- **المعايير القومية الأكاديمية المرجعية(NARS) لبرنامج الكيمياء الحيوية (منفرد التخصص)**

**1. General Attributes of the Graduates of Biochemistry program**

The graduates of the Biochemistry program must be able to:

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| **Attributes of the Graduates of Basic Sciences** | 1.1. Recognize the role of Basic Sciences in the development of society.<br>1.2. Develop scientific approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.<br>1.3. Utilize scientific facts and theories to analyze and interpret practical data.<br>1.4. Collect, analyze, and present data using appropriate formats and techniques.<br>1.5. Postulate concepts and choose appropriate solutions to solve problems on scientific basis.<br>1.6. Apply effectively information technology relevant to the field.<br>1.7. Participate effectively in a multidisciplinary teamwork and be flexible for adaptation, decision making and working under contradictory conditions as well as exhibiting the sense of beauty and neatness.<br>1.8. Adopt self and long life-learning and participate effectively in research activities.<br>1.9. Deal with scientific data in Arabic, English or other languages. |
| **Attributes of the Graduates of the Biochemistry program** | 1.1. Be acquainted with the molecular basis and chemistry of the processes that take place in cells and organisms.<br>1.2. Work safely in a laboratory environment and possess the basic competencies necessary for a range of practical biochemical techniques.<br>1.3. Apply statistical skills in manipulation and presentation of biochemical data.<br>1.4. Analyze biochemical data to characterize biomolecules and assess the activity of biochemical processes. |

## 2. Knowledge and Understanding

The graduates of the Biochemistry program must be able to demonstrate the knowledge and understanding of:

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| **NARS for Basic Sciences Graduates** | 2.1. The related basic scientific facts, concepts, principles and techniques.<br>2.2. The relevant theories and their applications.<br>2.3. The processes and mechanisms supporting the structure and function of the specific topics.<br>2.4. The related terminology, nomenclature and classification systems.<br>2.5. The theories and methods applied for interpreting and analyzing data related to discipline.<br>2.6. The developmental progress of the program-related knowledge.<br>2.7. The relation between the studied topics and the environment. |
| **NARS for Biochemistry program Graduates** | 2.1. The fundamentals of sciences relevant to biochemistry especially chemistry, physics and mathematics.<br>2.2. The basic knowledge of the molecular biosciences, including biochemical processes, genetics, molecular biology and cell biology.<br>2.3. The principles and limitations of practical techniques, and methods related to biochemical investigations.<br>2.4. The structures, assemblies and functions of biological macromolecules and how they conduct and control the biochemical processes.<br>2.5. Mechanisms of the key metabolic reactions involved in the biochemical processes as well as the relation between biochemistry and cellular and organismal processes.<br>2.6. The key processes involved in the control of arrangement and expression of genes.<br>2.7. The important biochemical features that distinguish plants from animals. |

**3. Practical and Professional Skills**

The graduates of Biochemistry program must be able to:

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| **NARS for Basic Sciences Graduates** | 3.1. Plan, design, process and report on the investigated data, using appropriate techniques and considering scientific guidance.<br>3.2. Apply techniques and tools considering scientific ethics.<br>3.3. Solve problems using a range of formats and approaches.<br>3.4. Identify and criticize the different methods used in addressing subject related issues. |
| **NARS for Biochemistry program Graduates** | 3.1. Use advanced biochemical techniques and methods relevant to the molecular biosciences in a safe, logistical and ethical manner.<br>3.2. Conduct standard laboratory procedures involved in biochemical analysis and synthetic work as well as industrial applications.<br>3.3. Consider variations inherent in dealing with biological materials such as sample size, accuracy, calibration and precision.<br>3.4. Use computational packages and statistics in data handling and manipulation of biochemical information. |

**4. Intellectual Skills**

The graduates of Biochemistry program must be able to:

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| **NARS for Basic Sciences Graduates** | 4.1. Differentiate between subject-related theories and assess their concepts and principles.<br>4.2. Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.<br>4.3. Develop lines of argument and appropriate judgments in accordance with scientific theories and concepts.<br>4.4. Postulate and deduce mechanisms and procedures to handle scientific problems.<br>4.5. Construct several related and integrated information to confirm, make evidence and test hypotheses. |

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| **NARS for Biochemistry program Graduates** | 4.1. Use computational softwares in simulation studies to understand, confirm and optimize his/her practical techniques.<br>4.2. Integrate and link information across different approaches studied in different areas of biochemistry.<br>4.3. Classify and elucidate mechanisms of biochemical processes.<br>4.4. Analyze biochemical data to identify and determine Biochemical Structures. |

**5. General and Transferable Skills**

The graduates of Biochemistry program must be able to:

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| **NARS for Basic Sciences Graduates** | 5.1. Use information and communication technology effectively.<br>5.2. Identify roles and responsibilities, and their performing manner.<br>5.3. Think independently, set tasks and solve problems on scientific basis.<br>5.4. Work in groups effectively; manage time, collaborate and communicate with others positively.<br>5.5. Consider community linked problems, ethics and traditions.<br>5.6. Acquire self- and long life–learning.<br>5.7. Apply scientific models, systems, and tools effectively.<br>5.8. Deal with scientific patents considering property right.<br>5.9. Exhibit the sense of beauty and neatness. |

أستاذ ورئيس القسم

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