S3 | Evaluate, interpret and analyze the collected data released from the interdisciplinary research on biodiversity                                                   |

### Values, Autonomy, and Responsibility:

|    |                                                                                                                                                                                                        |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V1 | Show awareness of values and ethics associated with the professional practices in biodiversity, and wildlife conservation and its management.                                                          |
| V2 | Cooperate with diverse work teams to accomplish group activities aiming to achieve common goals                                                                                                        |
| V3 | Share in specialized meetings and communicate scientific data effectively using the proper presentation forms and the scientific language and reasoning appropriate for different issues and audiences |



## C. Industrial and Environmental Biotechnology and Sustainability

### Knowledge and Understanding:

|    |                                                                                                                                                  |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------|
| K1 | List the principles, facts, concepts, and theories relevant to Biotechnology and sustainability and describe the processes of its applications.  |
| K2 | Clarify structural and functional aspects of biotechnology and its use to find sustainable solutions to current and future environmental issues. |
| K3 | Classify the various procedures related to the discipline of Industrial and Environmental Biotechnology and sustainability.                      |

### Skills:

|    |                                                                                                                                                           |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| S1 | Employ critical and creative thinking to answer questions in complex and familiar Industrial and Environmental Biotechnology and sustainability contexts. |
| S2 | Write a proposal and use modern tools and appropriate field techniques to conduct research work safely in the area of Biotechnology and sustainability.   |
| S3 | Interpret and analyze the collected data released from the interdisciplinary research activities on Biotechnology.                                        |

### Values, Autonomy, and Responsibility:

|    |                                                                                                                                                                                                         |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V1 | Demonstrate an understanding of the values and ethics associated with professional practices in Industrial and Environmental Biotechnology and Sustainability, as well as their practical applications. |
| V2 | Collaborate effectively with diverse work teams to accomplish group activities and achieve common goals.                                                                                                |



## C. Curriculum:

### 1. Curriculum Structure:

#### A. Track of Cell and Molecular Biology

| Program Structure           | Required/<br>Elective | No. of<br>courses | Credit<br>Hours | Percentage |
|-----------------------------|-----------------------|-------------------|-----------------|------------|
| <b>Course</b>               | Required              | 13                | 34              | 81%        |
|                             | Elective              | 2                 | 4               | 9.5%       |
| Graduation Project (if any) | Required              | 1                 | 4               | 9.5 %      |
| Thesis (if any)             | -                     | -                 | -               | -          |
| Field Experience(if any)    | -                     | -                 | -               | -          |
| Others (.....)              |                       |                   |                 |            |
| <b>Total</b>                |                       | 16                | 42              | 100%       |

\* Add a separate table for each track (if any).

#### B. Track of Biodiversity, Wildlife Conservation and Management

| Program Structure           | Required/<br>Elective | No. of<br>courses | Credit<br>Hours | Percentage |
|-----------------------------|-----------------------|-------------------|-----------------|------------|
| <b>Course</b>               | Required              | 11                | 32              | 76%        |
|                             | Elective              | 2                 | 4               | 9.5%       |
| Graduation Project (if any) | Required              | 1                 | 4               | 9.5 %      |
| Thesis (if any)             | -                     | -                 | -               | -          |
| Field Experience(if any)    | -                     | 1                 | 2               | 5 %        |
| Others (.....)              |                       |                   |                 |            |
| <b>Total</b>                |                       | 15                | 42              | 100%       |

#### C. Track of Industrial and Environmental Biotechnology and Sustainability:

| Program Structure           | Required/<br>Elective | No. of<br>courses | Credit<br>Hours | Percentage |
|-----------------------------|-----------------------|-------------------|-----------------|------------|
| <b>Course</b>               | Required              | 12                | 34              | 81%        |
|                             | Elective              | 2                 | 4               | 9.5%       |
| Graduation Project (if any) | Required              | 1                 | 4               | 9.5 %      |
| Thesis (if any)             | -                     | -                 | -               | -          |
| Field Experience(if any)    | -                     | -                 | -               | -          |
| Others (.....)              | -                     | -                 | --              | -          |
| <b>Total</b>                |                       | 15                | 42              | 100%       |

### 2. Program Courses:



## A. Track of Cell and Molecular Biology:

| Level   | Course Code | Course Title                             | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements<br>(Institution, College, or Program) |
|---------|-------------|------------------------------------------|----------------------|-----------------------|--------------|------------------------------------------------------------|
| Level 1 | BIO-6100    | Statistical Analysis of Biological Data  | Required             | -                     | 3            | Program                                                    |
|         | BIO-6110    | Advanced Biochemistry                    | Required             | -                     | 3            | Program                                                    |
|         | BIO-6112    | Methods in Biochemistry                  | Required             | -                     | 2            | Program                                                    |
|         | BIO-6114    | Advanced Cell and Molecular Biology      | Required             | -                     | 4            | Program                                                    |
| Level 2 | BIO-6210    | Molecular Genetics                       | Required             | BIO-6114              | 2            | Program                                                    |
|         | BIO-6201    | Cell Culturing Technology                | Required             | BIO-6114              | 3            | Program                                                    |
|         | BIO-6202    | Techniques in Cell and Molecular Biology | Required             | BIO-6114              | 3            | Program                                                    |
|         | BIO-6200    | Research Principles and Ethics           | Required             | -                     | 2            | Program                                                    |
|         | BIO-6216    | Epigenetics                              | Required             | BIO-6114              | 2            |                                                            |
|         |             | Elective 1                               | Elective             | -                     | 2            | Program                                                    |
| Level 3 | BIO-6310    | Cell Imaging Techniques                  | Required             | BIO-6114<br>BIO-6202  | 2            | Program                                                    |
|         | BIO-6312    | Genetic Engineering and Genomics         | Required             | BIO-6210              | 3            | Program                                                    |
|         | BIO-6314    | Cell Signalling and Communication        | Required             | BIO-6114              | 3            | Program                                                    |
|         | BIO-6391    | Project Planning and Proposal Writing    | Required             | -                     | 2            | Program                                                    |
|         |             | Elective 2                               | Elective             | -                     | 2            | Program                                                    |
| Level 4 | BIO-6499    | Graduation Project                       | Required             | BIO-6391              | 4            | Program                                                    |

| Level     | Course Code | Course Title                | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements<br>(Institution, College, or Program) |
|-----------|-------------|-----------------------------|----------------------|-----------------------|--------------|------------------------------------------------------------|
| Electives | BIO-6000    | Bioactive Natural Compounds | Elective             | BIO-6110<br>BIO-6112  | 2            | Program                                                    |
|           | BIO-6010    | Developmental Genetics      | Elective             | BIO-6210              | 2            | Program                                                    |
|           | BIO-6012    | Molecular Pathology         | Elective             | BIO-6114<br>BIO-6210  | 2            | Program                                                    |
|           | BIO-6014    | Human Genetic Disease       | Elective             | BIO-6210              | 2            | Program                                                    |
|           | BIO-6016    | Molecular Immunology        | Elective             | BIO-6114<br>BIO-6210  | 2            | Program                                                    |
|           | BIO-6018    | Molecular Oncology          | Elective             | BIO-6114<br>BIO-6202  | 2            | Program                                                    |

\* Include additional levels (for three semesters option or if needed).

\*\* Add a table for the courses of each track (if any)



## B. Track of Biodiversity, Wildlife Conservation and Management:

| Level   | Course Code | Course Title                                   | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements<br>(Institution, College, or Program) |
|---------|-------------|------------------------------------------------|----------------------|-----------------------|--------------|------------------------------------------------------------|
| Level 1 | BIO-6100    | Statistical Analysis of Biological Data        | Required             | -                     | 3            | Program                                                    |
|         | BIO-6120    | Biodiversity Studies and Applied Ecology       | Required             | -                     | 4            | Program                                                    |
|         | BIO-6122    | Basics of Wildlife Ecology                     | Required             | -                     | 3            | Program                                                    |
|         | BIO-6124    | Environmental and Natural Resources Protection | Required             | -                     | 3            | Program                                                    |
| Level 2 | BIO-6220    | Wildlife Conservation and Management           | Required             | BIO-6122              | 3            | Program                                                    |
|         | BIO-6222    | International Environmental Policy             | Required             | BIO-6120<br>BIO-6124  | 3            | Program                                                    |
|         | BIO-6200    | Research Principles and Ethics                 | Required             | -                     | 2            | Program                                                    |
|         | BIO-6224    | Aquatic Ecotoxicology                          | Required             | BIO-6120              | 3            | Program                                                    |
|         |             | Elective 1                                     | Elective             | -                     | 2            | Program                                                    |
| Level 3 | BIO-6320    | Environmental Remote Sensing                   | Required             | BIO-6120              | 3            | Program                                                    |
|         | BIO-6322    | Field Survey Design                            | Required             | BIO-6120<br>BIO-6122  | 3            | Program                                                    |
|         | BIO-6391    | Project Planning and Writing                   | Required             | -                     | 2            | Program                                                    |
|         | BIO-6324    | Field Training Course                          | Required             | BIO-6120<br>BIO-6122  | 2            | Program                                                    |
|         |             | Elective 2                                     | Elective             | -                     | 2            | Program                                                    |
| Level 4 | BIO-6499    | Graduation Project                             | Required             | BIO-6391              | 4            | Program                                                    |



| Level     | Course Code | Course Title                                                | Required or Elective | Pre-Requisite Courses                        | Credit Hours | Type of requirements<br>(Institution, College, or Program) |
|-----------|-------------|-------------------------------------------------------------|----------------------|----------------------------------------------|--------------|------------------------------------------------------------|
|           |             |                                                             |                      |                                              |              |                                                            |
| Electives | BIO-6001    | Sustainable Development and Environmental Impact Assessment | Elective             | BIO-6120<br>BIO-6124                         | 2            | Program                                                    |
|           | BIO-6022    | Applied Environmental Biotechnology                         | Elective             | BIO-6120                                     | 2            | Program                                                    |
|           | BIO-6024    | Bio-invasion, Bio-extinction, and Alien Species             | Elective             | BIO-6120<br>BIO-6220                         | 2            | Program                                                    |
|           | BIO-6026    | Environmental Economics                                     | Elective             | BIO-6100<br>BIO-6120<br>BIO-6220<br>BIO-6222 | 2            | Program                                                    |
|           | BIO-6028    | Sustainable Development of Natural Resources                | Elective             | BIO-6120<br>BIO-6124<br>BIO-6220             | 2            | Program                                                    |
|           | BIO-6029    | Natural Resources in Arid Lands                             | Elective             | BIO-6120<br>BIO-6124                         | 2            | Program                                                    |

\* Include additional levels (for three semesters option or if needed).

\*\* Add a table for the courses of each track (if any)



### C. Track of Industrial and Environmental Biotechnology and Sustainability:

| Level   | Course Code | Course Title                             | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements<br>(Institution, College, or Program) |
|---------|-------------|------------------------------------------|----------------------|-----------------------|--------------|------------------------------------------------------------|
| Level 1 | BIO-6100    | Statistical Analysis of Biological Data  | Required             | -                     | 3            | Program                                                    |
|         | BIO-6130    | Advanced Biotechnology                   | Required             | -                     | 4            | Program                                                    |
|         | BIO-6132    | Environmental Sustainability             | Required             | -                     | 2            | Program                                                    |
|         | BIO-6134    | Biological Treatment                     | Required             | -                     | 3            | Program                                                    |
| Level 2 | BIO-6201    | Cell Culturing Technology                | Required             | BIO-6130              | 3            | Program                                                    |
|         | BIO-6202    | Techniques in Cell and Molecular Biology | Required             | BIO-6130              | 3            | Program                                                    |
|         | BIO-6234    | Industrial Microbiology 1                | Required             | -                     | 3            | Program                                                    |
|         | BIO-6200    | Research Principles and Ethics           | Required             | -                     | 2            | Program                                                    |
|         |             | Elective 1                               | Elective             | -                     | 2            | Program                                                    |
| Level 3 | BIO-6330    | Bioinformatics                           | Required             | BIO-6100              | 3            | Program                                                    |
|         | BIO-6332    | Agricultural Biotechnology               | Required             | BIO-6130              | 3            | Program                                                    |
|         | BIO-6334    | Industrial Microbiology 2                | Required             | BIO-6234              | 3            | Program                                                    |
|         | BIO-6391    | Project Planning and Proposal Writing    | Required             | -                     | 2            | Program                                                    |
|         |             | Elective 2                               | Required             | -                     | 2            | Program                                                    |
| Level 4 | BIO-6499    | Graduation Project                       | Required             | BIO-6391              | 4            | Program                                                    |



| Level     | Course Code | Course Title                                                | Required or Elective | Pre-Requisite Courses            | Credit Hours | Type of requirements<br>(Institution, College, or Program) |
|-----------|-------------|-------------------------------------------------------------|----------------------|----------------------------------|--------------|------------------------------------------------------------|
|           |             |                                                             |                      |                                  |              |                                                            |
| Electives | BIO-6000    | Bioactive Natural Compounds                                 | Elective             | BIO-61130                        | 2            | Program                                                    |
|           | BIO-6001    | Sustainable Development and Environmental Impact Assessment | Elective             | BIO-6132<br>BIO-6134             | 2            | Program                                                    |
|           | BIO-6032    | Vaccine Development                                         | Elective             | BIO-6130<br>BIO-6202             | 2            | Program                                                    |
|           | BIO-6034    | Photobiology and Photobio-stimulation                       | Elective             | BIO-6130<br>BIO-6332             | 2            | Program                                                    |
|           | BIO-6036    | Plant Environmental Physiology                              | Elective             | BIO-6130<br>BIO-6202             | 2            | Program                                                    |
|           | BIO-6038    | Biomonitoring of Ecotoxicological Risks                     | Elective             | BIO-6130<br>BIO-6132<br>BIO-6134 | 2            | Program                                                    |

\* Include additional levels (for three semesters option or if needed).

\*\* Add a table for the courses of each track (if any)

### 3. Course Specifications:

Insert hyperlink for all course specifications using NCAAA template (T-104)



## 4. Program Learning Outcomes Mapping Matrix:

Align the program learning outcomes with program courses, according to the following desired levels of performance  
(I = Introduced P = Practiced M = Mastered).

### A. Track of Cell and Molecular Biology

| Course code & No. | Program Learning Outcomes   |    |    |    |        |    |    |     |                                      |    |    |
|-------------------|-----------------------------|----|----|----|--------|----|----|-----|--------------------------------------|----|----|
|                   | Knowledge and understanding |    |    |    | Skills |    |    |     | Values, Autonomy, and Responsibility |    |    |
|                   | K1                          | K2 | K3 | K4 | S1     | S2 | S3 | --- | V1                                   | V2 | V3 |
| BIO-6100          | I                           | I  | I  |    | I      | I  | I  |     | I                                    | I  |    |
| BIO-6110          | I                           | I  | I  |    | I      | I  |    |     | I                                    | I  |    |
| BIO-6112          | I                           | I  |    | I  | I      | I  | I  |     | I                                    | I  |    |
| BIO-6114          | I                           | I  | I  |    | I      | I  |    |     | I                                    |    | I  |
| BIO-6210          | P                           | P  | P  |    | P      | P  |    |     | P                                    |    | P  |
| BIO-6201          | P                           | P  | P  |    | P      | P  |    |     | P                                    |    | P  |
| BIO-6202          | P                           | P  | P  |    | P      | P  |    |     | P                                    |    | P  |
| BIO-6200          | P                           | P  | P  |    | P      |    | P  |     | P                                    |    | P  |
| BIO-6216          | P                           | P  | P  | P  | P      |    | P  |     | P                                    | P  |    |
| BIO-6310          | M                           | M  | M  |    | M      |    | M  |     | M                                    |    | M  |
| BIO-6312          | M                           | M  | M  |    | M      |    | M  |     |                                      | M  | M  |
| BIO-6314          | M                           | M  |    | M  | M      | M  | M  |     | M                                    |    | M  |
| BIO-6391          | M                           | M  | M  | M  | M      | M  | M  |     | M                                    | M  |    |
| BIO-6499          | M                           | M  |    | M  | M      | M  | M  |     | M                                    |    | M  |
| BIO-6000          | M                           | M  |    | M  | M      | M  | M  |     | M                                    |    | M  |
| BIO-6010          | M                           | M  | M  |    | M      | M  | M  |     | M                                    |    | M  |
| BIO-6012          | M                           | M  |    | M  | M      | M  | M  |     | M                                    | M  |    |
| BIO-6014          | M                           | M  | M  |    | M      | M  | M  |     | M                                    |    | M  |
| BIO-6016          | M                           | M  | M  | M  | M      | M  | M  |     | M                                    |    | M  |
| BIO-6018          | M                           | M  |    | M  | M      | M  | M  |     | M                                    | M  |    |
| BIO-6391          | M                           | M  | M  | M  | M      | M  | M  |     | M                                    |    | M  |
| BIO-6499          | M                           | M  | M  | M  | M      | M  | M  | M   | M                                    | M  | M  |

Add a separate table for each track (if any).

## B. Track of Biodiversity and Wild Life Conservation and its Management:

Align the program learning outcomes with program courses, according to the following desired levels of performance  
(I = Introduced P = Practiced M = Mastered).

| Course code & No. | Program Learning Outcomes   |    |    |     |        |    |    |     |                                      |    |    |
|-------------------|-----------------------------|----|----|-----|--------|----|----|-----|--------------------------------------|----|----|
|                   | Knowledge and understanding |    |    |     | Skills |    |    |     | Values, Autonomy, and Responsibility |    |    |
|                   | K1                          | K2 | K3 | --- | S1     | S2 | S3 | --- | V1                                   | V2 | V3 |
| BIO-6100          | I                           | I  |    |     | I      | I  | I  |     | I                                    | I  |    |
| BIO-6120          | I                           | I  | I  |     | I      | I  |    |     | I                                    | I  |    |
| BIO-6122          | I                           | I  | I  |     | I      |    | I  |     | I                                    | I  | I  |
| BIO-6124          | I                           | I  | I  |     | I      | I  | I  |     | I                                    | I  | I  |
| BIO-6220          | P                           | P  | P  |     | P      | P  |    |     | P                                    | P  |    |
| BIO-6222          | P                           | P  |    |     | P      | P  |    |     | P                                    | P  |    |
| BIO-6200          | P                           | P  |    |     | P      | P  |    |     | P                                    |    | P  |
| BIO-6224          | P                           | P  | P  |     | P      | P  |    |     | P                                    | P  | P  |
| BIO-6320          | M                           | M  | M  |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6322          | M                           | M  | M  |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6001          | M                           | M  |    |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6022          | M                           | M  |    |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6024          | M                           | M  | M  |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6026          | M                           | M  |    |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6028          | M                           | M  |    |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6029          | M                           | M  | M  |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6391          | M                           | M  | M  |     | M      | M  |    |     | M                                    | M  |    |
| BIO-6324          | M                           | M  | M  |     | M      | M  | M  |     | M                                    | M  | M  |
| BIO-6499          | M                           | M  | M  |     | M      | M  | M  |     | M                                    | M  | M  |

### C. Track of Industrial and Environmental Biotechnology and Sustainability:

Align the program learning outcomes with program courses, according to the following desired levels of performance

(I = Introduced P = Practiced M = Mastered).

| Course code & No. | Program Learning Outcomes   |    |    |     |        |    |    |     |                                      |    |      |
|-------------------|-----------------------------|----|----|-----|--------|----|----|-----|--------------------------------------|----|------|
|                   | Knowledge and understanding |    |    |     | Skills |    |    |     | Values, Autonomy, and Responsibility |    |      |
|                   | K1                          | K2 | K3 | --- | S1     | S2 | S3 | --- | V1                                   | V2 | ---- |
| BIO-6100          | I                           | I  |    |     | I      | I  | I  |     | I                                    |    |      |
| BIO-6130          | I                           | I  |    |     | I      |    |    |     | I                                    | I  |      |
| BIO-132           | I                           |    | I  |     | I      | I  |    |     | I                                    |    |      |
| BIO-134           | I                           | I  |    |     | I      | I  |    |     | I                                    | I  |      |
| BIO-6201          | P                           | P  |    |     | P      | P  |    |     | P                                    |    |      |
| BIO-6202          | P                           | P  | P  |     | P      | P  |    |     | P                                    | P  |      |
| BIO-6234          | P                           |    | P  |     | P      | P  | P  |     | P                                    | P  |      |
| BIO-6200          | P                           |    | P  |     | P      |    | P  |     | P                                    |    |      |
| BIO-6230          | M                           | M  |    |     | M      | M  |    |     | M                                    |    |      |
| BIO-6332          | M                           |    | M  |     | M      | M  |    |     | M                                    | M  |      |
| BIO-6334          | M                           |    | M  |     | M      |    | M  |     | M                                    |    |      |
| BIO-6000          | M                           | M  |    |     | M      |    | M  |     | M                                    | M  |      |
| BIO-66001         | M                           |    | M  |     | M      | M  |    |     | M                                    |    |      |
| BIO-6032          | M                           |    | M  |     | M      |    | M  |     | M                                    | M  |      |
| BIO-6034          | M                           |    | M  |     | M      |    | M  |     | M                                    |    |      |
| BIO-6036          | M                           | M  |    |     | M      | M  |    |     | M                                    |    |      |
| BIO-6038          | M                           | M  |    |     | M      |    | M  |     | M                                    |    |      |
| BIO-6391          | M                           | M  | M  |     | M      | M  | M  |     | M                                    | M  |      |
| BIO-6499          | M                           | M  | M  |     | M      | M  | M  |     | M                                    | M  |      |



## 5. Teaching and learning strategies applied to achieve program-learning outcomes:

Describe teaching and learning strategies, to achieve the program learning outcomes in all areas.

### A. Track of Cell and Molecular Biology:

|            | NQF Learning Domains and Learning Outcomes                                                                                                                                             | Teaching Strategies                                      |  |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--|
| <b>1.0</b> | <b>Knowledge</b>                                                                                                                                                                       |                                                          |  |
| 1.1        | Describe the cell compartments with the corresponding functions in prokaryotic and eukaryotic cells and the regulating mechanisms of the various cellular bioactivities.               | Lectures<br>Class discussion<br>Assignments<br>Tutorials |  |
| 1.2        | Explain the underlying molecular mechanisms of the diverse cellular biological processes relevant to genetics, epigenetics, cell signalling, cancer development, and immune disorders. |                                                          |  |
| 1.3        | Discuss the topics of cell biology and molecular mechanistic pathways of the cells in conjunction with a wide range of cellular biochemical activities                                 |                                                          |  |
| 1.4        | Clarify the molecular basis of disorders and disease conditions including those related to carcinogenesis, mutations, and cell metabolic defects.                                      |                                                          |  |





|            |                                                                                                                                                                                           |                                                                                                                                                                    |  |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>2.0</b> | <b>Skills</b>                                                                                                                                                                             |                                                                                                                                                                    |  |
| 2.1        | Relate between the concepts of molecular biology and cell chemistry in the corresponding research applications to answer questions in the discipline of cell biology                      | <ul style="list-style-type: none"> <li>-Demonstrations</li> <li>-Tutorials</li> <li>-Group Discussion</li> <li>-Field training.</li> <li>-Lab rotations</li> </ul> |  |
| 2.2        | Write a proposal and design a plan to conduct experimental research work using modern molecular techniques to test the generated hypotheses.                                              |                                                                                                                                                                    |  |
| 2.3        | Interpret, evaluate and analyze the research data by employing critical thinking, reasoning, and the appropriate statistical analytical methods                                           |                                                                                                                                                                    |  |
| <b>3.0</b> | <b>Values</b>                                                                                                                                                                             |                                                                                                                                                                    |  |
| 3.1        | Demonstrate responsibility, accountability, and independence in performing experimental work, and actively collaborate in teamwork to achieve common research goals                       | <ul style="list-style-type: none"> <li>-Group discussion.</li> <li>-Laboratory demonstrations</li> <li>-Tutorials</li> <li>-Presentations</li> </ul>               |  |
| 3.2        | Participate effectively in scientific sessions, communicate information professionally, and present research data clearly via oral presentations and written formats to a varied audience |                                                                                                                                                                    |  |
| 3.3        | Adhere to research principles and the relevant ethical rules while performing                                                                                                             |                                                                                                                                                                    |  |





|  |                                                          |  |
|--|----------------------------------------------------------|--|
|  | research work in the field of cell and molecular biology |  |
|  |                                                          |  |

## B. Track of Biodiversity, Wild Life Conservation, and Management:

|            | NQF Learning Domains and Learning Outcomes                                                                                                                         | Teaching Strategies                                                                     |  |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--|
| <b>1.0</b> | <b>Knowledge</b>                                                                                                                                                   |                                                                                         |  |
| 1.1        | Outline the facts, concepts, principles, theories, and processes related to Biodiversity and ecosystems.                                                           | -Lectures<br>-Class discussion<br>-Assignments<br>-Tutorials                            |  |
| 1.2        | Clarify the structural and functional aspects of biodiversity and the need for its conservation.                                                                   |                                                                                         |  |
| 1.3        | Identify the procedures of wildlife conservation and its management                                                                                                |                                                                                         |  |
| <b>2.0</b> | <b>Skills</b>                                                                                                                                                      |                                                                                         |  |
| 2.1        | Employ critical and creative thinking to answer questions in different complex and familiar contexts in biodiversity, and wildlife conservation and its management | -Demonstrations<br>-Tutorials<br>-Group Discussion<br>-Field training<br>-Lab rotations |  |
| 2.2        | Write a proposal and use modern tools and appropriate field techniques to conduct                                                                                  |                                                                                         |  |





|            |                                                                                                                                                                                                              |                                                                                                                                          |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
|            | research work safely in the area of wildlife conservation.                                                                                                                                                   |                                                                                                                                          |
| 2.3        | Interpret and analyze the collected data released from the interdisciplinary research on biodiversity                                                                                                        |                                                                                                                                          |
| <b>3.0</b> | <b>Values</b>                                                                                                                                                                                                |                                                                                                                                          |
| 3.1        | Demonstrate awareness of values and ethics associated with the professional practices in biodiversity, and wildlife conservation and its management.                                                         | <ul style="list-style-type: none"> <li>-Group discussion</li> <li>-Demonstrations</li> <li>-Tutorials</li> <li>-Presentations</li> </ul> |
| 3.2        | Cooperate with diverse work teams to accomplish group activities aiming to achieve common goals                                                                                                              |                                                                                                                                          |
| 3.3        | Participate in specialized meetings and communicate scientific data effectively using the proper presentation forms and the scientific language and reasoning appropriate for different issues and audiences |                                                                                                                                          |



### C. Track of Industrial and Environmental Biotechnology and Sustainability:

|            | NQF Learning and Learning Outcomes Domains                                                                                                                             | Teaching Strategies                                                                      |  |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--|
| <b>1.0</b> | <b>Knowledge</b>                                                                                                                                                       |                                                                                          |  |
| 1.1        | Outline the facts, concepts, principles, theories, and processes related to Biotechnology and sustainability and its applications.                                     | Lectures<br>-Class discussion<br>-Assignments<br>-Tutorials                              |  |
| 1.2        | Clarify the structural and functional aspects of Biotechnology and its use to find sustainable solutions to current and future environmental issues.                   |                                                                                          |  |
| 1.3        | Identify the procedures of Industrial and Environmental Biotechnology and sustainability.                                                                              |                                                                                          |  |
| <b>2.0</b> | <b>Skills</b>                                                                                                                                                          |                                                                                          |  |
| 2.1        | Employ critical and creative thinking to answer questions in different complex and familiar contexts in Industrial and Environmental Biotechnology and sustainability. | -Demonstrations<br>-Tutorials<br>-Group Discussion.<br>-Field training<br>-Lab rotations |  |
| 2.3        | Interpret and analyze the collected data released                                                                                                                      |                                                                                          |  |



|            |                                                                                                                                                                                                         |                                                                                                                                          |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
|            | from the interdisciplinary research activities on Biotechnology.                                                                                                                                        |                                                                                                                                          |
| <b>3.0</b> | <b>Values</b>                                                                                                                                                                                           |                                                                                                                                          |
| 3.1        | Demonstrate an understanding of the values and ethics associated with professional practices in Industrial and Environmental Biotechnology and Sustainability, as well as their practical applications. | <ul style="list-style-type: none"> <li>-Group discussion</li> <li>-Demonstrations</li> <li>-Tutorials</li> <li>-Presentations</li> </ul> |
| 3.2        | Collaborate effectively with diverse work teams to accomplish group activities and achieve common goals.                                                                                                |                                                                                                                                          |

## 6. Assessment Methods for program learning outcomes:

Describe assessment methods (Direct and Indirect) that can be used to measure the achievement of program learning outcomes in all areas.

The program should devise a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least once in the program's cycle).

Program assessment is a crucial process for academic program accreditation review. It is a fundamental aspect of quality education. In the Master of Biology program, the assessment and evaluation of courses help measure the level of achievement of each learning outcome. This helps identify areas for improvement in students' performance and suggests remedial actions in consultation with concerned faculty. The results of the program assessment are used to suggest changes to curricula, course structure, and content.

Assessing program learning outcomes (PLOs) involves using direct and indirect methods. Direct methods include essays/papers, lab work, exam questions, capstone projects, performances/presentations, and portfolios of student work. Indirect methods include feedback from student assessment of the quality of teaching, student assessment of the quality of program questionnaires, faculty assessment of the quality of program questionnaires, surveys from alumni, employer and exit interviews, and periodic assessment of student learning achievements.

The mechanism of using PLOs in the improvement and development process includes evaluating and improving the quality of teaching strategies, learning resources, faculty performance, student affairs, and student services. Feedback from various sources is used to make necessary changes to ensure the program provides the best possible education to students

**Mechanism of using PLOs in improvement and development process:**

1- Learning outcomes

Formulate the intended learning outcomes

2- Teaching and learning:

Implement the teaching/learning activities that align with the intended learning outcomes and determine the corresponding assessment methods

3- Evidence of learning:

Collect the various pieces of evidence (direct/indirect and quantitative/qualitative) of achievement of learning outcomes

4- Data analysis and reporting:

Analysis and interpretation of data, identification of strengths and weaknesses, reporting results, and recommending improvements

5- Improvements plan:

Using analyzed data to improve teaching and learning quality.



## A. Track of Cell and Molecular Biology:

|            | NQF Learning Domains and Learning Outcomes                                                                                                                                             | Assessment Methods                                                                                                                                                                                                                              |  |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>1.0</b> | <b>Knowledge</b>                                                                                                                                                                       |                                                                                                                                                                                                                                                 |  |
| 1.1        | Describe the cell compartments with the corresponding functions in prokaryotic and eukaryotic cells and the regulating mechanisms of the various cellular bioactivities.               | <ul style="list-style-type: none"> <li>-Assignments (Individual or Group).</li> <li>-Class Participation</li> <li>-Quizzes</li> <li>-Written exams</li> <li>-Essays</li> <li>-Data Search</li> </ul>                                            |  |
| 1.2        | Explain the underlying molecular mechanisms of the diverse cellular biological processes relevant to genetics, epigenetics, cell signalling, cancer development, and immune disorders. |                                                                                                                                                                                                                                                 |  |
| 1.3        | Discuss the topics of cell biology and molecular mechanistic pathways of the cells in conjunction with a wide range of cellular biochemical activities                                 |                                                                                                                                                                                                                                                 |  |
| 1.4        | Clarify the molecular basis of disorders and disease conditions including those related to carcinogenesis, mutations, and cell metabolic defects.                                      |                                                                                                                                                                                                                                                 |  |
| <b>2.0</b> | <b>Skills</b>                                                                                                                                                                          |                                                                                                                                                                                                                                                 |  |
| 2.1        | Relate between the concepts of molecular biology and cell chemistry in the corresponding research applications to answer questions in the discipline of cell biology                   | <ul style="list-style-type: none"> <li>-Quizzes</li> <li>-Problem-solving questions.</li> <li>-Written exams</li> <li>-Seminars</li> <li>-Essays</li> <li>-Presentations</li> <li>-Written Assignment.</li> <li>-Laboratory Reports.</li> </ul> |  |
| 2.2        | Write a proposal and design a plan to conduct experimental research work using modern molecular techniques to                                                                          |                                                                                                                                                                                                                                                 |  |





|            |                                                                                                                                                                                           |                                                                                                                                                  |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|            | test the generated hypotheses.                                                                                                                                                            |                                                                                                                                                  |
| 2.3        | Interpret, evaluate and analyze the research data by employing critical thinking, reasoning, and the appropriate statistical analytical methods                                           |                                                                                                                                                  |
| <b>3.0</b> | <b>Values</b>                                                                                                                                                                             |                                                                                                                                                  |
| 3.1        | Demonstrate responsibility, accountability, and independence in performing experimental work, and actively collaborating in teamwork to achieve common research goals                     | <ul style="list-style-type: none"> <li>-Presentations</li> <li>-Group discussion</li> <li>-Independent lab work</li> <li>-Lab reports</li> </ul> |
| 3.2        | Participate effectively in scientific sessions, communicate information professionally, and present research data clearly via oral presentations and written formats to a varied audience |                                                                                                                                                  |
| 3.3        | Adhere to research principles and the relevant ethical rules while performing research work in the field of cell and molecular biology                                                    |                                                                                                                                                  |

## B. Track of Biodiversity, Wild Life Conservation, and Management:

|            | NQF Learning Domains and Learning Outcomes                                                                                                                         | Assessment Methods                                                                                                                                                                                                                                |  |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>1.0</b> | <b>Knowledge</b>                                                                                                                                                   |                                                                                                                                                                                                                                                   |  |
| 1.1        | Outline the facts, concepts, principles, theories, and processes related to Biodiversity and ecosystems.                                                           | <ul style="list-style-type: none"> <li>-Assignments</li> <li>-Class Participation</li> <li>-Quizzes</li> <li>-Written exams</li> <li>-Essays</li> <li>-Data Search</li> </ul>                                                                     |  |
| 1.2        | Clarify the structural and functional aspects of biodiversity and the need for its conservation.                                                                   |                                                                                                                                                                                                                                                   |  |
| 1.3        | Identify the procedures of wildlife conservation and its management                                                                                                |                                                                                                                                                                                                                                                   |  |
| <b>2.0</b> | <b>Skills</b>                                                                                                                                                      |                                                                                                                                                                                                                                                   |  |
| 2.1        | Employ critical and creative thinking to answer questions in different complex and familiar contexts in biodiversity, and wildlife conservation and its management | <ul style="list-style-type: none"> <li>- Quizzes</li> <li>- Problem-solving questions.</li> <li>- Written exams</li> <li>-Seminars</li> <li>-Essays</li> <li>-Presentations</li> <li>-Written Assignment.</li> <li>Laboratory Reports.</li> </ul> |  |
| 2.2        | Write a proposal and use modern tools and appropriate field techniques to conduct research work safely in the area of wildlife conservation.                       |                                                                                                                                                                                                                                                   |  |





|            |                                                                                                                                                                                                              |                                                                                                                                                  |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.3        | Interpret and analyze the collected data released from the interdisciplinary research on biodiversity                                                                                                        |                                                                                                                                                  |
| <b>3.0</b> | <b>Values</b>                                                                                                                                                                                                |                                                                                                                                                  |
| 3.1        | Demonstrate awareness of values and ethics associated with the professional practices in biodiversity, and wildlife conservation and its management.                                                         | <ul style="list-style-type: none"> <li>-Presentations</li> <li>-Group discussion</li> <li>-Independent lab work</li> <li>-Lab reports</li> </ul> |
| 3.2        | Cooperate with diverse work teams to accomplish group activities aiming to achieve common goals                                                                                                              |                                                                                                                                                  |
| 3.3        | Participate in specialized meetings and communicate scientific data effectively using the proper presentation forms and the scientific language and reasoning appropriate for different issues and audiences |                                                                                                                                                  |



### C. Track of Industrial and Environmental Biotechnology and Sustainability:

|            | NQF Learning Domains and Learning Outcomes                                                                                                                             | Assessment Methods                                                                                                                                                                  |  |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>1.0</b> | <b>Knowledge</b>                                                                                                                                                       |                                                                                                                                                                                     |  |
| 1.1        | Outline the facts, concepts, principles, theories, and processes related to Biotechnology and sustainability and its applications.                                     | <ul style="list-style-type: none"> <li>-Assignments</li> <li>-Class Participation</li> <li>-Quizzes</li> <li>-Written exams</li> <li>-Essays</li> <li>-Data Search</li> </ul>       |  |
| 1.2        | Clarify the structural and functional aspects of Biotechnology and its use to find sustainable solutions to current and future environmental issues.                   |                                                                                                                                                                                     |  |
| 1.3        | Identify the procedures of Industrial and Environmental Biotechnology and sustainability.                                                                              |                                                                                                                                                                                     |  |
| <b>2.0</b> | <b>Skills</b>                                                                                                                                                          |                                                                                                                                                                                     |  |
| 2.1        | Employ critical and creative thinking to answer questions in different complex and familiar contexts in Industrial and Environmental Biotechnology and sustainability. | <ul style="list-style-type: none"> <li>-Quizzes</li> <li>-Problem-solving questions.</li> <li>-Written exams</li> <li>-Seminars</li> <li>-Essays</li> <li>-Presentations</li> </ul> |  |
| 2.3        | Interpret and analyze the collected data released                                                                                                                      | Laboratory Reports.                                                                                                                                                                 |  |



|            |                                                                                                                                                                                                         |                                                                                                                                                  |  |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--|
|            | from the interdisciplinary research activities on Biotechnology.                                                                                                                                        | skills in Biology                                                                                                                                |  |
| <b>3.0</b> | <b>Values</b>                                                                                                                                                                                           |                                                                                                                                                  |  |
| 3.1        | Demonstrate an understanding of the values and ethics associated with professional practices in Industrial and Environmental Biotechnology and Sustainability, as well as their practical applications. | <ul style="list-style-type: none"> <li>-Presentations</li> <li>-Group discussion</li> <li>-Independent lab work</li> <li>-Lab reports</li> </ul> |  |
| 3.2        | Collaborate effectively with diverse work teams to accomplish group activities and achieve common goals.                                                                                                |                                                                                                                                                  |  |



## D. Thesis and Its Requirements (if any):

### 1. Registration of the thesis:

(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

Not applicable

### 2. Scientific Supervision:

(The regulations of the selection of the scientific supervisor and his/her responsibilities, as well as the procedures/mechanisms of the scientific supervision and follow-up)

Not applicable

### 3. Thesis Defense/Examination:

(The regulations for selection of the defence/examination committee and the requirements to proceed for thesis defence, the procedures for defence and approval of the thesis, and criteria for evaluation of the thesis)

Not applicable

## H. Student Admission and Support:

### 1. Student Admission Requirements:

Eligibility Criteria:

Candidates who wish to apply for the specialized program should hold a bachelor's degree in Biology from any of the recognized local universities in the Kingdom. Additionally, graduates with a bachelor's degree in Biochemistry, Microbiology, Zoology, Medical or Veterinary Medicine from recognized universities approved by the Ministry of Higher Education in the Kingdom of Saudi Arabia are also eligible to apply.

Admission Requirements:

Admission requirements refer to the qualifications and criteria that the student needs to meet to be considered for admission to the program. These requirements typically include academic prerequisites, standardized test scores, and other relevant qualifications. It is important to carefully review and meet all admission requirements before submitting an application in order to increase chances of being accepted.



Applicants who are interested in this program track should meet the following requirements:

- A bachelor's degree in biology or a related field is mandatory.
- Applicants with insufficient basic knowledge required for the program's compulsory courses will need to complete additional basic courses.
- A cumulative graduation score (cumulative GPA) of at least 3.75 (on a 5.0 cumulative scale) is mandatory.
- Grades of "B" or higher are required for undergraduate courses closely related to the specialized program.
- Candidates with at least three years of certified and approved practical and/or research experience in the field of molecular biology are exempt from the graduation score and undergraduate course grade requirements.

Employees who are admitted to this program should submit a written approval of their reference.

For all applicants, their grades should correspond to Articles 14 and 15 of the unified regulations for postgraduate studies in Saudi universities. In addition, applicants should pass the undergraduate competency test provided by the National Center for Measurement and Evaluation.

## 2. Guidance and Orientation Programs for New Students:

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

Graduates who have completed their bachelor's degree in Biochemistry, Microbiology, Zoology, Medical or Veterinary Medicine from recognized universities approved by the Ministry of Higher Education in the Kingdom of Saudi Arabia are eligible to apply. However, these graduates are required to undergo an orientation procedure to ensure their degree is equivalent to that of graduates from the local Biology programs. To achieve this, they need to study a set of complementary coursework that is determined by the program committee on a case-by-case basis.

### 3. Student Counseling Services:

(Academic, professional, psychological and social)

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level)

#### **Academic Counseling:**

The academic advising unit offers courses designed to help students develop skills that will enable them to succeed in college and make effective career and life choices. Additionally, there are special topics courses related to various areas of academic career and personal development.

Each student in the Master Biology program has an academic advisor whose primary responsibility is to provide consultation and academic support during the registration period, as well as any other time during the semester. Students can consult their advisor, Department Chair or the Dean of the College for any issues or concerns regarding their academic life. Due to the high number of biology students, the students are divided among the college for advising. The process is as follows:

- The Student Academic Counseling Committee is responsible for student counseling.
- Each Faculty member is assigned a group of students for counselling.
- Faculty members will be available for student counselling during specific office hours daily.
- Faculty members should create a file for each student in their counselling group, where they should keep and update student contact information, a copy of the student timetable, and a copy of the student's academic record every semester.

### **Career Counseling:**

The alumni unit and academic advising at Imam University offer various opportunities for students to explore and evaluate their career interests, aptitudes, skills, and other characteristics related to vocational and pre-professional planning to achieve job success. This includes career assessments and interpretations, career workshops such as CV writing, interviewing assistance, researching occupations, labour market information, and career planning. The Faculty of Science is planning to invite stakeholders from different authorities and ministries to participate as speakers in alumni celebrations and workshops.

### **Social Counseling:**

Social programs at Imam University prepare students for leadership roles in all biological aspects. This helps in the developmental process and community services to address ecological and biological difficulties.

### **Psychological Counseling:**

The faculty of science doesn't have a psychologist on campus, but if a case requires psychological guidance, it will be referred to the Academic Guidance Unit of the Deanship of Student Affairs at Imam University.

#### 4. Special Support:

(Low achievers, disabled, and talented students).

##### **Low Achievers:**

A slow learner is someone whose performance is dismal in examinations and is on the lower end of the intelligence scale. However, the only problem with them is that they learn concepts and achieve developmental milestones at a slower pace than their peers. To help slow learners, teachers can try combining a variety of tasks to their learning, even if it is not assigned, such as painting a picture, asking questions of the students while they are working on the assignment, applying the “Three Transfer” form of learning in which the student must take information and do three things with it besides reading, and rewarding complete tasks.

##### **Disabled Students:**

Disabled students are not accepted for admission to the nursing program, but in emergencies, the nursing college has wheelchairs or mobility devices as well as special corridors for these wheelchairs.

##### **Talented Students:**

Talented students are those whose skills are distinctly above average in one or more areas of human performance. They perform at or have the potential to perform at a remarkably high level of accomplishment when compared to others of the same age, experience, or environment. 'Gifted' learners are those with abilities in one or more academic subjects, whereas 'talented' learners are those with practical skills in areas such as creative and performing nursing skills. Attributes such as leadership, decision-making, and organization may also be taken into account.



### **Instructional Strategies and Activities Used with Gifted Students:**

#### **1. Design lessons with Bloom's Taxonomy**

For gifted students, construct activities from the two upper levels: creating and evaluating. For example, activities could include conducting an experiment or writing an editorial about a current events topic.

#### **2. Assign independent projects**

When gifted students finish class assignments early, allow them to work on special projects. Assign topics that are of special interest to the students and have them explore the topic in-depth.

## E. Faculty and Administrative Staff:

### 1. Needed Teaching and Administrative Staff:

| Academic Rank                         | Track             | Specialty |          | Special Requirements / Skills (if any) | Required Numbers |   |   |
|---------------------------------------|-------------------|-----------|----------|----------------------------------------|------------------|---|---|
|                                       |                   | General   | Specific |                                        | M                | F | T |
| Professor                             | Molecular Biology |           | √        | -                                      | 4                | 4 | 8 |
|                                       | Biodiversity      |           | √        | -                                      | 3                | 3 | 8 |
|                                       | Biotechnology     |           | √        | -                                      | 3                | 3 | 6 |
| Associate Professor                   | Molecular Biology |           | √        | -                                      | 2                | 2 | 4 |
|                                       | Biodiversity      |           | √        | -                                      | 2                | 2 | 4 |
|                                       | Biotechnology     |           | √        | -                                      | 2                | 2 | 4 |
| Assistant Professor                   | Molecular Biology |           | √        | -                                      | 2                | 2 | 4 |
|                                       | Biodiversity      |           | √        | -                                      | 2                | 2 | 4 |
|                                       | Biotechnology     |           | √        | -                                      | 2                | 2 | 4 |
| Technicians and Laboratory Assistants | Molecular Biology |           | √        | -                                      | 2                | 2 | 4 |
|                                       | Biodiversity      |           | √        | -                                      | 2                | 2 | 4 |
|                                       | Biotechnology     |           | √        | -                                      | 2                | 2 | 4 |
| Administrative and Supportive Staff   | Molecular Biology |           | √        | -                                      | 1                | 1 | 2 |
|                                       | Biodiversity      |           | √        | -                                      | 1                | 1 | 2 |
|                                       | Biotechnology     |           | √        | -                                      | 1                | 1 | 2 |
| Others (specify)                      | -                 | -         | -        | -                                      | -                | - | - |

## F. Learning Resources, Facilities, and Equipment:

### 1. Learning Resources:

Learning resources required by the Program (textbooks, references, e-learning resources web-based resources, etc.)

The Biology Department at the College of Science, Imam Mohammed Ibn Saud Islamic University provides an ideal environment for acquiring knowledge. The department has a mini library in addition to the main library of the university, which houses a collection of books on various disciplines of Biology. The departmental library is located on the second floor of the College of Science building. Students can borrow books from the library for up to one week and return them to allow other students to use them. The departmental quality committee keeps a copy of electronic learning resources for each course on their computer. The list of learning resources is updated and approved annually by the department council.

### 2. Facilities and Equipment:

(Library, laboratories, classrooms, etc.)

#### **Classrooms and Laboratories:**

The capacity of the departmental classrooms is enough for teaching activities, each classroom is fitted with a whiteboard and overhead projector. A scheduled course has a designated textbook, which has been approved by the department council. Students may freely adopt other references to supplement teaching material, which may include prepared lecture notes. There are several study open places on all floors, a sports activities Room, a cafeteria, and a theatre.

The Biology Department provides all necessary equipment, tools, and safety aids for undergraduate students to conduct their studies in the laboratories.

The Biology Department has several laboratories, including Botany and Biology Labs each with a capacity of 30 students. Both laboratories are equipped with Ovens, pH meters, Water Baths, Heaters, Microscopes, Heaters, Distillatories, Incubators, Balances, Centrifuges, Shakers and Magnetic Stirrers. First aid boxes are available for emergencies in each lab.





### 3. Procedures to ensure a healthy and safe learning environment:

(According to the nature of the program)

The college is committed to providing a safe and healthy campus for all, including students, faculty, staff, visitors, and the community. To achieve this, the faculty has implemented occupational health and safety programs following all the relevant government laws and regulations. Moreover, the college provides a range of healthcare services to students and staff. The University clinic is located at the main campus and is accessible to students, administrative and staff members.

Smoking is strictly prohibited in all University facilities and colleges.

First aid boxes are placed in all rooms, and the Safety Program is in place to ensure proper handling of hazardous equipment and tools, as well as hazardous waste management and disposal. The use of appropriate Personal Protective Equipment (PPE) is required to minimize exposure to hazardous materials.

The Security and Safety Committee has the responsibility of overseeing lab safety issues and reviewing relevant regulations and requirements. All areas have fire prevention guidelines posted, and emergency exit doors have sufficient signboards.

Regular announcements about security and safety instructions are made in laboratories and other areas where students gather. The Workplace Health and Safety area in the College of Science includes fire alarms, fire extinguishers, infection control policies, safe lifting procedures, physical fitness guidelines, guidelines for handling workplace hazardous materials, and guidelines for accidents, injuries, and work-related incidents.

## G. Program Quality Assurance:

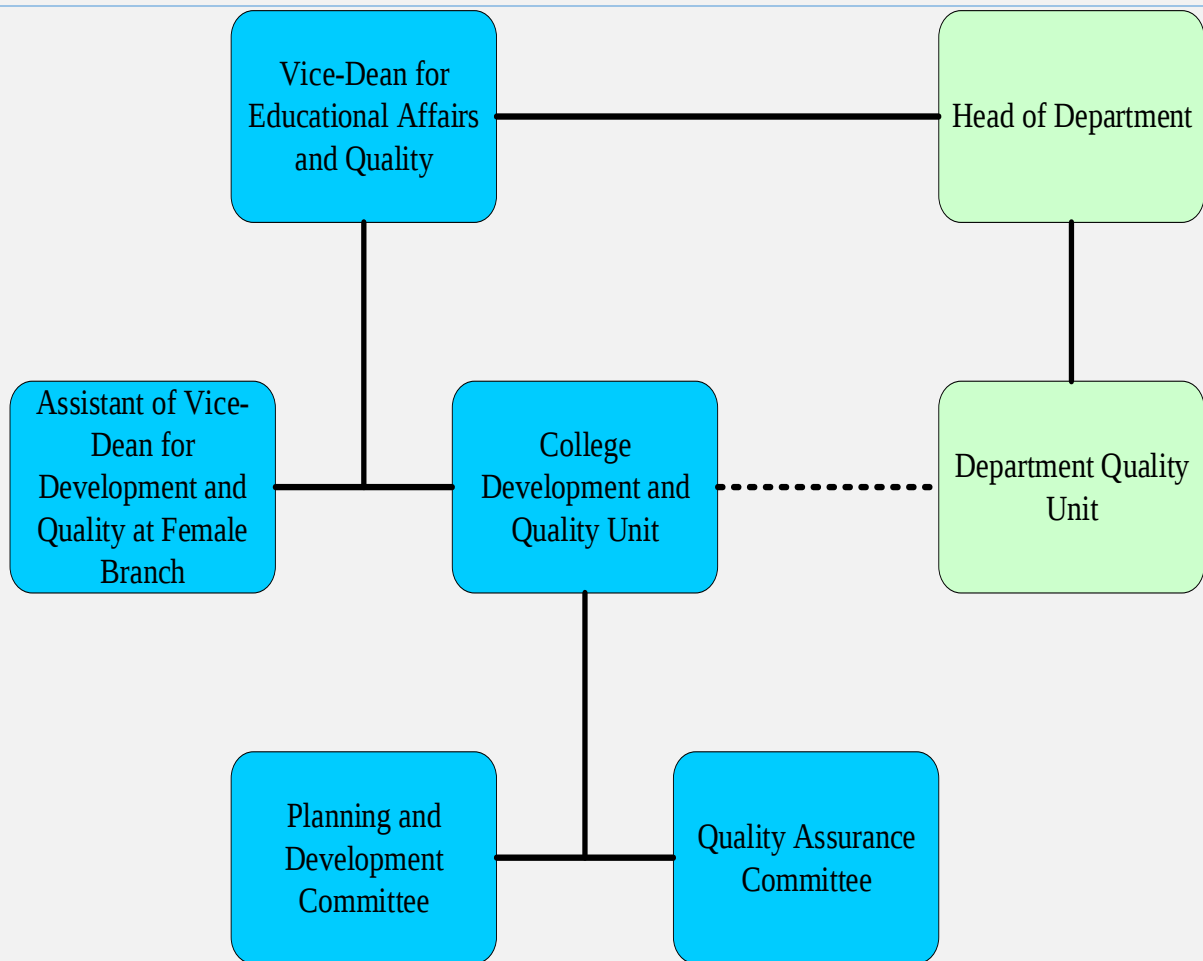
### 1. Program Quality Assurance System

Provide a link to the quality assurance manual.

The Development and Quality Unit (CDQU) at the College is responsible for overseeing the quality assurance process, which includes planning, implementation, assessment, and improvement. The CDQU is also responsible for meeting the quality requirements set by both the NCAAA and the University within the College community.

Under the vice-deanship for academic affairs and quality, CDQU is responsible for ensuring academic quality across the College, which includes managing and improving academic standards and ensuring that quality is maintained throughout. In addition, the CDQU is responsible for overseeing all accreditation committees, department committees, and associated working teams. "Quality Management" refers to the process of planning, implementing, and maintaining quality standards and practices within an organization. It involves the development of policies and procedures aimed at ensuring that products or services meet the expected quality levels. The goal of organizational quality management is to improve customer satisfaction, reduce errors and waste, and increase efficiency and productivity.





**Figure 1. Organizational Quality Management**

The College of Science's body structure and size determine the membership count. The head of the College's Development and Quality Unit is appointed by the dean. Currently, the membership consists of:

- Head of the College's Development and Quality Unit;
- Assistant of the Vice-Dean for Female Affairs;
- Assistant of the Vice-Den for Educational Affairs and Quality;
- Heads of Department Quality Units;
- Head of Statistical and Data Analysis Unit;
- Head of the College Training Unit;
- College Academic Advisors;

- Representatives of Departmental Quality Units at the Female Branch;
- Head of the Follow-up and Examinations Unit.

CDQU is responsible for overseeing the quality management of the College, which includes quality assurance. The department operates under a governance framework that emphasizes continual development and improvement. CDQU adopts a management style that involves planning, coordinating, implementing, assessing, and aligning all activities in the College with its vision and strategic goals.

A comprehensive cyclical quality process is implemented across the College and its academic programs through CDQU's consolidation of protocols, methods, and instruments in each department, ensuring teaching and learning quality.

The College considers a degree program to be a qualifying process in itself. The program specification documents provide precise definitions and descriptions of the level, aims, objectives, and learning outcomes of a program. These specifications follow the National Qualifications Framework (NQF). Additionally, NCAAA uses templates for its operations. The program and course specifications, along with their corresponding reports, are the primary sources for continuous monitoring and systematic improvement.

The program's progress and development are consistently assessed through the following procedures:

The program management receives reports on courses every semester. The appropriate committee is responsible for assessing and modifying teaching personnel. The program manager compiles and oversees the annual program report. Additionally, questionnaires are administered to students and employers to gain their perspectives on the courses and program. The recommendations submitted by the committees are evaluated by the program manager, who then decides after getting approval from the department council. The program's progress is regularly monitored through a comprehensive global assessment conducted at least once every five years.

All the previous processes follow the Teaching\Learning Quality Assurance Process Diagram.

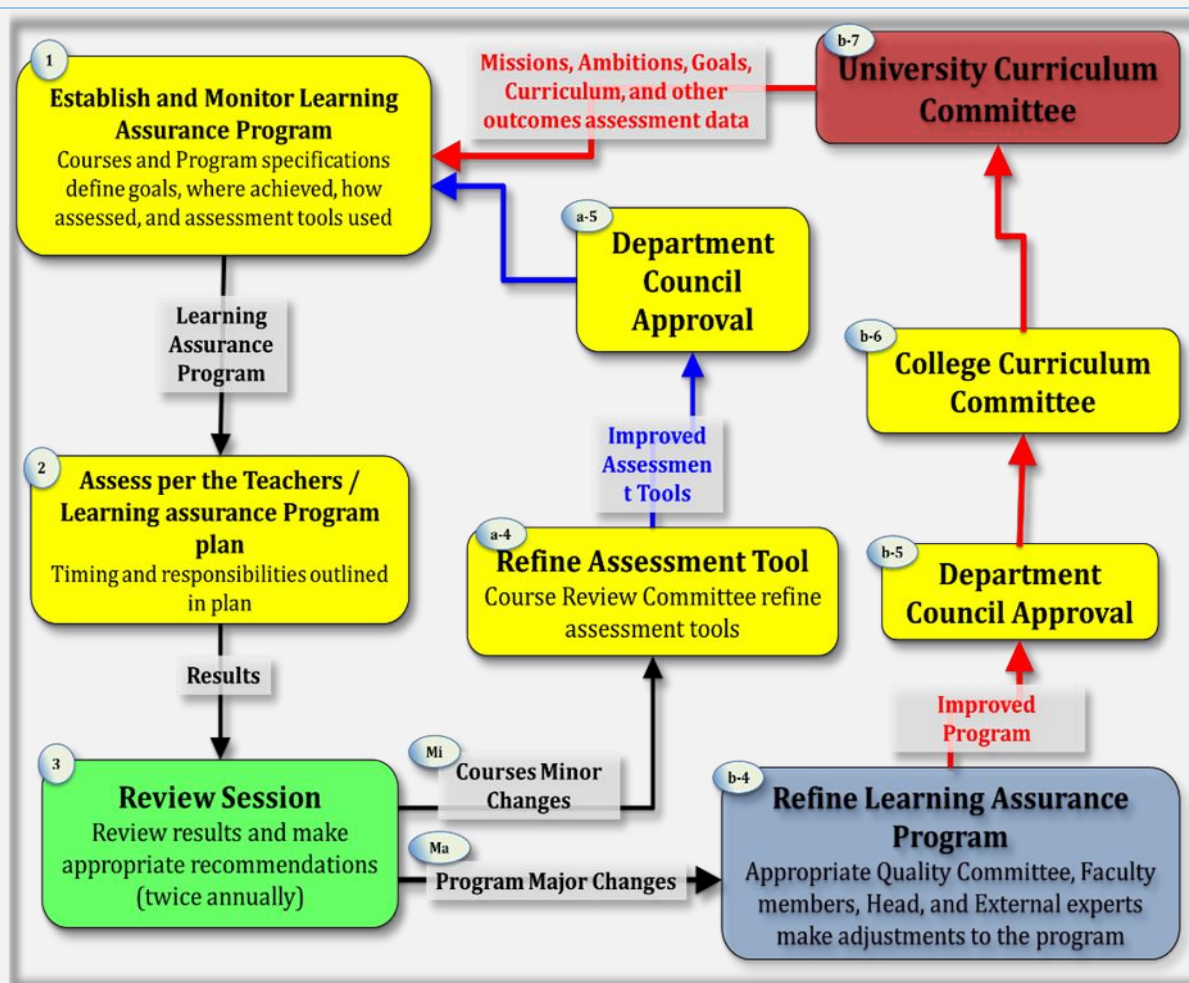


Figure 2. Teaching/Learning Quality Assurance Process Diagram.

The teaching staff plays an active role in ensuring program quality, annual evaluation, and improvement planning through various tools, including:

- Review by the Quality Department committee
- Approval of the program by the Department council
- Feedback from student course evaluations
- Course reports

- Program evaluation by the teaching staff
- Annual program reports

These tools help to monitor the quality of the program and identify areas for improvement.

## 2. Procedures to Monitor Quality of Courses Taught by other Departments

The Biology department has a set procedure that it follows to ensure that its courses meet the requirements of students enrolled in the program. This involves analyzing course specifications and effectively communicating the department's requirements to other departments. The department also collaborates regularly with other departments to evaluate their course syllabi and ensure they align with the program's criteria. Additionally, the department examines the program's professional prerequisites by analyzing surveys conducted by employers.

## 3. Procedures Used to Ensure the Consistency between Main Campus and Branches (including male and female sections).

The department has implemented specific measures to maintain consistency between the Main Campus and its Branches. Some of these measures are:

- The department assigns a coordinator for each course who covers all branches.
- All students across different branches follow the same curriculum.
- The final exam is standardized across all branches.

## 4. Assessment Plan for Program Learning Outcomes (PLOs):

Assessment Plan for Program Learning Outcomes (PLOs), and Mechanisms of Using its Results in the Development Processes

Accreditation reviews of academic programs necessitate assessment of these programs. The results of the program assessment processes are utilized to suggest improvements to curricula and courses content.

Assessment of PLOs include the following methods:

1. Direct methods:



Exam questions, essays lab work, Presentations and Portfolios of student work

2. Indirect methods:

-Feedback from Student and faculty Assessment are used to evaluate and improve quality of teaching/teaching strategies/learning resources.

-Surveys from Alumni, Employers.

### Time Plan for Assessing Program Learning Outcomes (PLOs)

| Domain                               | PLOs | 2025-2026 | 2026-2027 |
|--------------------------------------|------|-----------|-----------|
| Knowledge and Understanding          | K1   | √         |           |
|                                      | K2   | √         |           |
|                                      | K3   | √         |           |
|                                      | K4   | √         |           |
| Skills                               | S1   |           | √         |
|                                      | S2   |           | √         |
|                                      | S3   |           | √         |
| Values, Autonomy, and Responsibility | V1   |           | √         |
|                                      | V2   |           | √         |
|                                      | V3   |           | √         |

### Executive Plan for Assessing Program Learning Outcomes (PLOs)

| Domain                      | PLOs | Assessment Methods<br>(Direct and Indirect)                                                                                                              | Targeted Performance (%)                       | Implementation plan<br>How? Who? When? Where?                                                                                                                                            |
|-----------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Knowledge and Understanding | K1   | Essays, lab work, written exams, presentations, participation, student portfolios, students feedback, faculty feedback, alumni surveys, employer surveys | 85% of the students attain 70% CLO achievement | -(BIO- 6100)Student success %<br>-(BIO-6110)Student success %<br>-(BIO-6112)Student success %<br>- Program leader<br>-Program committee<br>-At the end of level 1<br>-Biology department |
|                             | K2   | Essays, lab work, written exams, presentations, participation, student portfolios, students feedback, faculty feedback, alumni surveys, employer surveys | 85% of the students attain 75% CLO achievement | -(BIO-6100)Student success %<br>-(BIO-6110)Student success %<br>-(BIO-6112)Student success %<br>- Program leader<br>-Program Committee<br>-At the end of level 1<br>-Biology department  |
|                             | K3   | Essays, lab work, written exams, presentations, participation, student portfolios, students feedback, faculty feedback, alumni surveys, employer surveys | 85% of the students attain 80% CLO achievement | (BIO- 6210)Student success %<br>-(BIO-6201)Student success %<br>-(BIO-6202)Student success %<br>- Program leader<br>-Program Committee<br>-At the end of level 2<br>-Biology department  |
|                             | K4   | Essays, lab work, written exams, presentations, participation,                                                                                           | 85% of the students attain 85%                 | BIO- 6210)Student success %<br>-(BIO-6201)Student success %<br>-(BIO-6202)Student success %<br>- Program leader                                                                          |



|                                            |    |                                                                                                                               |                                                           |                                                                                                                                                                                         |
|--------------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                            |    | student portfolios,<br>students feedback,<br>faculty feedback,<br>alumni surveys,<br>employer surveys                         | CLO<br>achievement                                        | -Program Committee<br>-At the end of level 2<br>-Biology department                                                                                                                     |
| Skills                                     | S1 | Lab work, lab<br>reports,<br>presentations,<br>students feedback,<br>faculty feedback,<br>alumni surveys,<br>employer surveys | 85% of the<br>students<br>attain70%<br>CLO<br>achievement | (BIO- 6200)Student success %<br>-(BIO-6216)Student success %<br>-(BIO-6310)Student success %<br>- Program leader<br>-Program committee<br>-At the end of level 3<br>-Biology department |
|                                            | S2 | Lab work, lab<br>reports,<br>presentations,<br>students feedback,<br>faculty feedback,<br>alumni surveys,<br>employer surveys | 85% of the<br>students<br>attain75%<br>CLO<br>achievement | BIO- 6200)Student success %<br>-(BIO-6216)Student success %<br>-(BIO-6310)Student success %<br>- Program leader<br>-Program committee<br>-At the end of level 3<br>-Biology department  |
|                                            | S3 | Lab work, lab<br>reports,<br>presentations,<br>students feedback,<br>faculty feedback,<br>alumni surveys,<br>employer surveys | 85% of the<br>students<br>attain80%<br>CLO<br>achievement | (BIO- 6312)Student success %<br>-(BIO-6314)Student success %<br>- Program leader<br>-Program Committee<br>-At the end of level 4<br>-Biology department                                 |
| Values,<br>Autonomy, and<br>Responsibility | V1 | Presentations,<br>students feedback,<br>faculty feedback,<br>alumni surveys,<br>employer surveys                              | 85% of the<br>students<br>attain70%<br>CLO<br>achievement | (BIO- 6391)Student success %<br>- Program leader<br>-Program Committee<br>-At the end of level 5<br>-Biology department                                                                 |
|                                            | V2 | Presentations,<br>students feedback,<br>faculty feedback,<br>alumni surveys,<br>employer surveys                              | 85% of the<br>students<br>attain75%<br>CLO<br>achievement | (BIO- 6391)Student success %<br>- Program leader<br>-Program Committee<br>-At the end of level 5<br>-Biology department                                                                 |



|  |    |                                                                       |                                                |                                                                                                                          |
|--|----|-----------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|  | V3 | students feedback, faculty feedback, alumni surveys, employer surveys | 85% of the students attain 80% CLO achievement | (BIO- 6110) Student success %<br>- Program leader<br>-Program Committee<br>-At the end of level 5<br>-Biology department |
|--|----|-----------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|

#### IMSIU's mission

Offering high-quality academic programs and conducting high-impact research through a stimulating environment, well-governed administrative systems, advanced technology, sustainable resources, and effective partnerships to achieve competitive outputs that would meet the needs of the labour market and contribute to building a knowledge economy and serve the local and global community.



# The Strategic Plan of Al-Imam Muhammad Ibn Saud Islamic University

## Vision

Excellence in teaching and research, and dissemination of knowledge to serve the homeland, Islam and humanity.

## Values

Moderateness - Transparency - Proactivity - Excellence  
Engagement - Sustainability - Responsibility

## Mission

Offering high-quality academic programs and conducting high-impact research through a stimulating environment, well-governed administrative systems, advanced technology, sustainable resources, and effective partnerships to achieve competitive outputs that would meet the needs of the labor market and contribute in building knowledge economy and serving the local and global community.



## Strategic Goals

### 1- Competitive, skilled and cognitively - qualified educational outputs that would meet the needs of the labor market.

#### Objectives

- a- Developing and introducing academic programs aligned with the needs of the labor market
- b- Improving the educational and digital environment that inspires creativity and excellence
- c- Enhancing students' skills in line with future professions
- d- Developing faculty skills and teaching methods
- e- Attracting and admitting the best and distinguished students

### 2- Rigorous research that contributes in advancing knowledge and fulfilling the requirements of national development.

### 3- Innovative and pioneering outputs that enhance the economy of knowledge and achieve sustainable development.

#### Objectives

- a- Developing an environment that supports and encourages research.
- b- Enhancing the research skills of faculty and students to write and publish distinguished research.
- c- Enhancing research in quantity and quality.
- d- Supporting and encouraging environmental research.
- e- Forging local and international partnerships for conducting bespoke research.
- f- Establishing an environment that supports and inspires creativity and entrepreneurship.
- g- Deploying the culture of creativity, entrepreneurship and self-employment.
- h- Encouraging creativity, entrepreneurial projects that provide national economic values.

### 4- Effective social partnerships and contributions .

### 5- Distinguished international partnerships of high impact

#### Objectives

- a- Building partnerships with private, public and no-profit organization for community and university services
- b- Offering specialized training and professional programs that meet the needs of the community
- c- Offering specialized advising services that speak to the community issues in all disciplines
- d- Contributing in the raising the community awareness about the varied empirical, social and national issues
- e- Strengthening the relationship with the alumni to serve the goals of the university and boost its local and international presence
- f- Supporting and regulating voluntary work
- g- Developing educational and research partnerships with international universities and research centers
- h- Developing and expanding centers for teaching Arabic and Islamic studies abroad
- i- Developing distance learning programs of international standards in the field of Arabic and Islamic studies.

### 6- Institutional excellence that achieves efficient and effective performance

#### Objectives

- a- Developing the institutional system for the effectivity of expenditure and quality of performance and governance of work
- b- Attracting and retaining of highly-qualified staff
- c- Developing the efficiencies and competencies of human resources
- d- Increasing women's participation in leadership and decision-making processes according to Vision 2030
- e- Augmenting and supporting technology infrastructure and digital transformation
- f- Improving and developing the work environment that inspires creativity and achievement to realize professional affiliation
- g- Developing and improving the infrastructure, facilities and quality of life in campus
- h- Achieving the highest standards of quality academically, administratively and technologically in campus

### 7- Sustainable financial resources and high levels of expenditure efficiency

#### Objectives

- a- Developing the institutional system of university revenues and investment for the quality of performance, governance of work and effectivity of expenditure
- b- Diversification and expanding the university investments

### 8- A national and Islamic icon characterized of moderation

#### Objectives

- a- Strengthening the Saudi iconic character and deepening national belonging among all affiliates
- b- Promoting the Islamic values based on moderation and tolerance

| Program's Goals | University's Goals |     |     |     |     |     |     |     |
|-----------------|--------------------|-----|-----|-----|-----|-----|-----|-----|
|                 | UG1                | UG2 | UG3 | UG4 | UG5 | UG6 | UG7 | UG8 |
| PG1             | √                  |     |     |     |     |     |     |     |
| PG2             |                    | √   |     |     |     |     |     |     |
| PG3             |                    |     | √   |     |     |     | √   |     |
| PG4             | √                  |     |     |     |     | √   |     | √   |
| PG5             |                    |     | √   |     |     |     |     |     |
| PG6             |                    |     |     | √   |     |     |     |     |
| PG7             |                    | √   |     | √   |     |     |     |     |
| PG8             |                    |     |     |     | √   |     |     |     |

### Map University's Goals with the Program's Goals

| Map University's Goals with the Program's Goals |                 |                    |     |     |     |     |     |     |     |
|-------------------------------------------------|-----------------|--------------------|-----|-----|-----|-----|-----|-----|-----|
| PLOs                                            | Program's Goals | University's Goals |     |     |     |     |     |     |     |
|                                                 |                 | UG1                | UG2 | UG3 | UG4 | UG5 | UG6 | UG7 | UG8 |
| K1                                              | PG1             | √                  |     |     |     |     |     |     |     |
| K2                                              | PG2             |                    | √   |     |     |     |     |     |     |
| K3                                              | PG3             |                    |     | √   |     |     |     |     |     |
| S1                                              | PG4             | √                  |     |     |     |     |     |     |     |
| S2                                              | PG5             |                    |     | √   |     |     |     |     |     |
| S3                                              | PG6             |                    |     |     | √   |     |     |     |     |
| V1                                              | PG7             |                    | √   |     | √   |     |     |     |     |
| V1                                              | PG8             |                    |     |     |     | √   |     |     |     |

### College Mission

Providing an academic environment for students to be productive and successful in their careers, and directing scientific research on community and labor market issues.

#### Map College's Goals with the Program's Goals

| College's Goals                                                                                      | PGs      |
|------------------------------------------------------------------------------------------------------|----------|
| CG1. Prepare qualified graduates with high scientific skills to suit the labour market requirements. | PG1, PG4 |
| CG2. Create new graduate degree programs and expand bachelor's programs.                             | PG3, PG5 |
| CG3. Maintain excellence in scientific research.                                                     | PG2, PG7 |
| CG4. Develop learning resources.                                                                     | PG1, PG4 |
| CG5. Develop learning resources.                                                                     | PG1, PG4 |

#### Map College's Goals with University's Goals

|     | UG1 | UG2 | UG3 | UG4 | UG5 | UG6 | UG7 | UG8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CG1 | √   | √   | √   | √   |     |     |     |     |
| CG2 | √   | √   | √   |     |     |     |     |     |
| CG3 | √   | √   | √   |     | √   | √   |     | √   |
| CG4 | √   |     | √   |     |     |     | √   |     |
| CG5 | √   |     | √   |     |     |     |     |     |

#### Map College's Goals with the Program's Goals

| Map Collage's Goals with the Program's Goals |                 |                 |     |     |     |     |
|----------------------------------------------|-----------------|-----------------|-----|-----|-----|-----|
| PLOs                                         | Program's Goals | Collage's Goals |     |     |     |     |
|                                              |                 | CG1             | CG2 | CG3 | CG4 | CG5 |
| K1                                           | PG1             | √               |     |     | √   | √   |
| K2                                           | PG2             |                 |     | √   |     |     |
| K3                                           | PG3             |                 | √   |     |     |     |
| S1                                           | PG4             | √               |     |     | √   | √   |
| S2                                           | PG5             |                 | √   |     |     |     |
| S3                                           | PG6             | √               |     |     |     |     |
| V1                                           | PG7             |                 |     | √   |     |     |
| V2                                           | PG8             |                 |     | √   |     |     |

The program's learning outcomes are in line with the National Qualifications Framework (NQF). Additionally, each course has its own unique learning outcomes which correspond with the program's learning outcomes.

There is an internal quality assurance system in place to ensure continual improvement in the program's quality, which includes learning outcomes and program requirements.

The Biology Department's Council follows the quality standards mandated by NCAAA and the University's Quality Process, in partnership with the Biology Department Quality Unit.

The course coordinator is responsible for evaluating the exam formats and learning objectives outlined in the program specification for each particular course.

The Biology Department's Council reviews and approves the views and comments provided by the Advisory Committee.

The assessment of learning outcomes is conducted annually using primary Key Performance Indicators (KPIs) authorized by the college council. The outcomes are documented in the annual report along with improvement strategies, taking into account feedback from course reports, student feedback, questionnaires, employers' feedback, external assessors for the program and exams, and the minutes of the advisory committee.

In summary, the learning outcomes of the program comply with the National Qualifications Framework (NQF), and each course has its learning outcomes that align with the program's learning outcomes. The program's quality is assured through an internal quality assurance system, and the Biology Department adheres to quality standards set by NCAAA and the University. Regarding the course folder, the course coordinator is responsible for evaluating the exam formats and learning objectives outlined in the program specification for each specific course.

The Biology Department's Council deliberated and approved the views and comments provided by the Advisory Committee.

The college council authorizes primary Key Performance Indicators (KPIs) to assess learning outcomes annually. Improvement strategies are recorded in the annual report, taking into account :

- feedback.
- course reports,
- student feedback,
- questionnaires,
- employers' feedback,
- external assessors for the program and exams,
- and minutes of the advisory committee.

In addition, all of these points were discussed in the Department's Council, and measures for improvement were proposed and implemented.

#### External Assessor:

The purpose of evaluating courses leading to program reviews is to communicate several aspects to the department head, in addition to the independent external assessor report.

- ✓ Quality of teaching;
- ✓ Learning activities;
- ✓ Course delivery methods;
- ✓ Course content;
- ✓ Teaching Strategies;
- ✓ Methods of assessment;
- ✓ Achievement of CLOs;
- ✓ Adequacy of facilities and resources.

A review of all student remarks, comments, and evaluations regarding the courses was conducted by the Airman and discussed in the Department's Council.

#### Self-Study Report of the Program:

Every five years.



### Evidence

- ✓ Courses reports.
- ✓ Feedback from the course reports.
- ✓ External assessor reports for the program and exams.
- ✓ The advisory committee minutes.
- ✓ the Biology Department's Council
- ✓ The external assessor report.
- ✓ The reply on the external assessor report.
- ✓ The analysis of the student questionnaires about the courses.
- ✓ An annual report.
- ✓ The summary of the program's annual report.
- ✓ The results of the student's questionnaires.
- ✓ The results of the graduate questionnaires.
- ✓ The results of the employer's questionnaires.

### **Program Assessment Process and Tools**

The Biology Department's Council evaluates the program's learning outcomes as defined in the Program and Courses requirements, determines the degree to which the program meets its objectives, and provides evidence to support ongoing improvements.

Assessment of learning outcomes involves:

- systematically gathering information about students' learning activities,
- providing ongoing assessment feedback,
- and using data to improve instruction, student learning, development, and departmental efficiency.

The course coordinator submits a course report to the program manager after each semester for every course in the program, with the report being relayed through the Head of Department.

The annual report for the program should cover its mission, goals, objectives, anticipated outcomes, assessment tools, results, improvement initiatives, and resource needs.

To improve teaching and learning quality, the Biology Department Council implements a new model.

- Mission and goals;
- College strategic plan goals;
- Key Performance indicators;
- Assessment procedures;
- Continuous improvement;
- Action plans with resources.

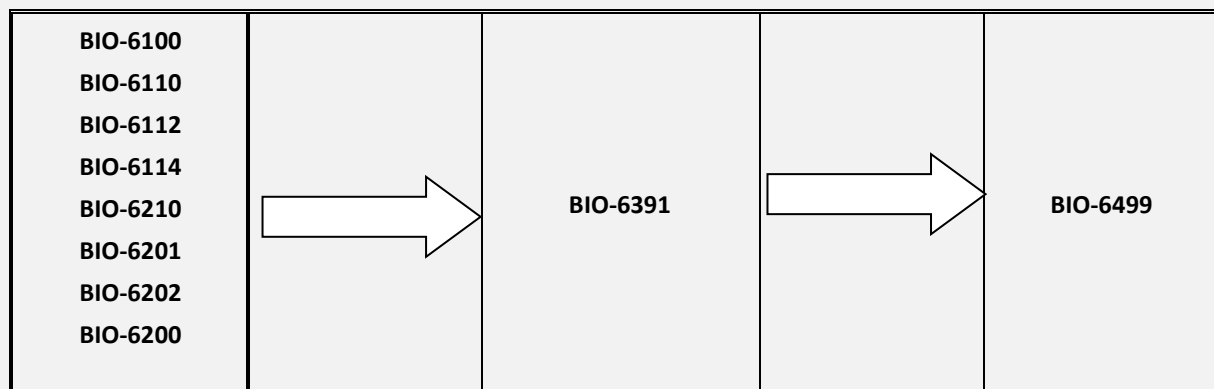




### Program Goal 1

| Goal Code                   | Statement                                                                                                                                                                                                                |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PG 1                        | To be one of the distinguishable biology programs that follow the recent procedures in science education in compliance with the Kingdom's major strategies and plans as well as the standards of reference universities. |
| Specific LOs to be assessed | Describe the cell compartments with the corresponding functions in prokaryotic and eukaryotic cells and the regulating mechanisms of the various cellular bioactivities.                                                 |
|                             | Explain the underlying molecular mechanisms of the diverse cellular biological processes relevant to genetics, epigenetics, cell signalling, cancer development, and immune disorders.                                   |
|                             | Outline the facts, concepts, principles, theories, and processes related to Biodiversity and ecosystems.                                                                                                                 |
|                             | Clarify the structural and functional aspects of biodiversity and the need for its conservation.                                                                                                                         |
|                             | Outline the principles, facts, concepts, and theories relevant to Biotechnology and sustainability and describe the processes of its applications.                                                                       |
|                             | Clarify the structural and functional aspects of Biotechnology and its use to find sustainable solutions to current and future environmental issues.                                                                     |

### Program Goal 1 Assessment flow



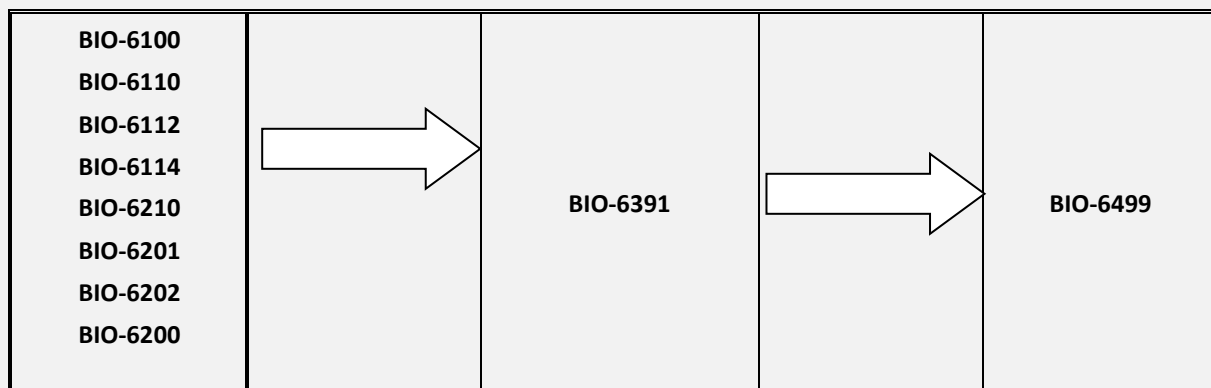
### Program Goal 2





| Goal Code                   | Statement                                                                                                                                              |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| PG 2                        | To be one of the outstanding contributors to enhancing creation and innovation in the field of biology.                                                |
| Specific LOs to be assessed | Discuss the topics of cell biology and molecular mechanistic pathways of the cells in conjunction with a wide range of cellular biochemical activities |
|                             | Clarify the molecular basis of disorders and disease conditions including those related to carcinogenesis, mutations, and cell metabolic defects.      |
|                             | Identify the procedures of wildlife conservation and its management                                                                                    |
|                             | Explain the various procedures related to the discipline of Industrial and Environmental Biotechnology and sustainability.                             |

Program Goal 2 Assessment flow



**Program Goal 3**

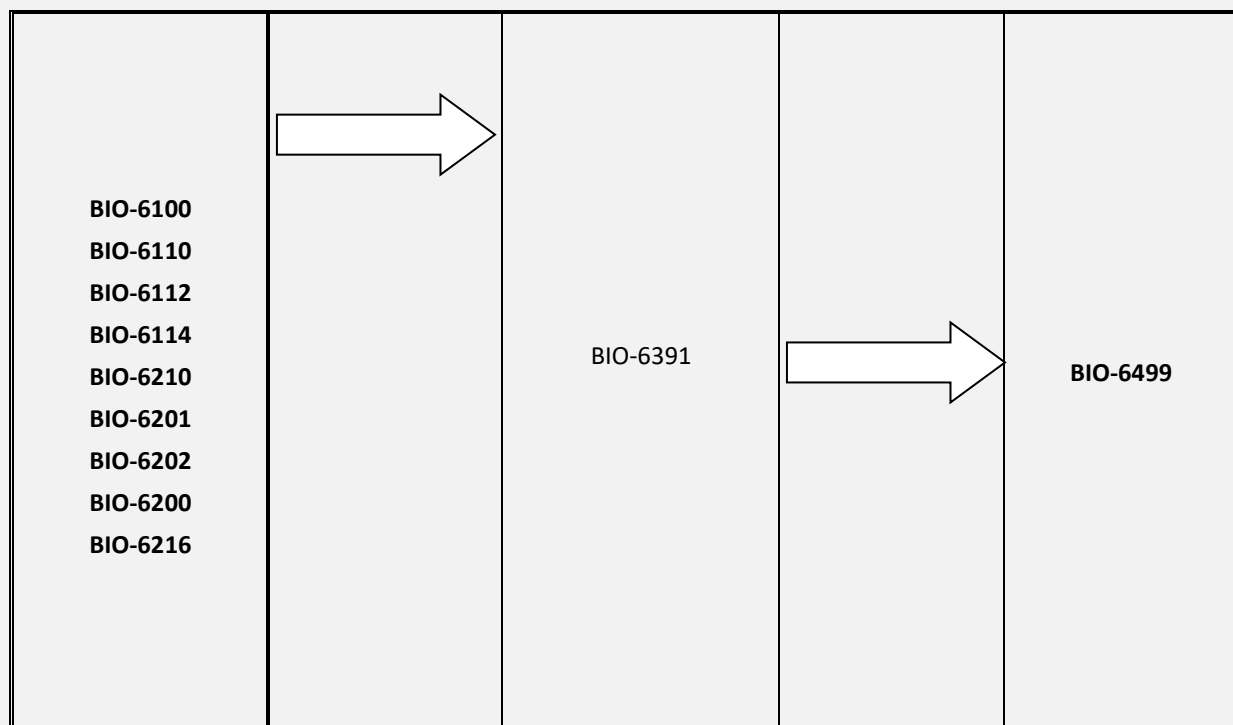
| Goal Code | Statement |
|-----------|-----------|
|-----------|-----------|





|                             |                                                                                                                                                                        |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PG 3                        | To equip the students with recognizable and applicable knowledge that allows them to practice biosciences professionally.                                              |
| Specific LOs to be assessed | Relate between the concepts of molecular biology and cell chemistry in the corresponding research applications to answer questions in the discipline of cell biology   |
|                             | Employ critical and creative thinking to answer questions in different complex and familiar contexts in biodiversity, and wildlife conservation and its management     |
|                             | Employ critical and creative thinking to answer questions in different complex and familiar contexts in Industrial and Environmental Biotechnology and sustainability. |

Program Goal 3 Assessment flow



**Program Goal 4**

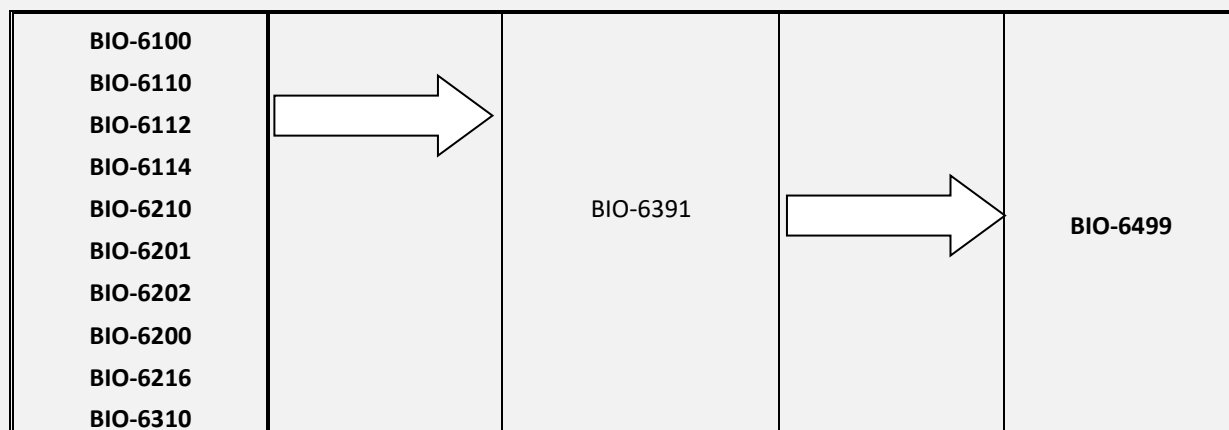
| Goal Code | Statement |
|-----------|-----------|
|-----------|-----------|





|                             |                                                                                                                                                            |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PG 4                        | To allow the students to acquire distinct practical skills that enable them upon successful completion of the program to compete for professions and jobs. |
| Specific LOs to be assessed | Write a proposal and design a plan to conduct experimental research work using modern molecular techniques to test the generated hypotheses.               |
|                             | Interpret, evaluate and analyze the research data by employing critical thinking, reasoning, and the appropriate statistical analytical methods            |
|                             | Write a proposal and use modern tools and appropriate field techniques to conduct research work safely in the area of wildlife conservation.               |
|                             | Write a proposal and use modern tools and appropriate field techniques to conduct research work safely in the area of Biotechnology and sustainability.    |

Program Goal 4 Assessment flow

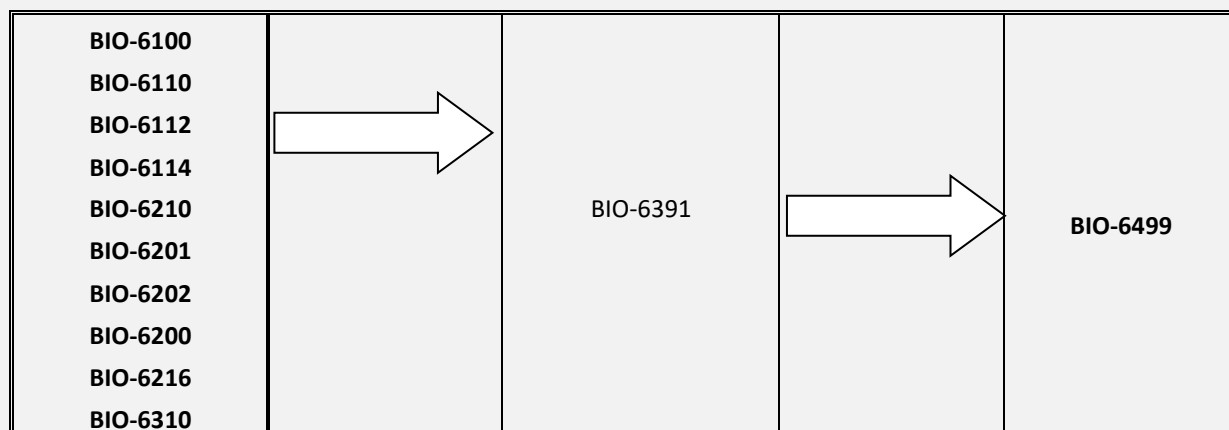


**Program Goal 5**



| Goal Code                   | Statement                                                                                                                                                                                                 |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PG 5                        | To provide the students with wide knowledge and reliable technical skills that constitute the essential base for them to be admitted to one of the Ph.D. programs in local or international universities. |
| Specific LOs to be assessed | Interpret, evaluate and analyze the research data by employing critical thinking, reasoning, and the appropriate statistical analytical methods                                                           |
|                             | Interpret and analyze the collected data released from the interdisciplinary research on biodiversity                                                                                                     |
|                             | Interpret and analyze the collected data released from the interdisciplinary research activities on Biotechnology.                                                                                        |

Program Goal 5 Assessment flow



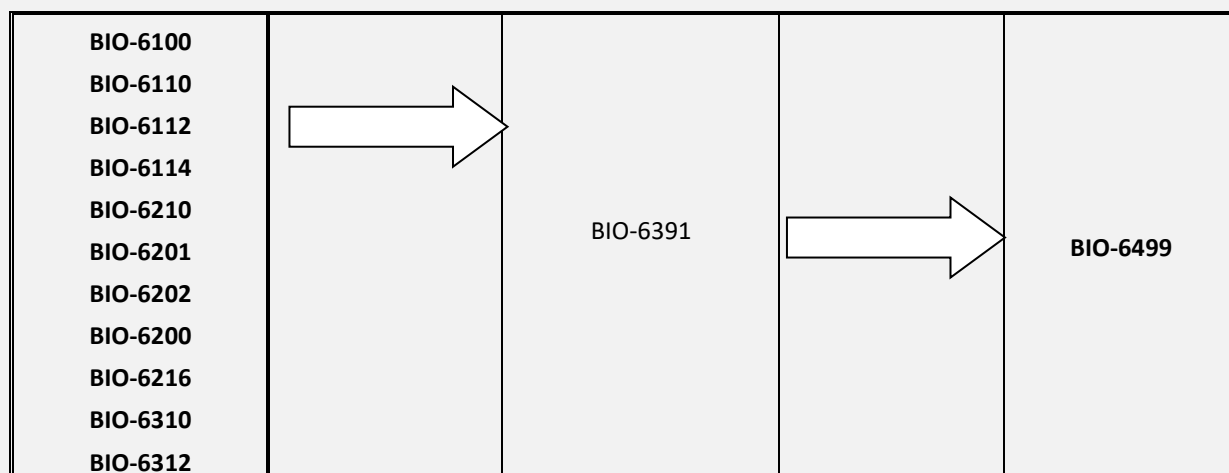
**Program Goal 6**

| Goal Code                   | Statement                                                                                                                                                                                                                                     |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PG 6                        | To be one of the profound resources that provide the community with highly qualified graduates to meet the demands of the labor market and the various community sectors including educational, health, industrial, and agricultural sectors. |
| Specific LOs to be assessed | Write a proposal and design a plan to conduct experimental research work using modern molecular techniques to test the generated hypotheses.                                                                                                  |
|                             | Interpret, evaluate and analyze the research data by employing critical thinking, reasoning, and the appropriate statistical analytical methods                                                                                               |
|                             | Interpret and analyze the collected data released from the interdisciplinary research on biodiversity                                                                                                                                         |



Interpret and analyze the collected data released from the interdisciplinary research activities on Biotechnology.

Program Goal 6 Assessment flow

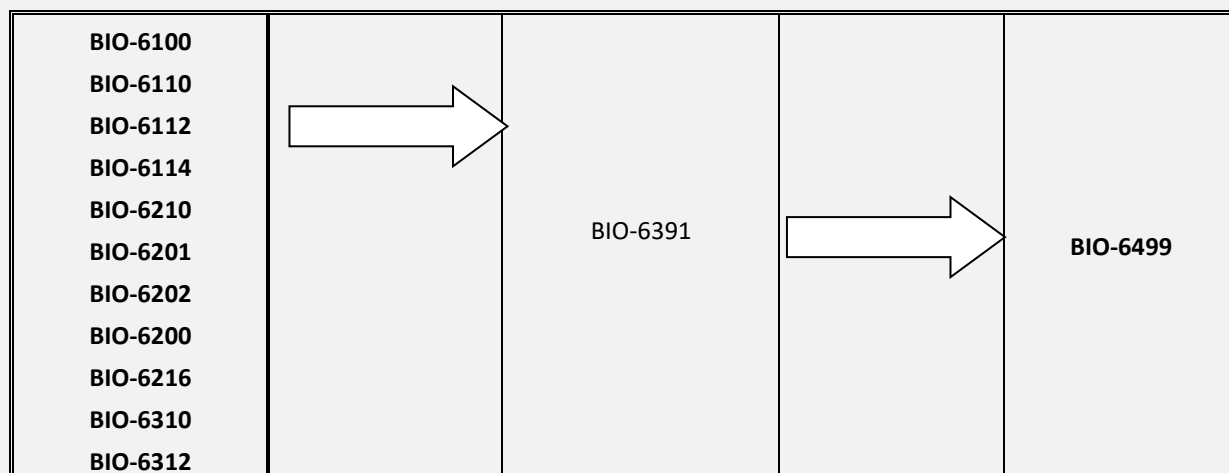


**Program Goal 7**

| Goal Code                   | Statement                                                                                                                                                                                                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PG 7                        | To be one of the outstanding resources that provides the scientific community with competent researchers who possess the recognizable experience to share effectively in the progress of biology research. |
| Specific LOs to be assessed | Demonstrate responsibility, accountability, and independence in performing experimental work, and actively collaborate in teamwork to achieve common research goals                                        |
|                             | Demonstrate awareness of values and ethics associated with the professional practices in biodiversity, and wildlife conservation and its management.                                                       |
|                             | Demonstrate an understanding of the values and ethics associated with professional practices in Industrial and Environmental Biotechnology and Sustainability, as well as their practical applications.    |

Program Goal 7 Assessment flow

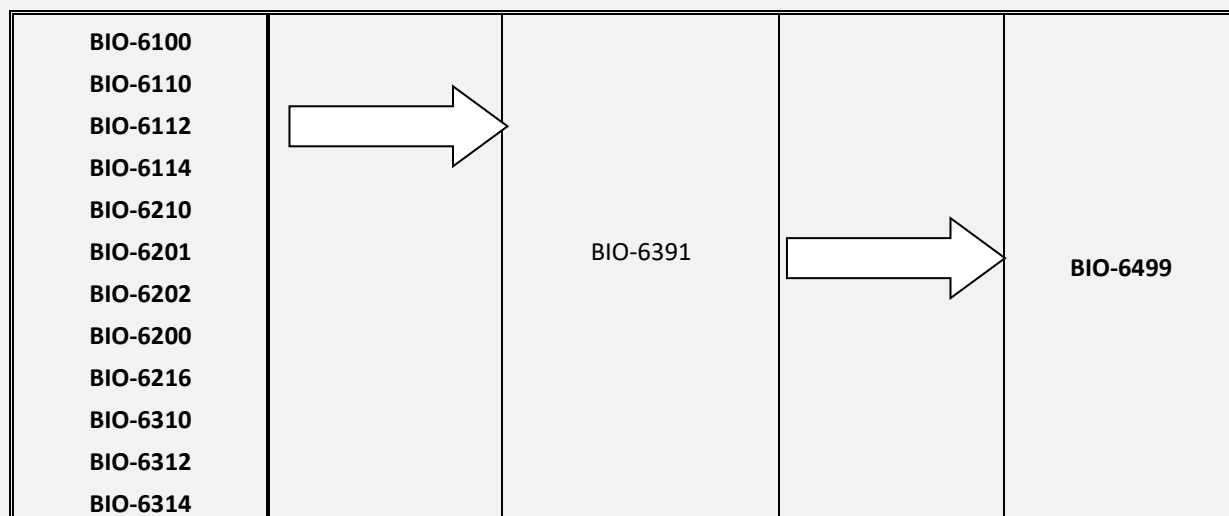




### Program Goal 8

| Goal Code                   | Statement                                                                                                                                                                                                    |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PG 8                        | To build effective local and international partnerships in terms of collaborative research work and reciprocal activities.                                                                                   |
| Specific LOs to be assessed | Demonstrate responsibility, accountability, and independence in performing experimental work, and actively collaborate in teamwork to achieve common research goals                                          |
|                             | Participate effectively in scientific sessions, communicate information professionally, and present research data clearly via oral presentations and written formats to a varied audience                    |
|                             | Participate in specialized meetings and communicate scientific data effectively using the proper presentation forms and the scientific language and reasoning appropriate for different issues and audiences |
|                             | Collaborate effectively with diverse work teams to accomplish group activities and achieve common goals.                                                                                                     |





## 5. Program Evaluation Matrix

| Evaluation Areas/Aspects               | Evaluation Sources/References | Evaluation Methods | Evaluation Time          |
|----------------------------------------|-------------------------------|--------------------|--------------------------|
| Effectiveness of teaching & assessment | Students                      | Surveys            | End of the academic year |
| Learning resources                     | Students                      | Surveys            | End of semesters         |
| External assessor                      | Faculty                       | Reports            | End of the academic year |
| Leadership                             | Graduates                     | Surveys            | End of the academic year |

**Evaluation Areas/Aspects** (e.g., leadership, effectiveness of teaching & assessment, learning resources, services, partnerships, etc.)

**Evaluation Sources** (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others.)

**Evaluation Methods** (e.g., Surveys, interviews, visits, etc.)

**Evaluation Time** (e.g., beginning of semesters, end of the academic year, etc.)

Program evaluation is a process that involves collecting and analyzing data to determine the effectiveness and efficiency of educational programs. The results of these evaluations are used to



enhance the quality of higher education, provide feedback to students, professors, and administrators, and ensure that the program, policies, curriculum, departments, and institutions are functioning as intended and generating positive outcomes.

To gain a comprehensive understanding of the program's impact, program assessment employs both direct and indirect metrics.

Direct measures, such as papers, projects, and tests, are frequently used to assess students' knowledge.

Indirect measures are utilized to gauge the perceptions, beliefs, and attitudes of individuals towards the program.

**The policy for program evaluation includes the following:**

1. Planning
  - Identify the purpose
  - Identify stakeholders
  - Identify resources of the program
2. Understanding Program Design
  - Describe the program's objectives and outcomes
  - Identify programmatic activities
  - Connect the objectives of the program with the activities and outcomes
3. Design the Evaluation Plan
  - Determine the scope of the evaluation
  - Find or develop measures to collect data
  - Write an evaluation plan
4. Conduct the evaluation
  - Gather the data
  - Analyze the data
  - Report the results to program stakeholders
5. Revise the program and/or evaluation plan for continuous improvement.

The Program Improvement Plan is designed to enhance the quality of a program by recognizing its strengths and weaknesses. Performance indicators such as students' feedback on their learning experience and job skills, as well as evaluations from external organizations, can provide



valuable insights. On the other hand, low test scores and a low percentage of students securing employment or progressing to other programs can highlight areas that require improvement.

To enhance the program and accomplish well-defined objectives, a program improvement plan is implemented. This plan comprises the essential actions to attain the desired outcomes and enables constant monitoring of the progress made towards those objectives. Through the collection and analysis of assessment data, the program improvement plan facilitates the continuous enhancement of the program's quality of service.

## 7. Program KPIs:\*

The period to achieve the target ( 2 ) year(s).

|                       | No. | KPIs Code | KPIs                                                                  | Targeted Level | Measurement Methods                                                                                                                                                | Measurement Time       |
|-----------------------|-----|-----------|-----------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Teaching and Learning | 1   | KPI-PG-1  | Students' Evaluation of Quality of learning experience in the Program | 4              | Average overall program rating for the learning experience of final-year students on a five-point scale in an annual survey.                                       | At the end of semester |
|                       | 2   | KPI-PG-2  | Students' evaluation of the quality of the courses                    | 4.5            | Average students rated the quality of courses on a five-point scale in an annual survey.                                                                           | At the end of semester |
|                       | 3   | KPI-PG-3  | Students' evaluation of the quality of academic supervision           | 4              | Average students rated scientific supervision quality on a five-point scale annually.                                                                              | At the end of semester |
|                       | 4   | KPI-PG-4  | Average time for students' graduation                                 | 4              | What is the average number of semesters it takes for students to graduate from the program?                                                                        | At the end of semester |
|                       | 5   | KPI-PG-5  | Rate of students dropping out of the program                          | 0              | What percentage of students in a cohort did not complete the program?                                                                                              | At the end of semester |
|                       | 6   | KPI-PG-6  | Employers' evaluation of the program graduates' competency            | 4              | Annual survey results show the average competency rating of program graduates on a five-point scale, as rated by their employers.                                  | At the end of semester |
| Students              | 7   | KPI-PG-7  | Students' satisfaction with services provided                         | 4              | The annual survey measures student satisfaction with program services including food, transportation, sports facilities, and academic advising on a 5-point scale. | At the end of semester |





|                       | No. | KPIs Code | KPIs                                                   | Targeted Level | Measurement Methods                                                                                                                                                                       | Measurement Time       |
|-----------------------|-----|-----------|--------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Faculty               | 8   | KPI-PG-8  | Ratio of students to faculty members                   | 1:4            | Ratio of students to full-time and full-time equivalent faculty members participating in the program.                                                                                     | At the end of semester |
| Research and Projects | 9   | KPI-PG-9  | Percentage of publications of faculty members          | 70%            | The percentage of faculty members with at least one published research paper during the year in the program, compared to the total number of faculty members in the program.              | At the end of the year |
|                       | 10  | KPI-PG-10 | Rate of published research per faculty member          | 3              | The average number of research papers published by each participating faculty member per year (total number of research papers published divided by the total number of faculty members). | At the end of the year |
|                       | 11  | KPI-PG-11 | Citations rate in refereed journals per faculty member | 10             | The ratio of total citations in refereed journals from published research to the total published research for faculty members.                                                            | At the end of the year |
|                       | 12  | KPI-PG-12 | Percentage of students' publication                    | 50%            | During the year, the percentage of students who published their research in refereed journals and presented papers in conferences is calculated and reported.                             | At the end of the year |





|  | No. | KPIs Code  | KPIs                                                             | Targeted Level | Measurement Methods                                                                                                                             | Measurement Time       |
|--|-----|------------|------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
|  |     |            |                                                                  |                |                                                                                                                                                 |                        |
|  | 13  | KPI- PG-13 | Number of patents, innovative products, and awards of excellence | 3              | Annually, the students and staff of the program obtain national and international excellence awards as well as innovative products and patents. | At the end of the year |

\*including KPIs required by NCAAA

## H. Specification Approval Data:

|                     |  |
|---------------------|--|
| Council / Committee |  |
| Reference No.       |  |
| Date                |  |

