

## **MSc in Biochemistry**

**(By coursework and thesis)**

### **Requirements for obtaining a master's degree in biochemistry:**

To obtain a master's degree in biochemistry, the student must complete at least (34) accredited units, including the master's thesis, and they are distributed as follows:

- A. (8) accredited units for compulsory courses.
- B. (16) units of accredited elective courses.
- C. (10) credit hours for master's thesis.

The following is a breakdown of the materials:

#### **A- Compulsory academic Courses (8) Accredited Units:**

Course ID	Course Name	Units
BIOC 601	Communication in Biochemistry	1
BIOC 602	Experimental Techniques in Biochemistry	2
BIOC 603	Computer Applications in Biochemistry	2
BIOC 604	Biostatistics	2
BIOC 695	Research Seminar	1

#### **B- Elective academic courses (16) credit hours:**

Under the guidance of the supervisor and the approval of the department head, the student selects a total of (16) accredited units from the following elective courses.

Course ID	Course Name	Units
BIOC 621	Enzymology	2
BIOC 622	Biochemistry of Toxins	2
BIOC 623	Regulation of Metabolism	2
BIOC 624	Nutrition	2
BIOC 631	Biochemistry of Antibiotics	2
BIOC 632	Microbial Biochemistry	2
BIOC 633	Biochemistry of Viruses	2
BIOC 641	Molecular Biochemistry	2
BIOC 642	Proteins Structure and Function	2
BIOC 643	Biochemical Genetics	2
BIOC 644	Physical Biochemistry	2
BIOC 651	Biotechnology	2
BIOC 652	Isotopes in Biochemistry	2
BIOC 653	Biochemical Immunology	2
BIOC 654	Porphyrins and Bile Pigments	2
BIOC 696	Special Topics in Biochemistry	2

#### **C - Thesis (10) credit hours:**

Course ID	Course Name	Units
BIOC 699	Thesis	10

Course No.	Course Title
	<b>A- Compulsory Courses: (8units)</b>
BIOC 601	The goal of this course is to provide a survey about the important sources of the biochemical literature and, classification systems and retrospective searches in the field.
	The goal of this course is to bring the student in contact with basic and modern techniques in the field of practical biochemistry.
BIOC 602	Subject include basic and modern techniques for the isolation, purification and characterization of biological molecules. Application of these techniques on selected biological samples.
	This course deals with computer applications in biochemistry.
BIOC 603	Subjects include application of computer in enzyme kinetics, nucleic acid and protein sequences, analysis of mass protein fragments and analysis of electrophoresis patterns.
	The aim of the course is to apply the law of statistics in biochemical researches.
BIOC 604	Subjects include experimental design, describing and summarizing the data, estimation and hypothesis tests, the analysis of variance, analysis of regression and correlation and the analysis of categorical data.
BIOC 695	Seminar
	<b>B- Elective Courses: (16units)</b>
	The goal of this course is to understand the chemical and physical basis of enzyme catalysis, and enzyme applications.
BIOC 621	Subjects include extraction and purification of enzyme, enzyme Kinetics, metal ions and coenzymes in enzyme catalysis and medical and pharmaceutical application of enzyme.
	The goal of this course is to provide extensive knowledge on the biochemical basis of toxicity
BIOC 622	Subjects include basic concepts in toxicology, history and branches, dose-response curves, statistically defined expression in toxicology, classification of toxicants and their modes of action, mutagens, teratogens, and carcinogens, phytotoxins, zootoxins, and environmental toxicants.
	The purpose of this course is to provide a thorough description of the mechanisms of metabolic regulation.
BIOC 623	Subjects include regulation of carbohydrate metabolism, regulation of glucose transport and metabolism, hormonal action in metabolic control, regulation of metabolism in starvation and obesity, and regulation of metabolism in diabetes mellitus.
	This course offers an overview to the fundamental concepts of nutrition.
BIOC 624	Subjects include: An overview of nutrition, food choices and diet planning guides, diet and health, functional foods, antioxidants, food-drug interactions, genetically modified food.
	The goal of this course is to provide extensive knowledge on the modes of action of some important antibiotics.
BIOC 631	Subjects include general properties of antimicrobial drugs, disruption of bacterial cell wall biosynthesis, inhibition of protein biosynthesis, inhibition of nucleic acid biosynthesis, interference with the metabolic pathways and the biochemical basis of resistance.
	This course deals with some aspects of microbial biochemistry and use of microorganisms in biotechnology.
BIOC 632	Subjects include microorganisms and biotechnological processes, fermentation technology, production of pharmaceuticals, microbial enzymes, biotechnology and the production of food, and environmental biotechnology.
	The course addresses basic principles of biochemistry of viruses.
BIOC 633	Subjects include structure, nomenclature, taxonomy and replication of viruses, viral transformation, antigenic properties, natural host range, diagnostic.
BIOC 641	The goal of this course is to provide an in-depth survey of the present state knowledge in molecular biology.

	Subjects include nucleic acids structure, nucleic acids extraction and purification, preparation of mRNA, polymerase chain reaction (PCR), analysis and cloning of PCR products, recombinant DNA technology cDNA library.
BIOC 642	The goal of this course is to provide knowledge on the structure, function and modification of protein. Subjects include levels of protein structure, protein post-translational modification, protein stability and folding, protein sources, protein purification and characterization, therapeutic proteins, protein used for analytical proposes.
BIOC 643	The course deals with the structure, transmission and expression of the genetic materials. Subjects include: the structure of genetic materials, regulation of gene expression in prokaryotic and eukaryotic cells, somatic recombination and antibody diversity, biochemistry in heal the and diseases, and trinucleotide repeat diseases.
BIOC 644	The aim of the course is to give the physical basis for a thorough understanding of the structure, organization, dynamic and regulation of biological systems. Subjects include cell environment, conformation of biological macromolecules, the molecular forces, techniques for the study of biological structure and function, ligand interactions, and regulation of biological activity.
BIOC 651	This course deals with the application of recombinant DNA and DNA cloning in biotechnology. Subjects include the concepts of recombinant DNA and cloning, preparation of recombinant DNA, vectors, gene transfere, cloning, application of recombinant DNA technology, tissues and cell culture and biotechnology.
BIOC 652	The aim of the course is to understand the principle of radioactive properties of the isotopes and how it can be used in biochemical experiments. Subjects include: the nature of radioactive decay, measurement of radioactivity, isotope dilution and reverse isotope dilution, radio immunoassay, determination of metabolic pathways, autoradiography, and radioactive labeling of DNA, RNA and proteins.
BIOC 653	The aim of the course is to understand the structure and function of the immune system. Subjects include origin of the immune system, types of immunity, antigen and antibodies, the immune response, immunity diseases, and immunoassay techniques.
BIOC 654	The aim of this course is to study the chemistry and types of porphyrin and metalporphyrin. The subjects include: Macromolecules containing porphyrin, hemoglobins, erythocruorins, myoglobins, cytochromes, catalases and tryptophan pyrrolase. The study also includes spectrum of porphrins and metalloporphyrin and the effect of metal types on the spectrum and their importance in different biological processes in different organisms.
BIOC 696	The goal of this course is to bring the student in contact with advanced scientific knowledge in the field of biochemistry Selected up to date topics in the different areas of biochemistry will be presented by biochemist staff every semester.
BIOC 699	Thesis